



NO ONE LEFT BEHIND

D5.5 – Report and findings from experimental pilot in Spain

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LIST OF ABBREVIATIONS

NOLB	No One Left Behind
WP	Work Package
PMD	Project Management Dashboard
SaFa	Sagrada Familia
PEMAR	Programa de mejora del aprendizaje y rendimiento
KPI	Key Performance Indicator
CV	Curriculum Vitae
ATT	Attractiveness
PQ	Pragmatic
HQ-I	Identity
HQ-S	Stimulation

EXECUTIVE SUMMARY

This deliverable presents the planning and the execution of the Spanish pilot. The description of the context of the pilot and methodology for the evaluation of the “No One Left Behind” project will be presented. Two schools have been participating into the Spaniard pilot: the SaFa Úbeda and the SaFa Puerto de Santa Maria.

This document is organized in 6 chapters.

Chapter 1: Introduction. It provides a brief overview of the No One Left Behind Spanish pilots, its structure and its results. Following the deliverable 5.2 we have carried out a preliminary setting-up of the pilot, we have made meeting and focus group with teachers and schools’ directors in order to start using the Pocket Code app with teachers and students.

Chapter 2: Characterization of the pilot. It describes the main scenario of the pilot. The schools, the teachers, the pupils, the infrastructures. The Spanish context was planned to address immigration. What we have done is focus the school context in different collectives. What we have found in the pilot is that there were no immigrant students but only few students’ belongings to different cultures that were sons of immigrants. Our school don’t provide us the information about the parents of each students for privacy.

Chapter 3: The Spanish work plan. It matches the pilot planned activities with the performed works. The workplan of the Spanish pilot started with focus group with teachers in order to set up with then the educational domain where Pocket Code after and Create@School have been applied, it follows with tutorial and training with teachers and Student and, finally it is based on a two cycle experimental follow up of the pilot where we have periodically trained teachers and students on the new tools we have been providing along the project (Pocket Code, Create@School, Project Management Dashboard, etc..).

Chapter 4: Result of the pilot. It provides an overview of the evaluation methodology used in the pilot and the details of the outcomes. The main objective of this chapter is to provide to the reader a set quantitative and qualitative data that later will be discussed and interpreted. In order to be as much objective as possible we have used the AttrakDiff questionnaires based on the Hassenzhal model. The AttrakDiff tools is a well-known tool used for evaluating the usability and design of an interactive product.

Chapter 5: Discussions and conclusions. In this chapter the data of the chapter 4 are analysed, the findings of the pilot are discussed taking into the context of the pilot. Conclusions and future improvements are presented.

Chapter 6: References. It provides the bibliography that have been used in the document.

1 INTRODUCTION

The Spanish education system follows traditionally an instructivist approach [1]. One of the objectives of the Spanish pilot is the sensibilization and the introduction of a starting point for a behavioural change through a constructive methodology [2], applied in our pilot schools.

This task is very hard to reach, because almost all the teachers, that have been participating in the Spanish pilot are teachers with years of experience that have already almost all the material for their classes. They apply these materials, repetitively years by years, in their classes.

The application of a new constructivist approach has to match within the teachers' contents, it has to be introduced step by step and it has to be integrated within the teaching methodology they are familiar with, without replacing it.

Through focus groups, meetings, tutorials and Game Jam we have been able to convince our teachers that the new generation of Pocket Code will be an essential part of their teaching material at schools in the future. Within the first phases of the two cycle experiment approach used in the No One Left Behind, the teachers of all the pilots gave us, through a co-design process, the specifications of the new generation of Pocket Code, the Create@School application.

Within the Spanish pilot, Create@School was also a very useful tool in order to break barriers related to the different mother languages spoken by pupils belonging to different collectives. Through working group in class and the ability of Create@School to be used in different languages there were no significant differences within pupils belonging to different collectives and the rest of the classes.

In the Spanish pilot there was also a strong usage of the Project Management Dashboard (PMD)[3], which is a teacher side tool, where each teacher can create assignments for Create@School. The PMD has the advantage that pupils can upload Create@School programs through the app and make them available to the teachers within the Create@School web player.

Following in the document, there will be described the Spanish pilot context, will be showed the results about Create@School and PMD, and finally, these results will be discussed.

2 THE CHARACTERIZATION OF THE PILOT

2.1 *The participant schools, teachers and students*

In Spain, two schools located in two different Andalusian cities (Úbeda and Puerto de Santa María) at the south of Spain have participated in the pilots. Both schools belong to the SaFa Foundation: SaFa Úbeda [4] and SaFa San Luis Gonzaga [5].

The Spanish pilot targets classrooms that have a group of children that follow a Compensatory School Program, as they are at risk of social exclusion. SaFa Foundation has provided classes which gather about 20% of children that are not currently reaching their full potential, as they come from highly differentiated collectives (e.g. immigrants).

Preparatory Cycle (January – December 2015)

During the first months of the project data collection has been done. This data comprises schools/teachers/students as well as curricula and lesson plans. In order to familiarise teachers and students with Pocket Code basic tutorials were implemented into the different courses through several workshops.

1st Innovative Cycle (January - July 2016)

The 1st innovation cycle has allowed the customization of Pocket Code and the generation of the first templates/modules for customisation into the curriculum topics. This cycle has also allowed introduce Pocket Code in the following curricula subjects: sciences, free disposition, maths and PEMAR.

School Site	Course	Age	Teacher Technical Background	Subject	Students	Teen Girls	Teen Boys	In exclusion
Puerto Santa María	4 ESO	15-16	No	Mathematics	30	14	16	5
	3 ESO	14-15	No	PEMAR – Mathematics & Sciences	13	7	6	3
	2 ESO	13-14	Yes	Mathematics	30	13	17	4
Úbeda	3 ESO	14-15	No	Sciences Methods	12	5	7	2
	2 ESO	13-14	Yes	Free disposition	12	6	6	3
	6th EPO	11-12	No	Sciences	25	12	13	6
	5th EPO	10-11	No	Sciences	24	9	15	5

Table 1. 1st Innovative Cycle data

2nd Innovative Cycle (September 2016 – June 2017)

During this cycle Create@School has been validated and refined. The curricula subjects in which has been used are: computing, maths, sciences, programming basics, biology, geology, language, free disposition and social sciences.

School Site	Course	Age	Teacher Technical Background	Subject	Students	Teen Girls	Teen Boys	In exclusion
Puerto Santa María	4 ESO	15-16	Yes	Computing	17	8	9	3
	3 ESO	14-15	No	Mathematics	20	9	11	3
	2 ESO	13-14	No	Sciences	9	3	6	1
	1 ESO	12-13	No	Maths	11	5	6	1
Úbeda	4 ESO	15-16	No	Programming basics	30	13	17	5
	3 ESO	14-15	No	Programming basics	16	7	9	2
	1 ESO	12-13	No	Maths, Biology and Geology	21	9	12	3
	1 ESO	12-13	Yes	Free Disposition	12	5	7	1
	6th EPO	11-12	No	Language, Maths, Social and Sciences	26	12	14	4

Table 2. 2nd Innovative Cycle data

General Overview

Tables 2 and 3 describe all the data collected in the Spanish pilot. For each Innovative Cycle this data has been gathered: school site, course, students’ age, teacher’s technical background, subject, number of students, number of teen girls, number of teen boys and number of students in risk of exclusion.

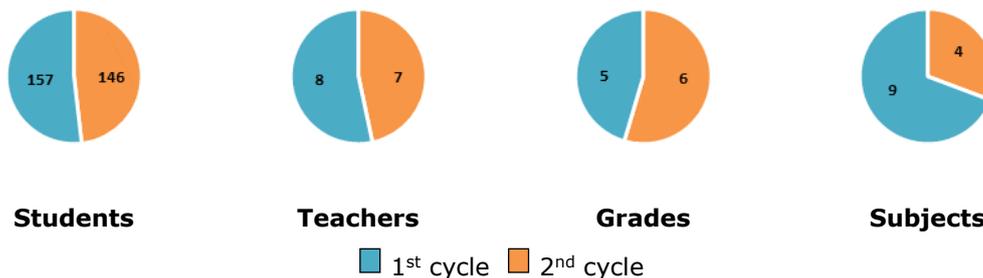


Table 3. Spanish Pilot general overview data

2.2 Co-participative development of Create@School

The students and teachers' recommendations have been essentials in defining the specifications of Create@School and the PMD. Over the course of the co-creation sessions in schools, requirements have been collected for the creation and improvement of new tools developed.

During the first months of the project, Pocket Code was neither simple to use nor intuitive. There was a need to invest much time to obtain really easy developments, which led us to define the templates or modules within the project. In this way, we could improve the efficiency in the production of games and increase the motivation of the users. Teachers have collaborated in the co-creation process of Create@School as well as Project Management Dashboard platform. However, students' feedback has been focused on the New Generation of Pocket Code, i.e., Create@School.

In the first meetings with teachers and SaFa Foundation members some Pocket Code new functionalities have been proposed regarding their needs:

- Shared Pocket Code programs only visible for a selected group of users. For example, if a teacher wants to share his program only with his pupils.
- Classified database according to subjects/topics/courses. They are based on JClick platform, which is an educational content classifier.
- Pocket Code could move to a Web environment?
- The development of new components: balloon text, edit text.

After that sessions and during the co-creation process the teachers expressed their impressions about some functionalities that seemed to be very useful for them and Pocket Code did not include it:

- Better control of uploaded projects to the Pocket Code Server; as different programs will crash when uploaded with the same program name.
- Copy and paste instructions between different objects.
- Clarify some brick actions; for example, the difference between "Set" and "Change" actions in the variables is not understood.
- Be able to manipulate input and output
- The object is hidden by default
- Modify the text brick "change" by "add" or by a more intuitive word
- To offer the possibility to draw figures by coding

As a result of the workshops, interviews and surveys in the pilot sites, concretely the Spanish ones, we have participated in the co-creation process of Create@School as well as the Project Management Dashboard. Thanks to the feedback, recommendations and suggestions provided by the users has been possible to create two learning tools for the education sector. These tools are really useful for teachers and students that helps them to improve their knowledge every day in a different way.

2.2.1 Templates created in Spain

First versions of the templates were developed in the first cycles of the project. Figures 4, 5, 6, 7 and 8 show some screenshots from Pocket Code programs developed in Spain; they have been selected not just for their look&feel but also for its useful for learning.

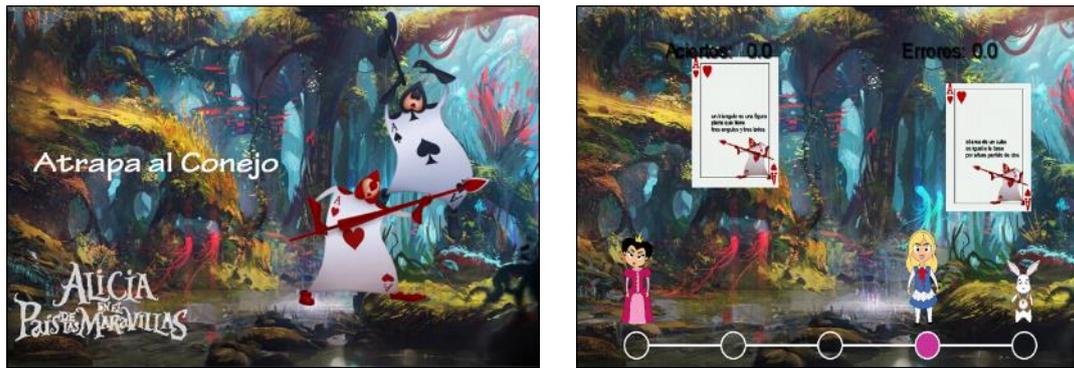


Figure 1. Pocket Code Quiz Game – Maths

The algebraic wheel is a game used to explain to the teachers and students how to create a game with all its elements: title, instruction, game, end game screen, “the shape of a game”.

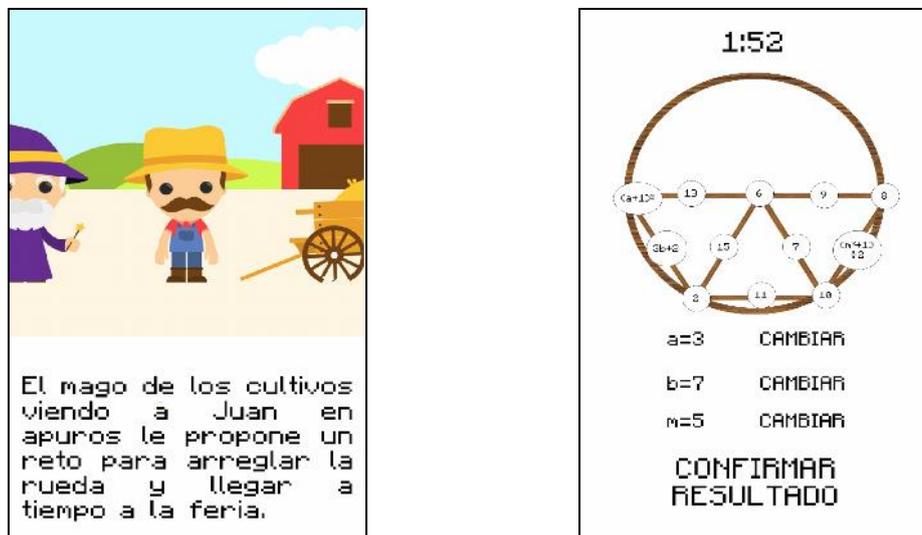


Figure 2. Pocket Code Puzzle Game - Maths

The action shooter game was oriented to learn the difference between the vertebrates and invertebrate animals. The most interesting aspect is that it could be used in any other subject; for example, in shooting prime numbers, shooting viruses and leaving red blood cells free, etc. It was also the first attempt in including HUD elements through the simulation with variables.



Figure 3. Pocket Code Action Game – Sciences

They are easily customized and several academic curriculums can be adapted to them in order to reuse the resources and learn by coding. For example, the adventure game about the photosynthesis is easily customizable just changing the backgrounds and the logic of the answers according to the contents.



Figure 4. Pocket Code Adventure Game - Sciences

These games have served as inspiration in the design and the creation of the templates and the new generation of Pocket Code. Figure 8, the interactive book, was the first attempt to generate a customizable book in the project.



Figure 5. Pocket Code - Interactive Book

In the project 13 final templates or modules have been created in three cycles: October 2016, February 2017, and May 2017. To summarize three out of 13 templates were developed in Spain although the first versions of each template were collected by the TU Graz. In order to have a similar look&feel the usability team and partners were redesigning the graphics, restructuring the programs, and performing iterative feedback rounds. In the following their description and screenshots.

Action shooter template

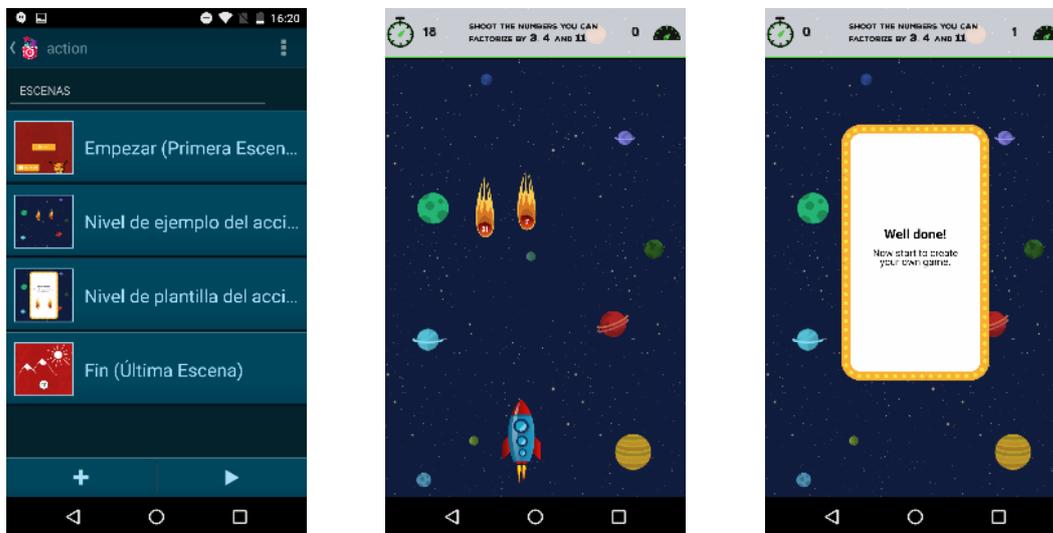


Figure 6. Action shooter template

The Action Shooter Template is a game template that include some sort of weapon. In this template there is a spaceship that is able to shot laser beams against comets. The spaceship movements are entangled to the X axis of the mobile inclination, rotating the mobile phone on the left or on the right, around its X axis, the spaceship moves to the left or to the right.

The template also includes a set of head-up display (HUD) elements that show to the player the remaining time to play, its points and a short description of the objective of the game. This template comes with a demo level, which is about factoring numbers by 3, 4 and 11. When the gameplay of the level starts, the player has to shot to the comets that come with a number label. If this label is divisible by 3, 4 or 11, the player collects a point, if the player shots to a wrong label he loses a point.

The learning objective of this demo level is to provide a playable environment where a pupil can practise with applying in mind the rules of factorization in less time as possible. The pupils have not to be worry about the game mechanics and dynamics, just by changing rules and labels, this constructivist approach of the demo level, can be used in almost all curricula subjects.

Interactive Book Template

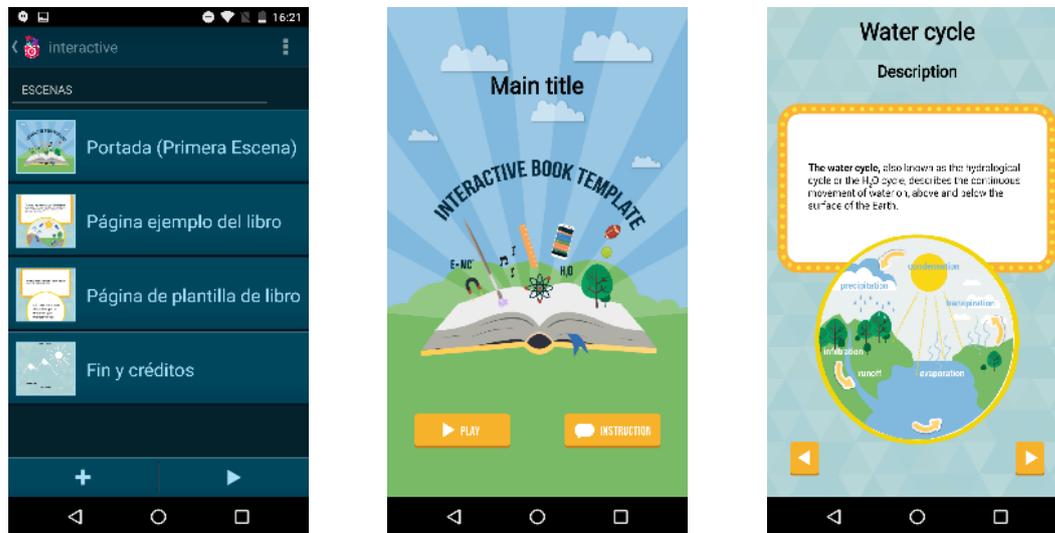


Figure 7. Interactive Book Template

The Spanish teachers request an easy way to start with the programming in the Create@School app, for both sides: Students and teachers. The idea of this template is to help to make a program through the replacement of graphics adding the own, including some text and pages to the book, in order to create the content of it. Due the template is like a book, the topic could be anything and apply perfectly to the kind of classes like: Biology, Geology, Natural Science, Literature, etc. For this reason, for the Spanish pilot, this template was specially made for the classes 6^o Primary, 1^o ESO and 2^o ESO of both pilots. Although the other pilots could give the use that they wish according to their needs.

The pilots had been using the template since Nov. 2016. In the case of the pilot: "SaFa Puerto Santa Maria" some teachers apply this template in a project for their class, in order to record the orchard's evolution of each student. Here the pupils will learn to use the basics bricks of the app, e.g.: Next and Previous scene, Next look, Adjust image size, Add text with the paint tool. Additionally, if the student wants, could use the "Ask bricks" in order to make more interactive the book.

Race Game Template

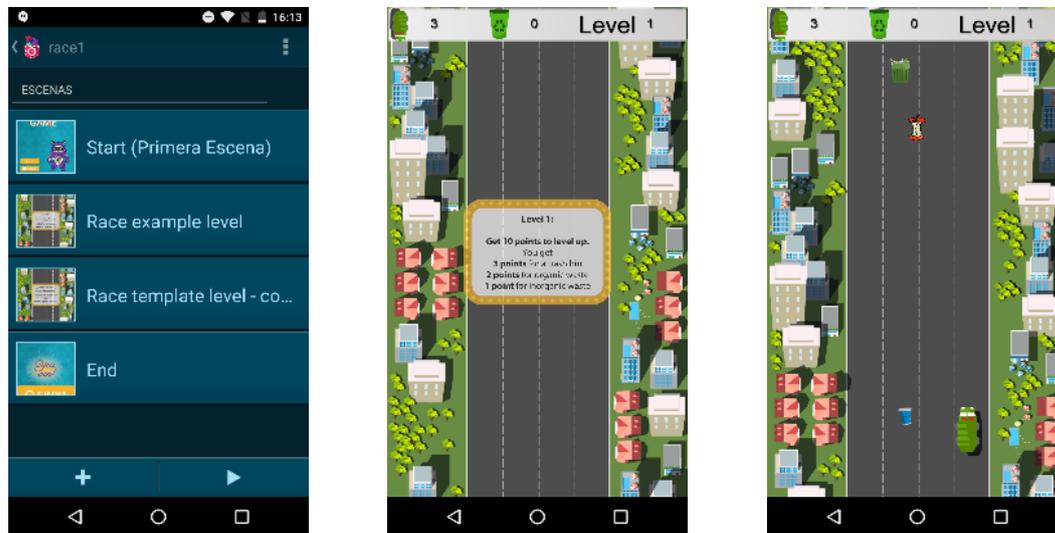


Figure 8. Race Game Template

As part of all the templates for the Create@School app, the last template developed in Spain, was the Race Game. This template requires a little more experience from the student, because works with variables, physic bricks, transitions of graphics, etc. The sense of the Race Game Template is collect or avoids objects, depending of the game's logic. The subject of the template is about the Environment Pollution and the player must to collect the garbage to clean the city avoiding the others cars. Works with a life indicator and if the student reaches the goal of the stage can move on to the next one. The user loses a life if the program detects a collision with other elements, in this case other cars.

2.3 Programs statistics

During the feasibility study and the 1st Innovative Cycle we have worked with Pocket Code in schools, creating simple games adapted to the students and teachers at all times. Step by step Pocket Code was improving as well as the users' skills thus we used more complex functions.

In the 2nd Innovative Cycle with the uptake of Create@School the tool was maximum exploited due to its simplicity, usability and usefulness. Teachers and students have been able to adapt to a new learning method getting a very good efficiency in their classes.

The graphic below shows the number of programs created in the Spanish pilot comparing both tools. Since the time dedicated to each of them has been similar, it is observed how the tool adapted to the educational context, Create@School, has been much more used.

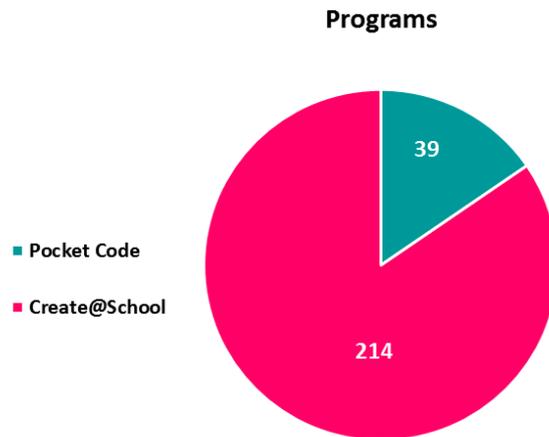


Figure 9. Pocket Code vs Create@School programs

To access in detail each of the created games, Annex 1 contains a list with links to all Spanish pilot programs. The following figures describe the statistics of the Spanish pilot regarding uploads and downloads.

Uploads

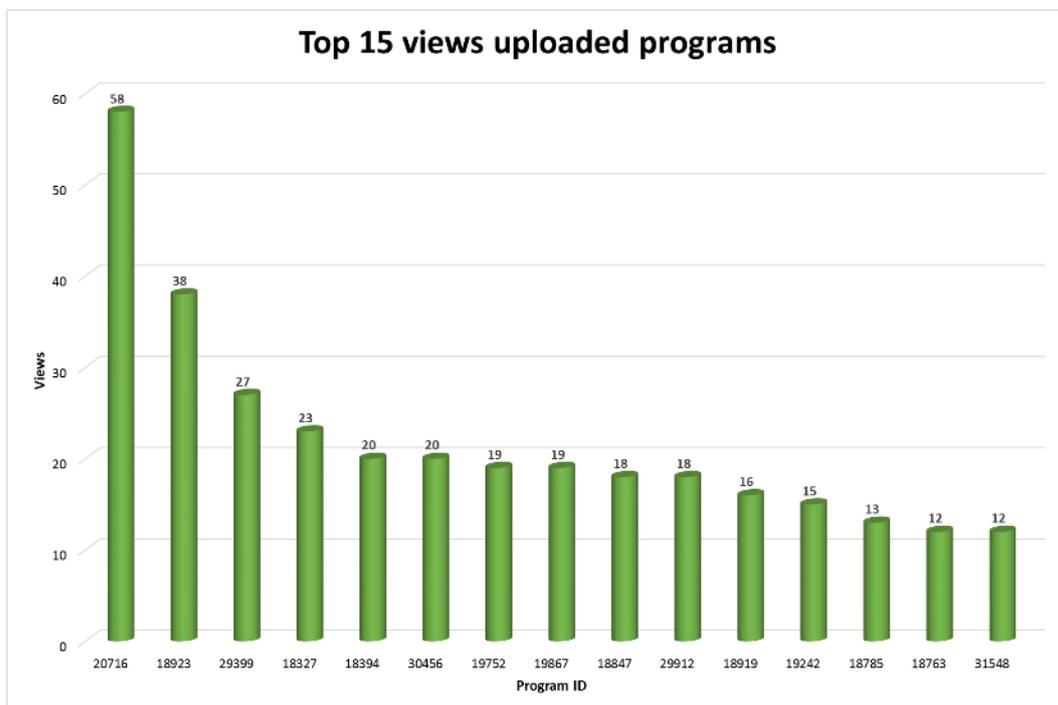


Figure 10. Uploads – Top 15 views

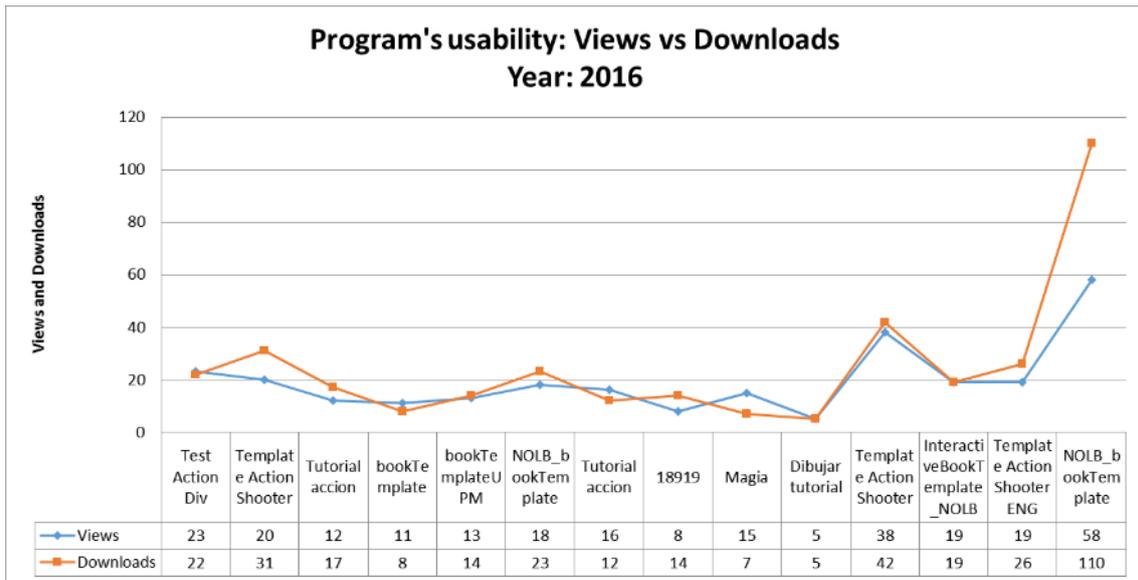


Figure 11. Views vs Downloads

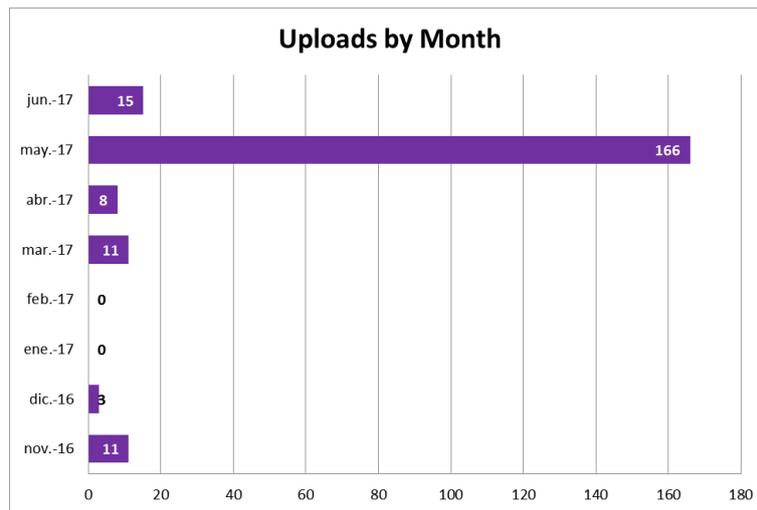


Figure 12. Uploads by month

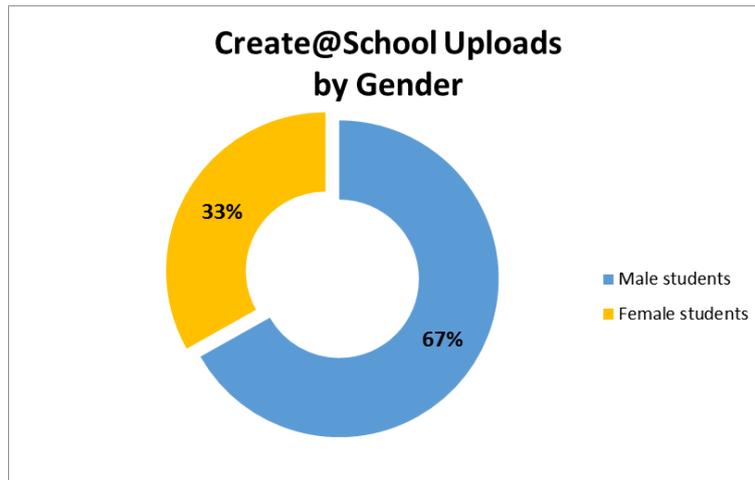


Figure 13. Uploads by gender

Downloads

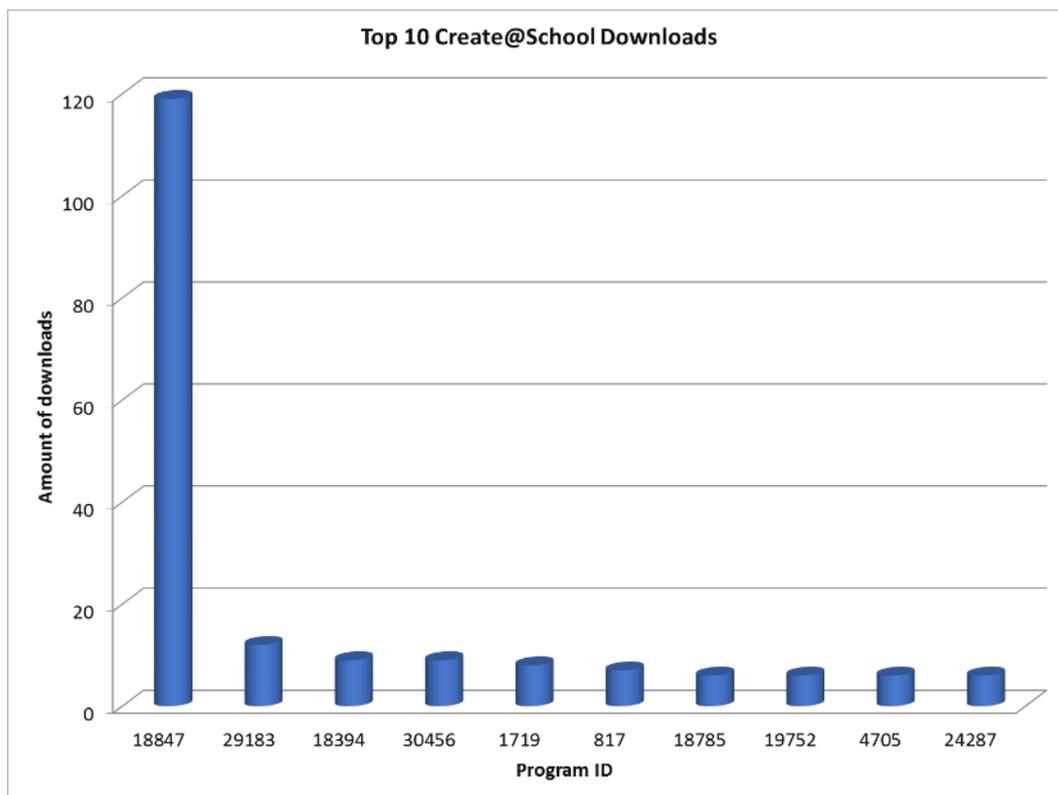


Figure 14. Downloads - Top 10

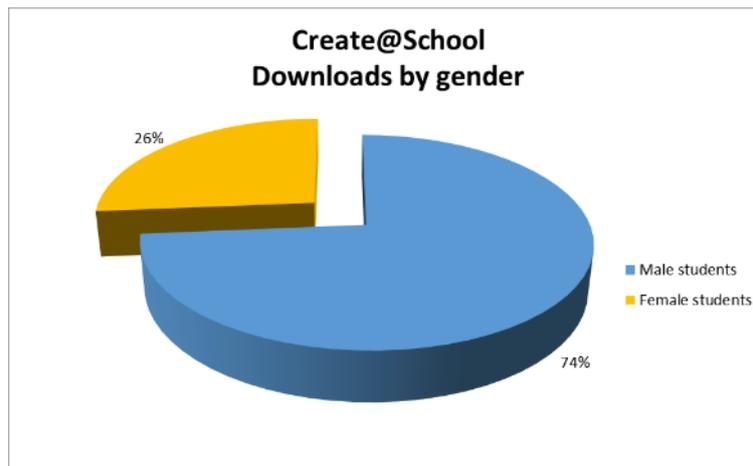


Figure 15. Downloads by gender

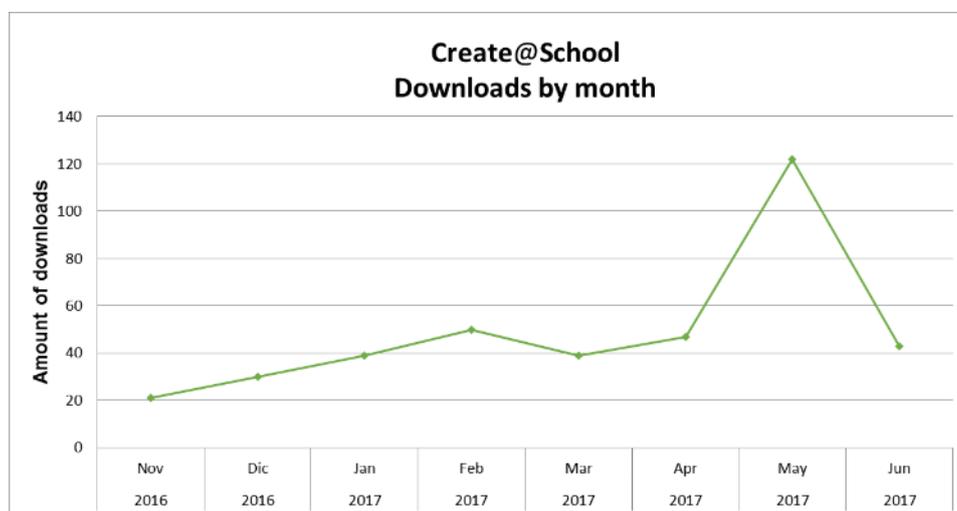


Figure 16. Downloads by month

2.4 Lego NTX, EV3 & First LEGO League

Since 2016 our pilot school in Úbeda has been used Pocket Code and Create@School for the First Lego League. The FIRST LEGO® League Open European Championship [6] is an international robotics tournament hosting more than 90 teams from more than 80 countries all over the world. It presents an international platform that inspires future leaders and innovators in science and technology through challenges, competitions and team work. Young candidates of 10-16 years old will be guided by adult coaches in FIRST LEGO team to research a real-world problem of their interests, such as food safety, recycling, energy, etc., and are challenged to come up with a solution, the process of which requires them to design, build, and program a robot with LEGO MINDSTORMS® technology. The competition would be on a table-top playing field.



Figure 17. SaFa Úbeda & LEGO

At our school in Úbeda, they have a program for high capacity pupils. In this program they have extra curricula activities, one of this activity is a taller of robotics by using Lego NTX and EV3 robots.

Under the direction of the teacher Andres Romero Peralta, our pupils in Úbeda have been used Pocket Code and Create@School for prototyping solution with Lego robots by using only tablets and mobile phones. They have presented these project at First Lego League in 2016 and 2017.

3 THE SPANISH PILOT'S PLAN

In Spain the plan to carry out the pilot has been defined according to the general project plan defined in the deliverables D5.1 & D5.2 - Plan for the No One Left Behind small scale pilots' validation set-ups and the evidence collection.

At the beginning of the project was expected that Pocket Code was a subject of the courses but it wasn't and finally teachers have not evaluated students just for their Pocket code skills. The plan has been to introduce Pocket Code to the students in 3 phases.

- **Phase 1:** The children approach Pocket Code just playing with examples related to the subjects of the courses. The examples will be: animations, interactive quiz or games.
- **Phase 2:** The children approach Pocket Code with tutorials. In this phase the teachers will teach Pocket Code to the pupils developing applications all together in class.
- **Phase 3:** Project development with Pocket Code. In this phase the pupils will develop a Pocket Code application related to course subjects.

3.1 Progress of the performed work

According to the general WP5 Gantt chart (see Figure 23), Spanish pilot tasks and subtasks have been completed successfully. In the following a detailed revision describing each of them has been done.

Setting-up (M1 – M12)

This process sets up the technological, functional and learning environment for teachers and students. One of the main carried out task was the identification of the teachers and students involved in the pilots, those who are proactive towards constructivism approaches.

- Device definition and logistics: the feature of Pocket Code have limited the selection of the devices to be acquired in the market in order to ensure that Pocket Code run appropriately. The tablets were preferred to the mobile phones and some teachers also prefer 10 inches tablets instead of 7 inches. Finally, BQ Edison 3 and BQ Edison 3 Mini were the selected devices. Meanwhile, the NOLB team and the schools made a written agreement for maintaining the devices secure and with right functioning for all the duration of the project as well as politics of use of tablets in and outside the schools.
- Schools agreements: several communication activities with schools and teachers were performed in order to agree on the responsibilities and benefits for each part, NOLB and schools. Moreover, parental consent (see Annex 2) were signed by the students' parents.

Pocket Code approach (M2 – M25)

This process has allowed the integration of the first used version of Pocket Code blocks into ones that provide a higher level of flexibility and improved functionalities. New bricks that ease the coding for children, the usability and the adaptation of gaming have been defined according to the students and teachers' needs with the goal of transfer the power of engagement of leisure gaming techniques and constructivism approaches.

Several discussions with teachers have been needed to understand how to proceed with the introduction of Pocket Code in the classes. To achieve this goal was mandatory to know how much time of their classes could be used to integrate and

teach Pocket Code, how student could use Pocket Code in class, how Pocket Code can be integrated in the academic program and in the themes.

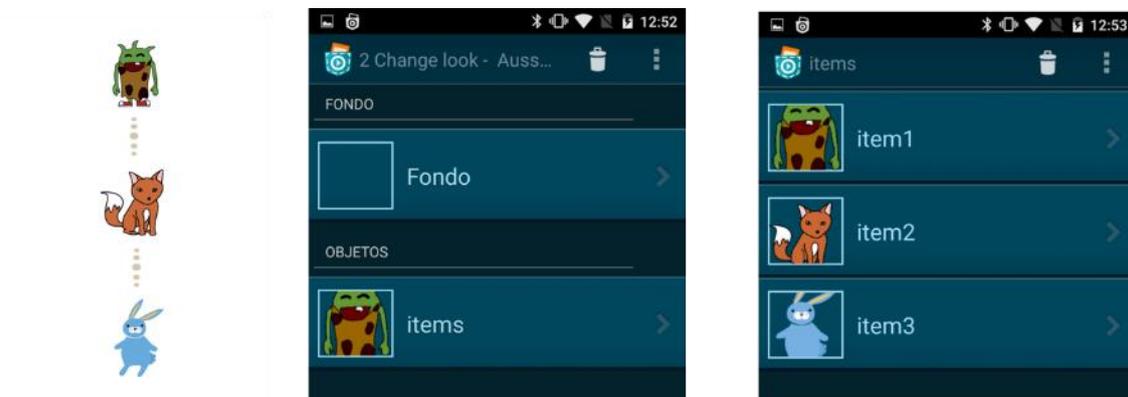


Figure 18. Basic Pocket Code tutorials – change look

Considering the outputs of the discussions, a set of demos (basic and advanced) and customised pedagogic oriented examples of Pocket Code was developed in Spain with a view to furthering the integration of Pocket Code in classes.

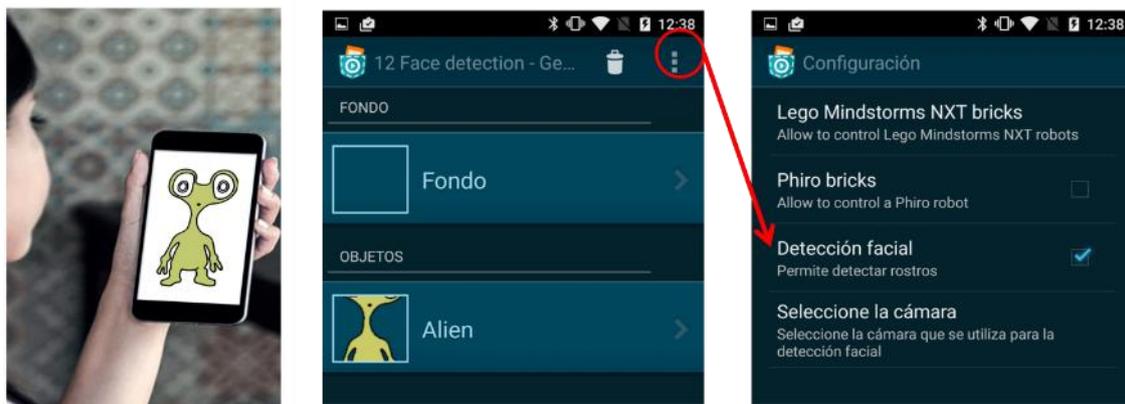


Figure 19. Advanced Pocket Code tutorials – facial detection

Development of pedagogical teaching content (M3 – M30)

The aim of this task has been to identify themes in academic subjects, in the different courses where Pocket Code modules have been integrated in order to support meaningful learning. For this purpose, strategies and methodologies were defined around courses evaluation, contents definition, detection of interest and expectations.

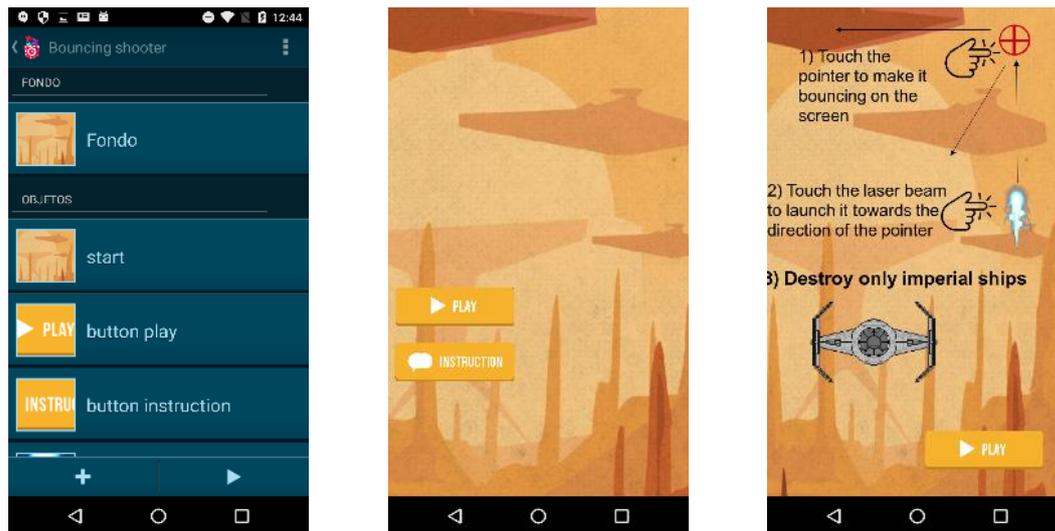


Figure 20. Screenshots of Create@School programs

NOLB team and teachers organized focus groups and face to face meeting in order to: select key contents of the courses where Pocket Code can add value and support teaching/learning process; evaluate and understand objectives of the class from the student integral development perspective; transfer and identify the contents where Pocket Code learning modules were integrated - subjects of selected courses; identify skills and background knowledge for Pocket Code usage in relation to the courses for both teachers and students.

Teachers' training (M6 – M23)

This task has comprised several meetings (focus group, game jam, face to face, etc...) between NOLB team and teachers that have to use Pocket Code in their classes. During these meetings the NOLB team provided demos and tutorials about Pocket Code performances for the purpose of teach how Pocket Code/Create@School works, create programs and games, use the object scripting interface properly, design and develop a game with the Pocket Code environment.



Figure 21. Teachers' training

This process provides the necessary training to the teachers in order to use and ingrate Pocket Code into the academic curricula. With this in mind, concepts of constructivism, playful learning, computational thinking, computational expressions, creative playing, gaming techniques and dynamics have been offered.

Students' training (M8 – M25)

In this process the teachers and the NOLB team have provided the necessary training to the students in order to be familiar with Pocket Code/Create@School user interface and the concept of object oriented programming they have used in class.

The goals of the trainings have been: to teach the necessary skills to the students in order to follow and understand the usage of Pocket Code in class; to allow and gather creativity and gaming examples for creating student driven new games; to introduce Create@School to students and the use of templates in the selected subjects.



Figure 22. Students' training

For taking these objectives forward, the activities using Pocket Code and Create@School have been: evaluate the skills they need for each class; provide basic and advanced tutorials for students; evaluate the integration of the first used version of Pocket Code blocks into a higher level, so more basic skills of coding are required from students; personalize and train on skills that allow to have a proper use of them.

Evaluation phase (M1 – M30)

The objective of this phase is related to the evaluation of Pocket Code, Create@School and the PMD as tools that support deeper and playful learning to move towards a constructivist teaching model. This compromise the definition of the pilots' experimental design objective, the measurement and verification and the interval observation instruction and coding sheet. Also, during this phase all needed tools for data collection have been integrated into the pilots. The data collection and the evaluation details are included in the Chapter 4 of this deliverable.

Follow-up of running pilot (M1 – M30)

This task has been run the whole project because of its strategy significance. One of the main activities was to support and help teachers and students during lessons in order to obtain persistent feedback from them. The follow-up has consisted of several on-site visits to both sites, a fixed one at the beginning and end of the course but also more visits along the academic year.

- The objective of the first visit is the guidance and training of users with the new functionalities that will be used throughout the academic year.
- Over the academic year the visits are oriented to the improvement of the users' skills and to go more in-depth of new functionalities, concepts, promotion of events like game jams, etc.

- The last visit is focused on the evaluation of the results and improvements throughout the year, in addition to select the contents for the next academic year.

- Cycle times (preparatory, 1st innovative and 2nd innovative) in which the project is divided
- Overall process
- Sub-processes or tasks belonging to the overall process

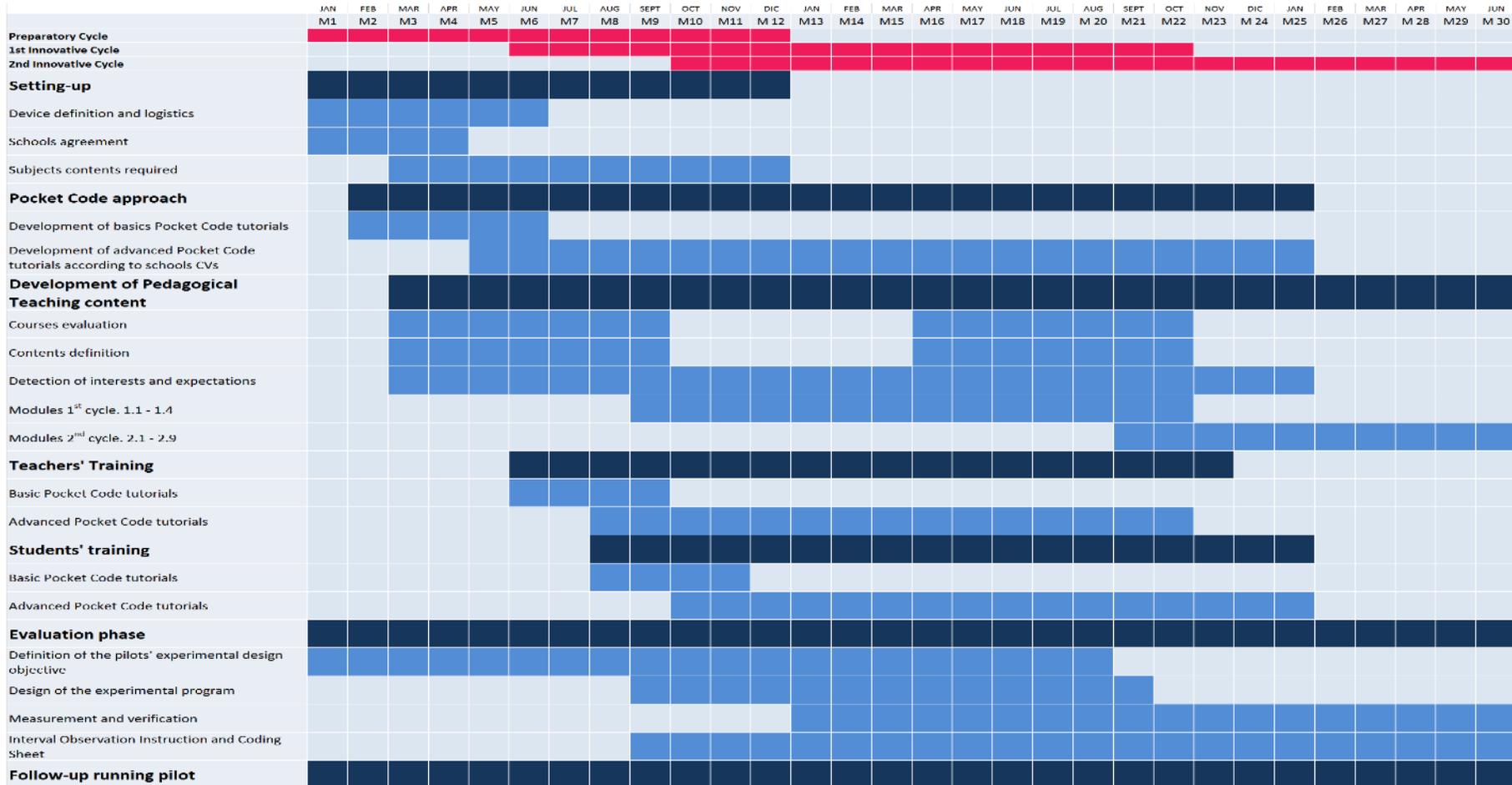


Figure 23: No One Left Behind pilots' Gantt chart

3.2 Barriers and challenges managed during the project

Throughout the project we have encountered some barriers and challenges that, although sometimes it has not been easy, the final result has been the improvement in several aspects. We list all of them and the solutions adopted in cases where it has been possible.

- Internet connection failure in the pilot sites in the case of many tablets accessing from the same place (the classroom) to the same WiFi network. The improvement of the network infrastructure at schools were suggested and thus avoid delays and unexpected loss of time due to network failures.
- Tablets with low battery level at the time of using them. The adopted solution has been turn off and charge the tablets after each session to ensure that the devices are enough loaded for upcoming sessions.
- Different learning level. We have adapted our planning to the teachers and students needs creating learning materials in a progressively complex-wise.
- At the beginning of the project, coding many bricks to create a simple program was necessary. For this reason, the NOLB team has been working hard in the New Generation of Pocket Code - Create@School which has greatly improved the users' experience.
- Schools have restricted Internet access for security purposes. Download resources to speed up the game creation in training sessions was not possible. From the NOLB team a special permission was required for free Internet access during training session and it was accepted by the directors of the school.
- The functionalities of Pocket Code and Create@School cannot be fully exploited by the younger students because their knowledge is limited. In order to engage and motivate the younger pupils we prepared the tutorials for them more oriented to painting than coding.
- The time dedicated to Pocket Code in our schools was less than the expected at the beginning of the project. We have provided the necessary tools to create games adapted to their subjects in a more dynamic way, for example, the templates.
- The pilots sites are so far from the NOLB team place of work, so that the remote monitoring became complicated. It has been difficult to follow up comprehensively from a distance. We have not been able to adopt any solution during the project but we will take this into account for future projects.
- Unequal development between the Spanish schools. Some of the possible reasons could be: different number of students per group, involvement of the teachers, the tablets arrived with some delay to the school SaFa San Luis. In order to homogenize the level of knowledge of the tools and the involvement of the schools, support sessions were held in the most disadvantaged school.
- Low participation in the first Game Jam promoted by the project. The measures taken were to notify the Game Jam earlier and to provide more resources.

3.3 Recommendations

Based on the barriers and challenges identified in the Spanish pilot, our recommendations to schools, students and teachers that will adopt Create@School as well as to the pilots' coordinators are:

- Computer teachers are the most qualified and they should be the leaders training so we can recommend that technical background teachers should be leaders in schools to make it viral.
- Older pupils can create complex games while the younger ones have a lot of fun by painting. To ensure the engagement of all the users we should motivate younger pupils painting and creating objects while the older students create games using these resources.
- Teachers and pupils with different learning abilities. We should do a previous classification of the groups according to the learning levels and adapt the proposed games to those abilities.
- Few difficulties to interact with schools due to the distance between the NOLB team and the pilot sites. To carry out a more exhaustive follow-up and enhance the communication between the end users and the pilot coordinator the pilot site should be near the NOLB team, in this case Madrid.
- In order to optimize the time spent by students in their classes and get the most out of Pocket Code/Create@School, the project must provide several easily adaptable and customizable programs according to the classes' CVs

4 RESULTS OF THE PILOT

4.1 Methodology

In this paragraph will be described the methodologies that have been used in order to evaluate the Spanish pilot. The objective of the study is the evaluation of the impact of the Game Making Teaching Framework developed during the No One Left Behind project.

By using the Hassenzahl model through the AttrackDiff surveys we have been able to evaluate:

- The usability and utility of the technologies perceived by the users
- The satisfaction of the users that have been used the technologies
- The attractiveness of the technologies.

Behavioural assessment refers to an approach to understanding and changing behaviour by identifying the context in which it occurs (the situations or stimuli that either precede it or follow from it).

4.1.1 Hassenzahl model assessment

Our relationship with technology affects our emotions and quality of life. The Hassenzahl model [7] is designed for measuring user's experience, satisfaction and understanding their emotional responses.

Making users like something is not as easy as you might think. The qualities of physical products, websites, software and other digital media can be classified into two distinct groups:

- **Pragmatic qualities**

Pragmatic qualities relate to practicality and functionality. A consequence of pragmatic qualities is usefulness and usability. Examples of attributes that are typically assigned to software in general are "supporting," "useful," "clear" and "controllable." The purpose should be clear and the user should understand how to use it.

- **Hedonic qualities**

Hedonic qualities refer to the psychological needs and emotional experience of the user. Into the Hassenzahl model hedonic qualities are divided into 2 categories:

- Stimulation (HQ-S): users want to be stimulated in order to enjoy their experience with the software or product. Rarely used functions can stimulate the user and satisfy the human urge for personal development and more skills.
- Identification (HQ-I): the human need for expressing ourselves through objects to control how you want to be perceived by others. We all have a desire to communicate our identity to others and we do this through the things we own and the things we use. They help us to express ourselves; who we are, what we care about and who we aspire to be. This is why people enjoy using personalisation on sites such as Twitter. Changing our background wallpaper and header image, helps us to express ourselves.

The right balance between pragmatic and hedonic quality is important and make the user get a kind of an experience and satisfaction while working with the application.

AttrakDiff questionnaire

The AttrakDiff [8] questionnaire (see Annex 3), it's a survey, based on the Hassenzahl model, that builds a quantitative scale able to measure both hedonic and pragmatic qualities. It is a psychometric tool based on Semantic Differential. The Semantic Differential [9] is commonly used by usability specialists in order to overcome the poverty of subjective data that would otherwise be obtained in the tests or in an open question survey.

4.1.2 Behavioural assessment

Behavioural assessment [10] refers to an approach to understanding and changing behaviour by identifying the context in which it occurs (the situations or stimuli that either precede it or follow from it).

Cognitive and behavioural measurement in No One Left Behind has been handled through qualitative and quantitative observations (automatic collection data from usage of Create@School).

The statistical analysis of collected data evidence aims at improving the constructivist oriented learning and teaching model, evaluate several users' cognitive/didactical and behavioural performance, such as engagement, persistence and Create@School usage.

The PMD captures the perception of the teachers regarding the academic achievement (e.g. reaching the academic goal) and some students' abilities and social behaviours (such as creativity and collaboration).

Tracked observational variables/parameters comprise: matching of the academic and gaming goals, game works well (narrative, sequence and completeness of the type of game used), game originality (very creative, with creative characters, etc.), defence of the work or project submitted and need of teacher intervention (coaching, mentoring, answering questions regarding the project requested or Create@School).

The analytical tool environment provides continuous tracking on the activities and usage of coding components used to develop games for their lessons. It captures actions as happening in the Create@School Development Environment (IDE), such as: object creation, clicks, visualizations, additions, deletions, crashes, etc.

The aggregation of these variables has been done to support the evaluation of the following pre-selected constructs:

Didactical/cognitive: Measurement of the alignment of the learning objectives and the developed game.

Social/behavioural: the social and behavioural dimension goes beyond academic readiness and cognitive ability, and it is important to influence success in school.

Overall, we have divided the social/behavioural in three types of factors:

- ***Motivational factors:*** Although there are many different theories of motivation, we have selected with the teachers a limited number of motivational constructs that support the goal-setting process that precedes goal commitment.
- ***Self-regulatory factors:*** relate with the self-effort needed to reach the goals. These efforts could be effective but have impact in academic performance and learning process.

- **Engagement and collaboration factors:** engagement factors comprise those that affect the connection between the learner and the learning activity or the school environment/class. It is determined by experiences to see the students' degree of interaction with social (e.g., peers), and academic systems.

The analytics data has been tracked from October 2016 until the end of the project. The PMD/measurement was ready for use in April 2016. Consequently, only three classes could be evaluated because the other classes already finished their lessons.

Behavioural measurements are available for the following classes:

School	Course	Age	Subject
SaFa Puerto Santa María	4 ESO	15-16	Mathematics
	3 ESO	14-15	PEMAR – Mathematics & Sciences
	2 ESO	13-14	Mathematics
SaFa Úbeda	3 ESO	14-15	Sciences Methods
	2 ESO	13-14	Free disposition
	6th EPO	11-12	Sciences
	5th EPO	10-11	Sciences

Table 4. Spanish classes participating in behavioural measurements

Table 5 summarizes all measurements and parameters collected by the PMD and the Data Collected by the Analytics tools, while the Figure 24 shows the overall evaluation of the Spanish pilot. Figure 25 shows the averages of the evaluation per subcategories comprising the following behaviour:

- Confidence:
 - Event creation, e.g., create program, object, look, sound and copy actions
- Creativity:
 - Look&Feel Customisatzion / Aestetics , e.g., Create your own resources (Pocket Paint , Camera, Recorder)
- Effort/dedicated time:
 - Time in Web View
 - Time spent with playing / testing the game
- Interest
 - Event creation
 - Look&Feel Customisatzion / Aestetics
 - Time in Web View
 - Time spent on research/tutorials (help function in Create@School)
- Persistence:
 - Event deletion, e.g., delete program, object, look, brick
 - Time in web-view
 - Time spent in Pocket Paint
 - Time spent with playing / testing the game
- Positive affect
 - Look&Feel Customisatzion / Aestetics

- Self-efficiency:
 - Absolute time spent in Create@School
- Self-engagement (over average in positive affect)
 - Look&Feel Customisatzion / Aesthetics
 - Time spent in Pocket Paint
- Usage of Create@School
 - Coding Skills
 - use simple bricks (e.g., simple loops, show/hide, position bricks)
 - use of advanced bricks (collision, physics bricks,...)
 - usage of variables, lists, broadcast messages
 - merge programs
 - use templates



	Teachers` observation					App related					Time Management					Support			
	Match of academic & gaming objectives	Game originality	Complete/Sequence/flow / narrative/story structure	Work defence	Collaboration	Event Creation	Event Deletion	Coding Skills	Look & Feel/Customisation / Aesthetics	Customizes/Changes GPII	Absolute time spent	Tracked events/actions per minutes	Time spent w/playing-testing the game	Time spent in Pocket Paint	Time in Web View	Time spent in research/tutorials	Time spent in programming (remaining time)	Uses help button/uses brick help option	Teacher intervention (positive intervention / mentoring)
Process:																			
PMD																			
SDK																			

Table 5. Summary of all measurements and parameters collected by the PMD and the Analytics tools

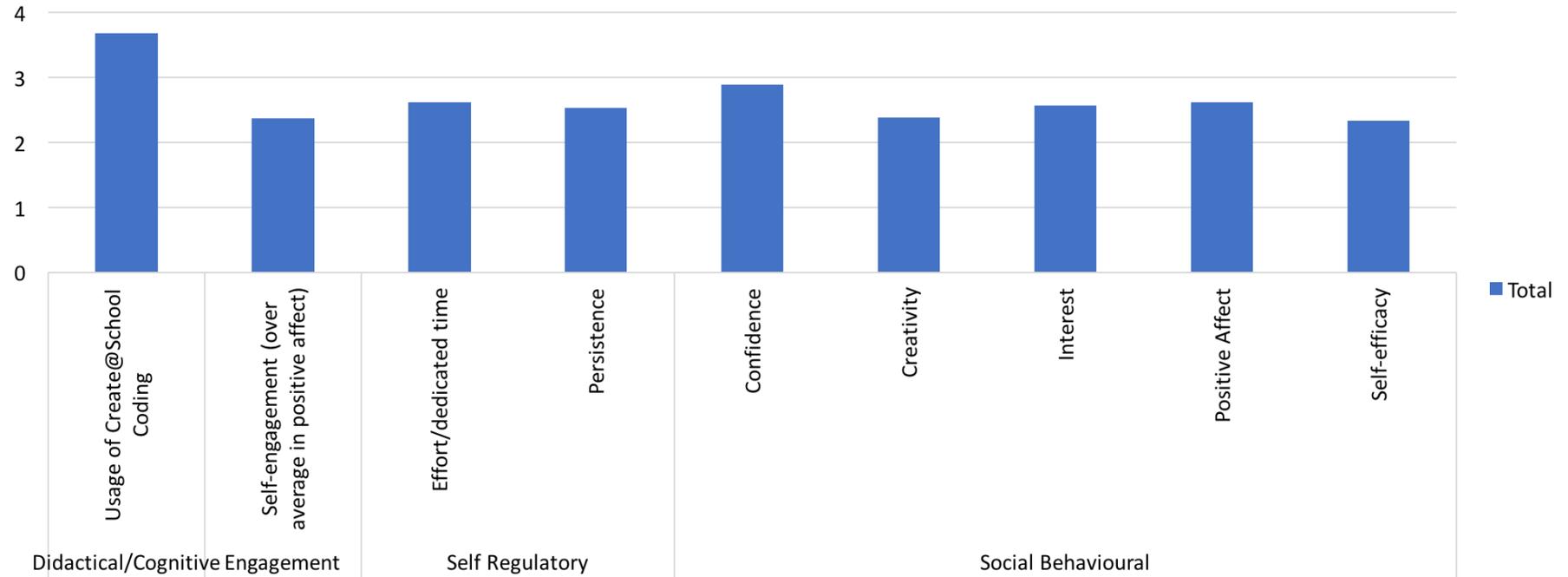


Figure 24. Behavioural assessment Spanish pilot

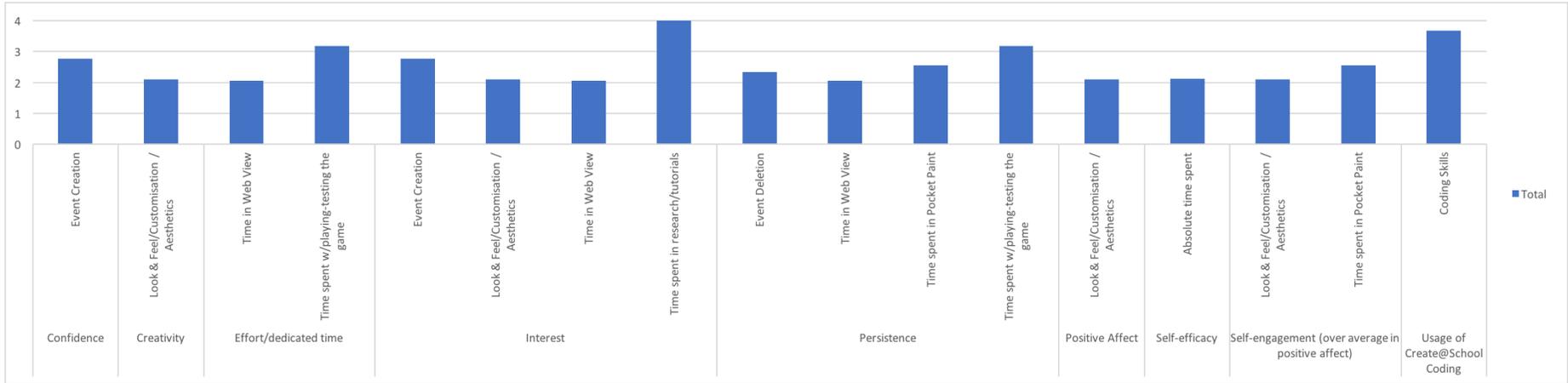


Figure 25. Behavioural assessment Spanish pilot averages of the subcategories

4.2 For students at risk of exclusion

For the Spanish pilot the risk of exclusion has been addressed at class level. Teachers have created working group of pupils with 2 or 3 students where pupils with disabilities and belonging to social exclusion collectives have been working together. In some cases, the feature of Create@School related to the localization of the language has been very useful in order to speed up the integration of pupils that experiments difficulties due to the different language that them speak at home.

4.3 Outcomes of the pilot

4.3.1 Teacher's study of Pocket Code vs Create@School

This study collects the evaluations of teachers that have participated into the Spanish and Austrian Pilot of the No One Left behind Project. It compares Pocket Code with Create@School. The surveys about Pocket Code were collected at the end of the first cycle (September 2016) while the surveys on Create@School were collected at the end of the second cycle (June 2017). The participants were 8 teachers for Pocket Code and 8 teachers for Create@School, 4 teachers were using both Pocket Code than Create@School but not all the teachers were using the application for the same amount of time during the pilot study.

Results of evaluation of Pocket Code vs Create@School

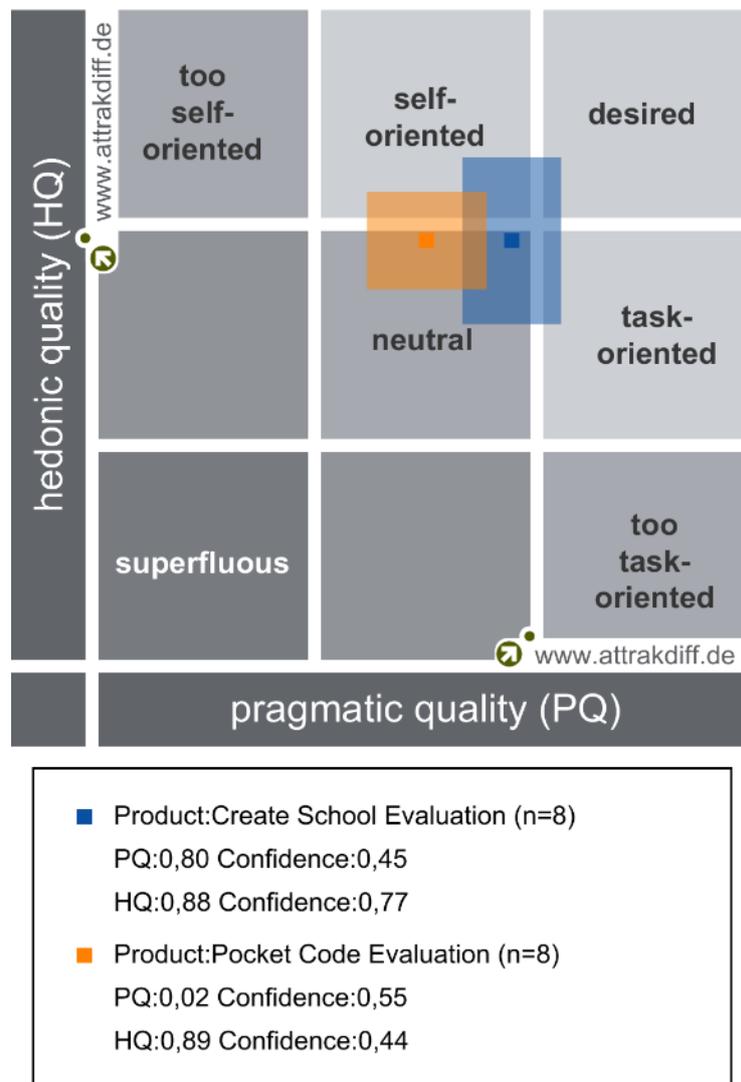


Figure 26. Pocket Code vs Create@School evaluation of hedonic and pragmatic qualities

Create@School performed a little bit better than Pocket Code both in hedonic quality than in pragmatic quality. The larger confidence rectangle observed for product Create@School implies that users were largely different, while for Pocket Code they were largely one. Both products have a right balance between pragmatic and hedonic quality. They are positively accepted but they are still not the desired products that teachers are looking for.

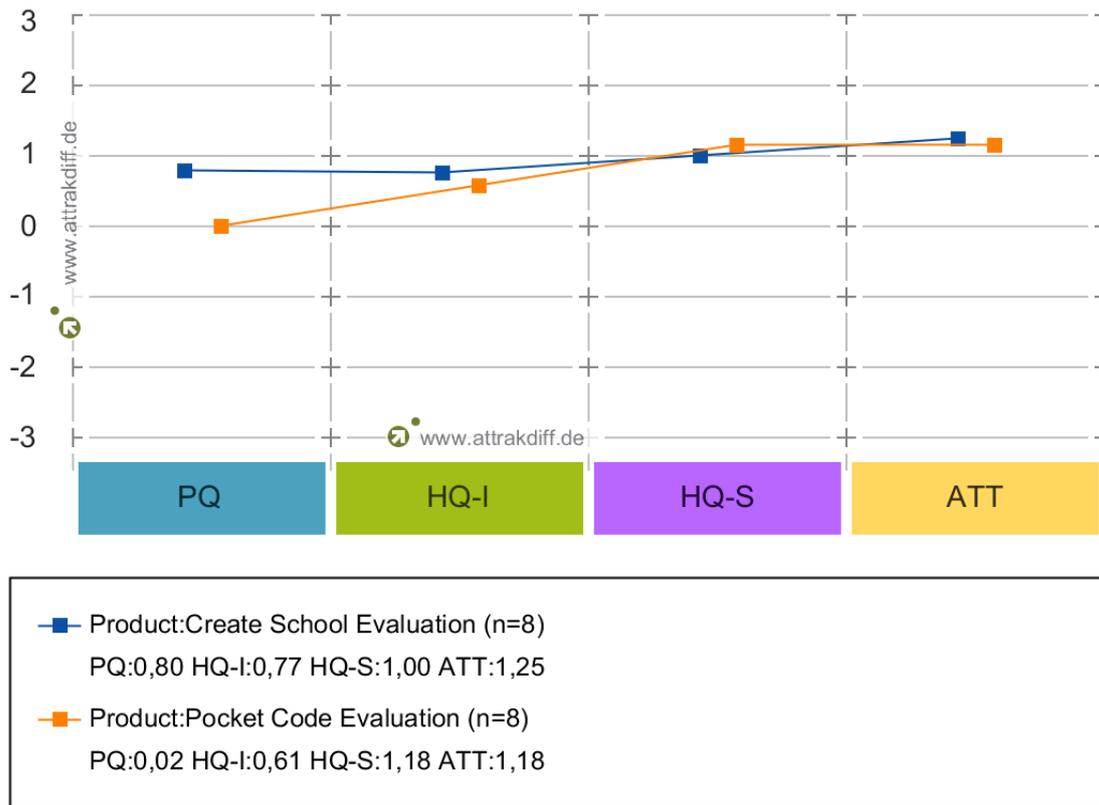


Figure 27. Pocket Code vs Create@School diagram of average values

In the average diagram (Figure 3) it can be seen that:

- all qualities have positive evaluation for each product
- for pragmatic quality there is the maximum positive distance between Create@School and Pocket Code.
- Pocket Code evaluation of pragmatic qualities is close to zero
- for Identity (HQ-I) Create@School is very little bit better than Pocket Code
- for Stimulation (HQ-S) Pocket Code is very little bit better than Create@School
- both products don't reach the maximum rates in any qualities.

The diagram of the Annex 3 shows the details of the Semantic Differential of the surveys. The adjectives of the survey that is contributing to each quality: pragmatic (PQ), identity (HQ-I), stimulation (HQ-S) and Attractiveness (ATT) for the Pocket Code (blu line) and Create@School (orange line) apps.

4.3.2 Teacher's study of Project Management Dashboard

This study collects the evaluations of all the teachers that have been using the Project Management Dashboard (PMD) into the Spanish and the Austrian pilots of the No One Left behind Project. The surveys about PMD were collected at the end of the second cycle (June 2017). The participants were 7 teachers from Spain and 3 teachers from Austria.

Results of evaluation of PMD

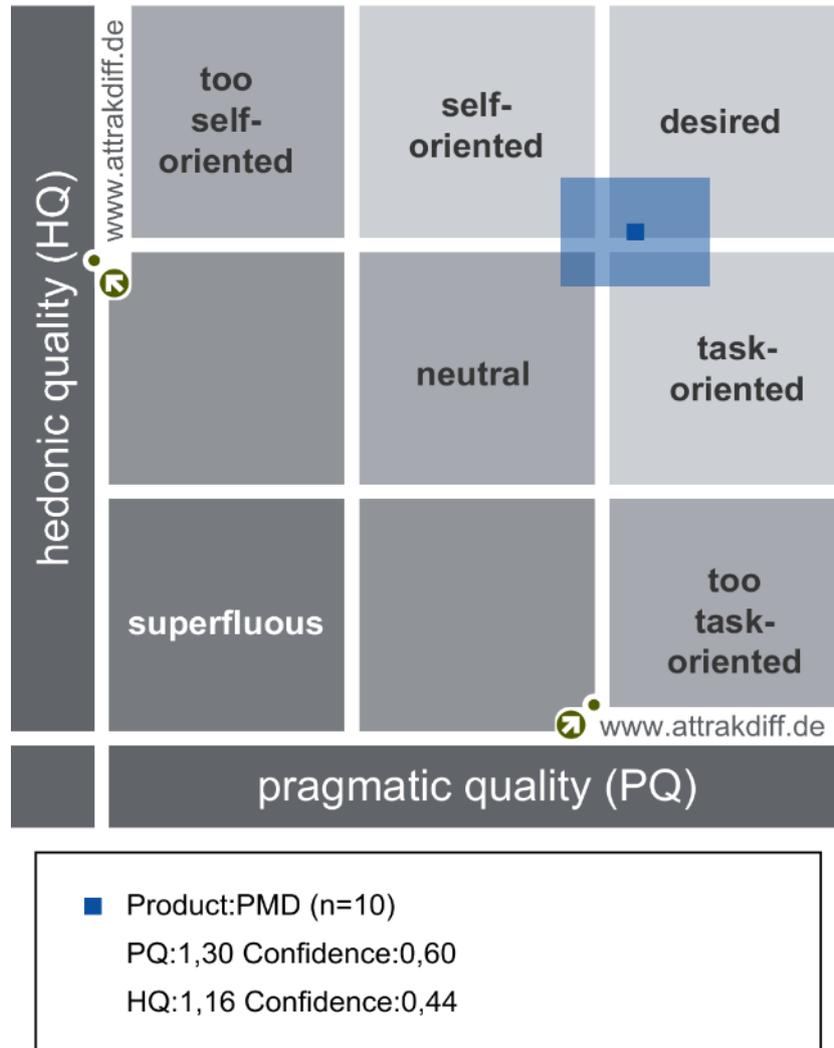


Figure 28. PMD overall evaluation of hedonic and pragmatic qualities

The confidence rectangle shows that according to teacher consensus, the hedonic quality is close to the pragmatic quality. For PMD the confidence rectangle extends from the desired area and into the self-oriented area, neutral and task-oriented. It can therefore not clearly be classified as desirable.

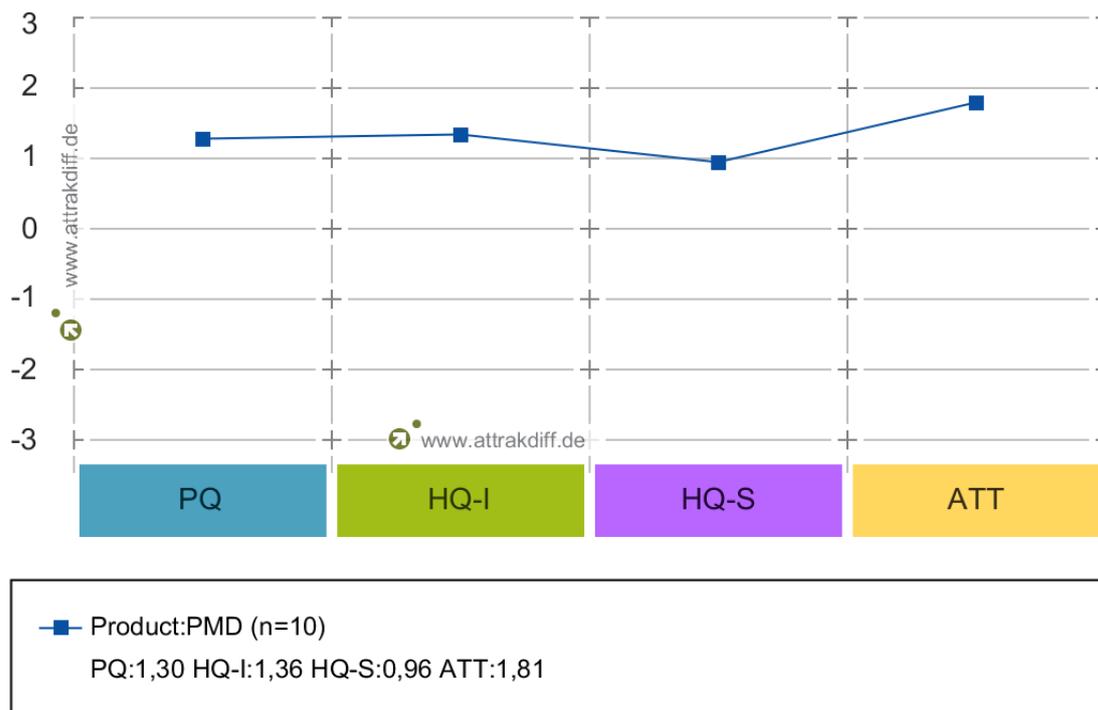


Figure 29. PMD diagram of average values

In the average diagram (Figure 5) it can be seen that:

- all qualities have positive evaluation
- all qualities are well balanced,
- attractiveness (ATT) has a little bit better evaluation than other qualities
- PMD don't reach the maximum rates in any qualities.

The diagram of the Annex 4 shows the details of the Semantic Differential of the surveys. The adjectives of the survey that have been contributing to each quality: pragmatic (PQ), identity (HQ-I), stimulation (HQ-S) and Attractiveness (ATT) for the PMD.

4.3.3 Students' study of Create@School

This study collects the evaluations of all the students that have been using the Create@School into the Spanish Pilot of the No One Left behind Project. The surveys about Create@School were collected at the end of the second cycle (June 2017) and the population is described in chapter 2. The participants were 115 students that was using Create@School in different subjects.

Results of evaluation of Create@School

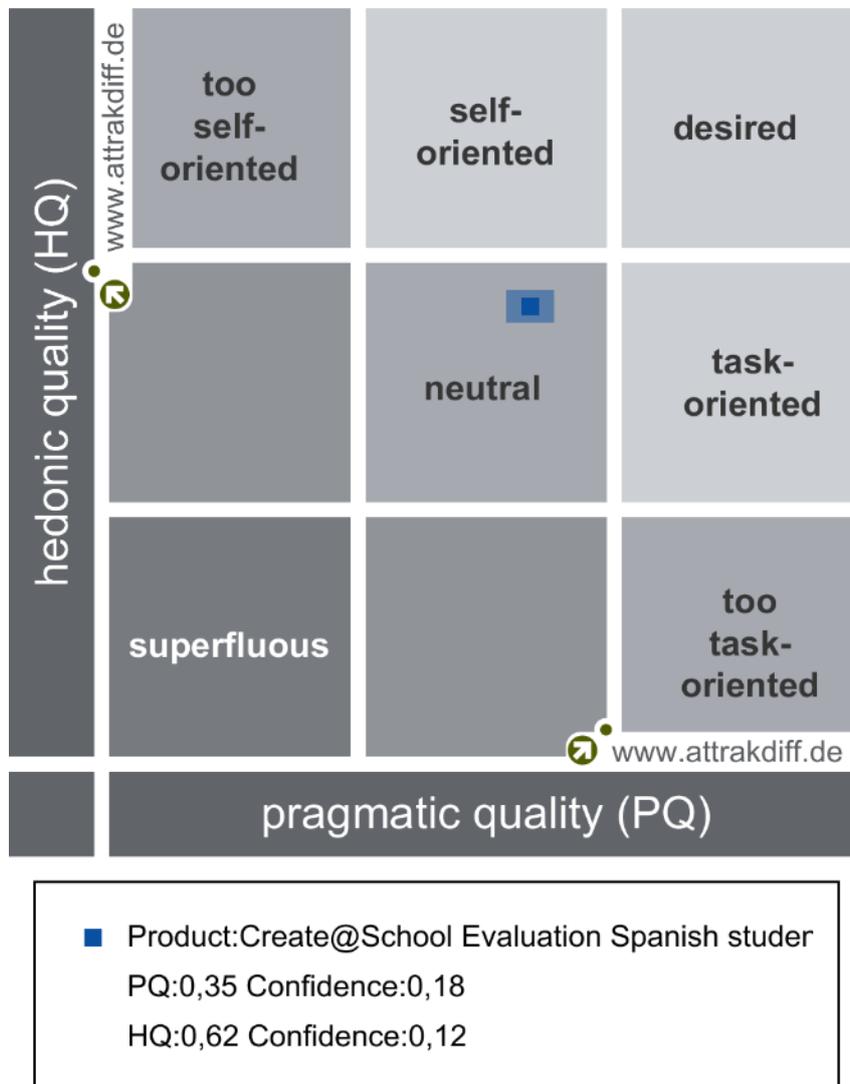


Figure 30. Create@School overall evaluation of hedonic and pragmatic qualities

The confidence rectangle shows that according to pupil consensus, the hedonic quality is close to the pragmatic quality. For this study the confidence rectangle is very small, it means that the confidence about the results is very reliable and we can classify the Create@School application as neutral.

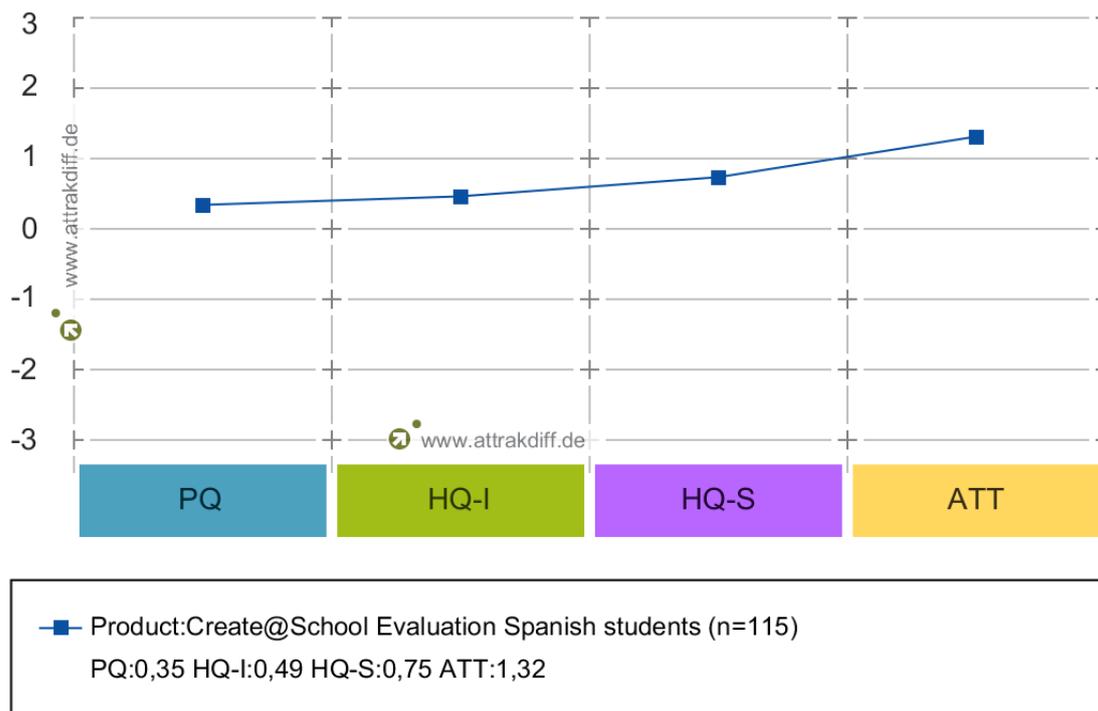


Figure 31. Create@School diagram of average values

In the average diagram (Figure 7) it can be seen that:

- all qualities have positive evaluation
- all qualities are well balanced,
- attractiveness (ATT) has a little bit better evaluation than other qualities
- the study doesn't reach the maximum rates in any qualities.

The diagram of the Annex 5 shows the details of the Semantic Differential of the surveys. The adjectives of the survey that have been contributing to each quality: pragmatic (PQ), identity (HQ-I), stimulation (HQ-S) and Attractiveness (ATT) for the study.

4.3.4 Results of First Lego League

In March, 2016, The Úbeda Team (Lego Tec SaFa Úbeda) ranked the second under the guidance of coach Andrés Romero Peralta in the local championship of Granada.

In the competition of 2017 in Cordoba, the new teams trained by Andres Romero Peralta won:

- Robot design to the team 'Lego Tec Safa Ubeda' award
- Young promises to the team 'Minigram Safa Úbeda' award

5 DISCUSSIONS AND CONCLUSIONS

5.1 *Discussions of the results*

In this section will be discussed the results of the previous section related to the evaluation studies:

- Teachers' evaluation of Pocket Code versus Create@School
- Teachers' evaluation of the PMD
- Pupils' evaluation of Create@School

According to the teachers' experience with the Create@School app, they gave us some observations or recommendations for improving it. In the following list there the details of some of their comments:

- Improve login process of Create@School
- Improve network performances, when an entire class with about 20 students, try to upload at the same time a program.
- Improvements in the "Next Look brick" of Create@School, the teachers suggested that would be useful to have the option "look's name", in order to select which look they want to change. Something similar to the variable brick, where they can select the name of the variable that they want to use.
- In the case of the Arduino, the teacher Andres Romero, request for another way, instead of Bluetooth, to establish the connection between the app and the Arduino's board. Additionally, he asks for some tutorials too.

5.1.1 *Discussion about the study Pocket Code vs Create@School*

Pocket Code and Create@School have a very close evaluation; this is an expected behaviour because both applications are sharing more than 90% of their code. There are 2 different flavours of the Catrobat project.

Pocket Code and Create@School have been positively accepted from the teacher even if they are not still the product they are looking for. For the Spanish context, this should be due to external factor of the application. Teachers and students have been experimented connection and authentication problems that should have cause frustration in the usage of the apps.

Anyway, the positives values and the right balance between pragmatic and hedonic qualities shows satisfaction while working with the applications. As it was expected Create@School is more task-oriented to the education domain than Pocket Code, which is perceived a little bit more like game or an app for entertainment.

This is the most relevant results because of it is the confirmation that the idea of include into the Catrobat project features oriented to the education domain bring Pocket Code closer to an educational tool than an app for entertainment.

From the evaluation of Pragmatic Quality (PQ) it can be extracted the usefulness and usability of the system, into Figure X+1 and X+2 it can be seen the difference between Create@School and Pocket Code.

Create@School is perceived more usable and useful than Pocket Code for the educational domain. From Figure X+1 it can be seen that the high differential value of the qualities' average is pragmatic quality (PQ) that collects all adjectives related to practicality and functionality as it is shows in Figure X+2. This is also an expected behaviour because the main differences, between Pocket Code and

Create@School, are related to the built in game template for education and the integration with the Project Management Dashboard.

5.1.2 Discussion about the study PMD

The PMD satisfies the teachers' expectations even if it is not still their desired product.

This is the expected result because the PMD was designed in order to support evaluation of Create@School projects. It is missing common functionalities of a Learning Management System such as student view, content sharing, etc. These functionalities are the improvements that teachers commented to us.

Anyway the positive assessment of the PMD shows that functionally it is useful and usable while emotionally it is attractive and stimulating. It is a very good base product for a Learning Management System that include Create@School as new tool for education.

5.1.3 Discussion about the students' study of Create@School

The Create@School app satisfies the pupils' expectations even if it is not still their desired product. This is the expected result for Spanish pilot because problems like internet connectivity, lack of infrastructure has been perceived by the pupils as related to the Create@School app. Anyway the positive assessment of the Create@School shows that functionally it is useful and usable while emotionally it is attractive and stimulating. It is a good base product for the creation of a new innovative tool for education.

5.1.4 Discussion about the First Lego League

It's important to highlight that: the First Lego League competition, the usage of the Lego robots with Create@School bring together all the concept of gamification, game based learning, problem solving activities, Game Jam competitions that we have been interested to test in NOLB.

The educational value of this context and the engagement it shows is amazing. The team effort is not limited to the field of play, the young people research on their own, talk and interact with each other, make a presentation of their scientific projects. When pupils build and experiment together, they are actually learning how to create ideas, solve problems and overcome obstacles in team work and a collaborative intelligent environment, independently from the awards they receive or the position they classify in the competition.

5.2 Conclusions

In conclusion, the Spanish pilot shows that the Game Making Teaching Framework and its related technologies has been accepted by teachers and students, but they are not still the desired products, some important issues, that were not visible during the preparatory cycle and 1st cycle of the pilot, appeared after the validation.

By means of qualitative observations during the focus groups, the trainings and the tutorials at schools we have observed several issues that are very time consuming:

- The IT infrastructure of the schools does not support many devices connected at time, during the time change for example the network collapses and the connection is very slow

- The devices should be designed with a custom version of operating system that fit better the usage at school, for instance:
 - Google Play should be locked,
 - Web browser should be limited,
 - Account recovery and updates should be completely transparent for the usersthe version of Android 4.2, we used for the pilot, does not meet these requirements, the pupils install unwanted application, if the devices is turned off for some time it requires an account recovery, the updates are constantly reducing the performances of the devices.
- The PMD should have a deeper integration with the Learning Management System used at school.

These issues are very time consuming and if avoided should improve exponentially the performance of game making teaching framework. Even if it has not been formally validated the 2 cycles experiment approach is very useful and dynamic for an innovation project and it also result a very interesting approach for building a commercial product.

As future improvements, solutions for time consuming issues should be taken into account:

- for network speed improvement we saw that with plug and play 4G router we can easily overcome the network congestions at schools,
- we are also in contact with BQ in order to create customized version of their devices that include, at OS level, applications for parental control, such as [Kiddoware Kids Place Parental Control](#) [11], and further customization settings,
- a PMD plugins for the [Moodle](#) [12] in order to have a fully integrated Learning Management System platform connected with Create@School should be a better solution than an ad-hoc platform.

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ANNEX 1. OVERVIEW OF CREATED GAMES

Pocket Code games

- <https://share.catrob.at/pocketcode/program/5486>
- <https://share.catrob.at/pocketcode/program/5487>
- <https://share.catrob.at/pocketcode/program/5488>
- <https://share.catrob.at/pocketcode/program/5489>
- <https://share.catrob.at/pocketcode/program/5490>
- <https://share.catrob.at/pocketcode/program/5492>
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- <https://share.catrob.at/pocketcode/program/5495>
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Create@School games

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ANNEX 2. SCHOOLS AGREEMENT & PARENTAL CONSENT



Escuelas Profesionales de la Sagrada Familia
Subdirección General

Sevilla a 22 de enero de 2015

Estimada Xenia, habiendo tenido conocimiento del proyecto *No One Left Behind* que pensáis desarrollar en España, solicitamos formalmente la participación en el mismo.

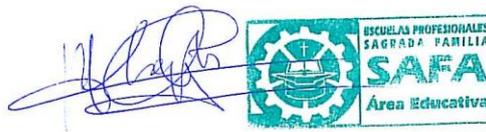
Las razones que avalan esta petición son las siguientes:

1. SAFA es una Fundación con 26 centros Educativos en Andalucía y con un larga trayectoria educativa.
2. Estamos presentes en todas las provincias andaluzas y tenemos centros de diversos tipos desde centros pequeños de Infantil, Primaria y ESO, hasta centros con todos los niveles educativos incluida una Escuela Universitaria de Magisterio.
3. Por carisma fundacional estamos ubicados principalmente en zonas desfavorecidas.
4. Creemos que podemos colaborar con éxito en la consecución de los objetivos del proyecto, especialmente en lo que hace referencia al desarrollo académico y de integración social.
5. A lo largo de nuestra historia hemos participado en muchos proyectos de experimentación y en la actualidad estamos inmersos en algunos de innovación educativa.

Por todo esto y algunas cuestiones más, creemos que podemos desarrollar el proyecto con garantías de éxito y esperamos ser aceptados.

Si es necesario aportar más información complementaria, estamos a vuestra disposición.

Un saludo.



ESCUELAS PROFESIONALES
SAGRADA FAMILIA
SAFA
Área Educativa

Fdo.: Francisco Expósito Piñas
Subdirector General de la Fundación SAFA



Fundación inscrita con el número JA/311 en la Sección Primera del Registro de Fundaciones de Andalucía
C/ Trajano, 35 A - 41002 Sevilla
Telfs.: 954 915 857 - Fax: 954 371 483 - E-mail: educativa@safa.edu - safado@safa.edu - www.safa.edu



Escuelas Profesionales de la Sagrada Familia
- Úbeda -

Úbeda, 21 de diciembre de 2015

Adjunto remito los consentimientos firmados de las familias de los alumnos y alumnas de 5º y 6º de Primaria y 2º y 3º de ESO del Centro SAFA de Úbeda para participar en el proyecto "No One Left Behind"

Sin otro particular les saluda atentamente

EL DIRECTOR



Fdo.: Víctor Pérez Cárdenas



Fundación inscrita con el número JA/311 en la Sección Primera del Registro de Fundaciones de Andalucía
Av. Cristo Rey, 25 - Apdo. Correos, 5 - 23400 Úbeda (Jaén)
Telf: 953 79 61 02 - Fax: 953 79 64 56 - E-mail: ubeda@safa.edu
www.safa.edu



Queridos padres/madres/tutores,

Nuestro colegio ha sido seleccionado para participar en uno de los 3 pilotos que se van a desarrollar en el proyecto "No One Left Behind" (contract nº 645215) cofinanciado por la Comisión Europea dentro del Programa Horizonte 2020.

"No One Left Behind" es un proyecto que tiene como objetivo fundamental utilizar técnicas de videojuegos para mejorar las habilidades de los alumnos tanto a nivel de contenido académico como en programación, creatividad y habilidades sociales.

"No One Left Behind" está coordinado por la empresa española INMARK Europa y cuenta con un consorcio de 7 participantes entre los cuales podemos encontrar educadores, programadores, diseñadores y empresas de videojuegos de 4 países europeos (España, Reino Unido, Alemania y Austria).

Para más información pueden visitar: www.no1leftbehind.eu

Para la participación en dicho proyecto y siguiendo la legislación aplicable en materia de protección de datos por la presente solicitamos su consentimiento expreso e informado, mediante firma en el Anexo I adjunto

Annexo I

CONSENTIMIENTO INFORMADO

Con mi firma, después de haber sido debidamente informado del proyecto "No One Left Behind" (contract nº 645215), procedo a manifestar mi consentimiento expreso e informado para la participación del menor al que represento, en el mismo.

Colegio:

Clase:

Nombre y apellidos del menor	Nombre y apellidos del padre/madre/tutor	Firma	Comentarios

En ade de 2015

Fdo.:

POLITICA DE PRIVACIDAD y PROTECCIÓN DE DATOS.

La utilización de los datos e información recogida en el piloto será solo y exclusivamente para su utilización en el ámbito del proyecto No One Left Behind. La información será utilizada con fines de análisis en el ámbito del proyecto y siempre de forma anónima y no identificada. En el caso de que los resultados del proyecto sean publicados, en ningún momento se incluirá información que pueda revelar la identidad de los menores participantes.

De conformidad con lo establecido en la Ley Orgánica 15/1999, de 13 de diciembre, de Protección de Datos de Carácter Personal, se le informa de que esta autorización, así como los todos datos facilitados en el desarrollo del piloto van a ser incorporados para su tratamiento a un fichero de titularidad del INMARK Europa. Ud. tiene derecho de acceso, rectificación, cancelación y oposición en los términos previstos en la Ley, que podrá ejercitar por escrito dirigido a INMARK Europa SA email: sabina.quaylupo@grupoinmark.com

ANNEX 3. ATTRAKDIFF QUESTIONNAIRE

Name	AttrakDiff (http://attrakdiff.de/index-en.html)																																																																																																																																																																																					
Description	<p>AttrakDiff helps to understand how users personally rate the usability and design of an interactive product. The online tool supports various usage scenarios:</p> <ul style="list-style-type: none"> • Single Evaluation. • Comparison between product A and product B. • Comparison Before-After. <p>It is based on the Hassenzahl model¹ for interaction design.</p>																																																																																																																																																																																					
Questionnaire or validation tool	<p>Assessment of www.attrakdiff3.de</p> <p>The following word pairs will help you for your assessment. They represent stark contrasts and can be subdivided into further rating levels.</p> <p>For example:</p> <p style="text-align: center;">pleasant* ○ ○ ● ○ ○ ○ ○ unpleasant</p> <p>This rating indicates that the product is quite pleasant but has room for improvement.</p> <p>Do not ponder over the word pairs and make your assessment spontaneously. You may feel that some word pairs do not fit the product very well. However, we would ask you to give an answer anyway. Remember that there are no "right" or "wrong" answers - your personal opinion is what counts.</p> <p>Assessment of www.attrakdiff3.de</p> <p>With the help of the word pairs please enter what you consider the most appropriate description for www.attrakdiff3.de.</p> <p>Please click one item in every line.</p> <table border="0" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;">human*</td> <td style="width: 5%;"><input type="radio"/></td> <td style="width: 15%;">technical</td> </tr> <tr> <td>isolating*</td> <td><input type="radio"/></td> <td>connective</td> </tr> <tr> <td>pleasant*</td> <td><input type="radio"/></td> <td>unpleasant</td> </tr> <tr> <td>inventive*</td> <td><input type="radio"/></td> <td>conventional</td> </tr> <tr> <td>simple*</td> <td><input type="radio"/></td> <td>complicated</td> </tr> <tr> <td>professional*</td> <td><input type="radio"/></td> <td>unprofessional</td> </tr> <tr> <td>ugly*</td> <td><input type="radio"/></td> <td>attractive</td> </tr> <tr> <td>practical*</td> <td><input type="radio"/></td> <td>impractical</td> </tr> <tr> <td>likeable*</td> <td><input type="radio"/></td> <td>disagreeable</td> </tr> <tr> <td>cumbersome*</td> <td><input type="radio"/></td> <td>straightforward</td> </tr> </table> <p>* required field</p> <p>Assessment of www.attrakdiff3.de</p> <p>With the help of the word pairs please enter what you consider the most appropriate description for www.attrakdiff3.de.</p> <p>Please click one item in every line.</p> <table border="0" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%;">stylish*</td> <td style="width: 5%;"><input type="radio"/></td> <td style="width: 15%;">tacky</td> </tr> <tr> <td>predictable*</td> <td><input type="radio"/></td> <td>unpredictable</td> </tr> <tr> <td>cheap*</td> <td><input type="radio"/></td> <td>premium</td> </tr> <tr> <td>alienating*</td> <td><input type="radio"/></td> <td>integrating</td> </tr> <tr> <td>brings me closer to people*</td> <td><input type="radio"/></td> <td>separates me from people</td> </tr> <tr> <td>unpresentable*</td> <td><input type="radio"/></td> <td>presentable</td> </tr> <tr> <td>rejecting*</td> <td><input type="radio"/></td> <td>inviting</td> </tr> <tr> <td>unimaginative*</td> <td><input type="radio"/></td> <td>creative</td> </tr> <tr> <td>good*</td> <td><input type="radio"/></td> <td>bad</td> </tr> </table> <p>* required field</p>	human*	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	technical	isolating*	<input type="radio"/>	connective	pleasant*	<input type="radio"/>	unpleasant	inventive*	<input type="radio"/>	conventional	simple*	<input type="radio"/>	complicated	professional*	<input type="radio"/>	unprofessional	ugly*	<input type="radio"/>	attractive	practical*	<input type="radio"/>	impractical	likeable*	<input type="radio"/>	disagreeable	cumbersome*	<input type="radio"/>	straightforward	stylish*	<input type="radio"/>	tacky	predictable*	<input type="radio"/>	unpredictable	cheap*	<input type="radio"/>	premium	alienating*	<input type="radio"/>	integrating	brings me closer to people*	<input type="radio"/>	separates me from people	unpresentable*	<input type="radio"/>	presentable	rejecting*	<input type="radio"/>	inviting	unimaginative*	<input type="radio"/>	creative	good*	<input type="radio"/>	bad																																																																																																																										
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¹ Hassenzahl, M. The Thing and I: Understanding the Relationship Between User and Product. In Funology – From Usability to Enjoyment, Kluwer Academic Publishers, NL, 2003.

Assessment of www.attrakdiff3.de

With the help of the word pairs please enter what you consider the most appropriate description for www.attrakdiff3.de.

Please click one item in every line.

confusing*	<input type="radio"/>	clearly structured						
repelling*	<input type="radio"/>	appealing						
bold*	<input type="radio"/>	cautious						
innovative*	<input type="radio"/>	conservative						
dull*	<input type="radio"/>	captivating						
undemanding*	<input type="radio"/>	challenging						
motivating*	<input type="radio"/>	discouraging						
novel*	<input type="radio"/>	ordinary						
unruly*	<input type="radio"/>	manageable						

* required field

Assessment of www.attrakdiff3.de

In the following section we would ask you to give information about yourself and your own experience with the product.

Age

Gender

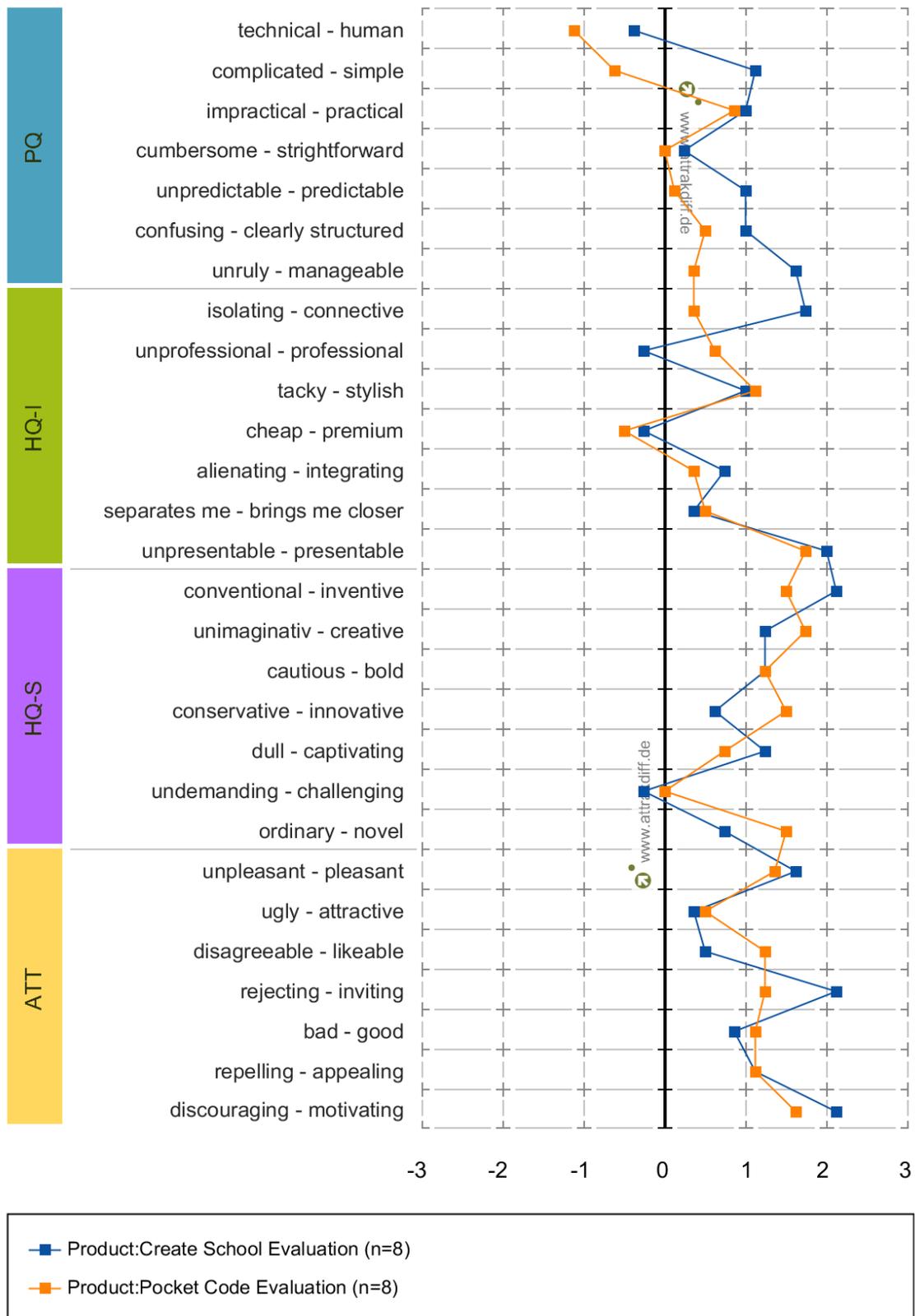
Education completion

Profession

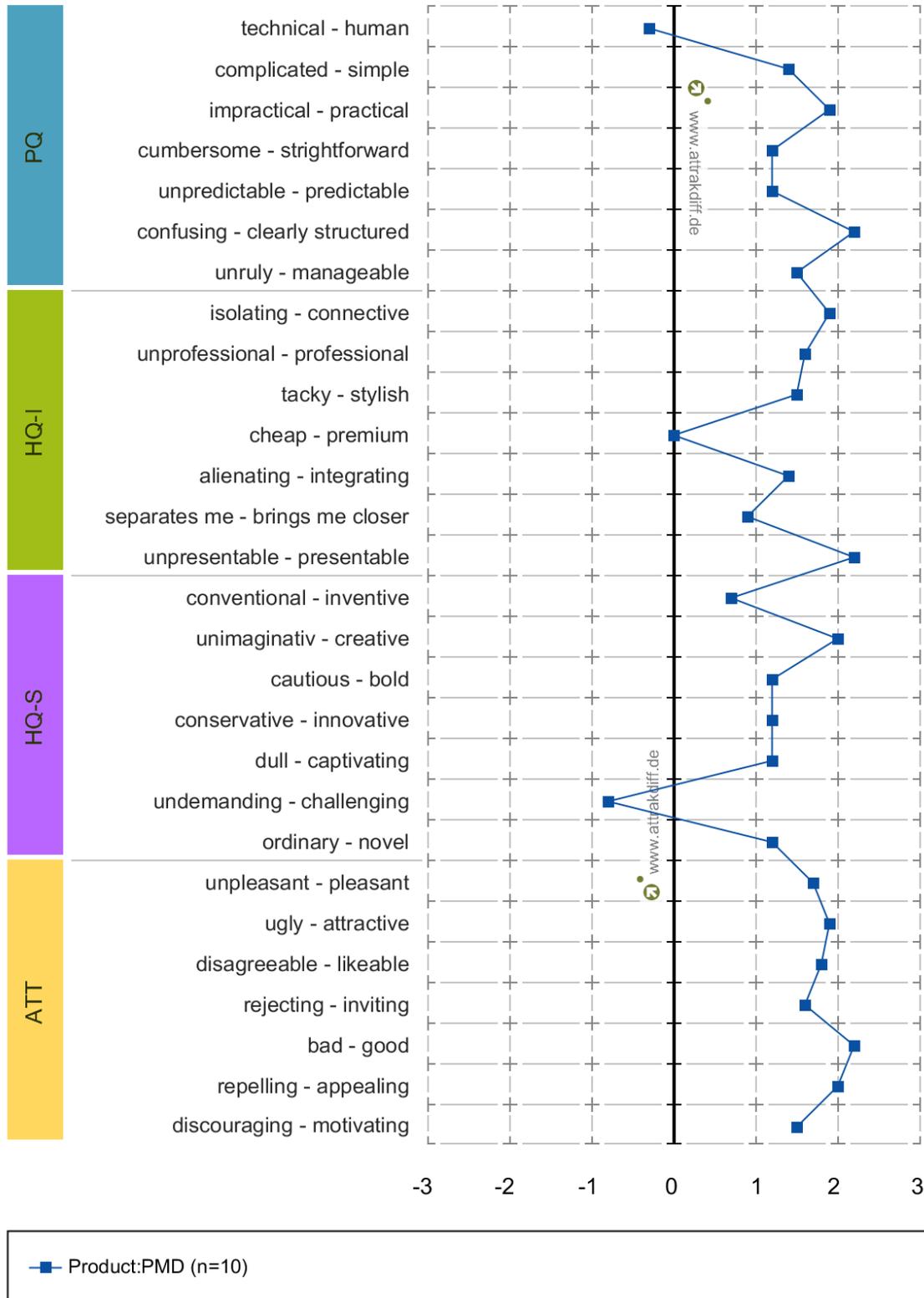
How long have you been using www.attrakdiff3.de?

Product experience*

ANNEX 4. GRAPHICS WORD – PAIRS STUDY 4.3.1



ANNEX 5. GRAPHICS WORD – PAIRS STUDY 4.3.2



ANNEX 6. GRAPHICS WORD – PAIRS STUDY 4.3.3

