



D4.2 Collaborative Game App

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¹ **R**=Document, report; **DEM**=Demonstrator, pilot, prototype; **DEC**=website, patent fillings, videos, etc.; **OTHER**=other

² **PU**=Public, **CO**=Confidential, only for members of the consortium (including the Commission Services), **CI**=Classified, as referred to in Commission Decision 2001/844/EC

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EXECUTIVE SUMMARY

The deliverable D4.2 “Collaborative Game App” describes “Games Hunter”, the marketable name for one of the Pluggable Applications within the PLUGGY project. The novelty of this application is the authoring app, which aims to develop collaborative games without previous programming knowledge, providing basic blocks such as rules, routes, packages to create easy-to-use games where end-users are engaged into cultural activities through challenges, trials and other gamification-based techniques. The entire tool consists of a Basic Editor (“drag and drop”), a more complex Editor Pro and the player which is exactly Games Hunter app.

This deliverable is of type OTHER, hence the main output are the different apps, available from the links below. This report is an accompanying document for the actual developed software.

Games are one of the most effective solutions if you want to actively involve the user. To be attractive, however, you have to design and develop simple but interesting games which can be appealing for the decided target audience.

The deliverable explains the basic features of the Rapid Application Development app with the aid of some tutorials.

Tutorial and links for Pluggy Basic Editor:

<https://www.youtube.com/watch?v=e-KXbF0pGY&feature=youtu.be>
<https://www.youtube.com/watch?v=p0wh03XV0R4&feature=youtu.be>
<https://www.xteamssoftware.com/pluggy/editor/>

Tutorial and links for Pluggy Editor Pro:

<https://youtu.be/kkONByDZ2JQ>
<https://drive.google.com/file/d/17gl1Fq2RP95Uw1is8GRIfT16shpBWYcw/view?usp=sharing>

Tutorial and links for Pluggy Apps:

https://www.youtube.com/watch?v=U5_x6CgUHMQ
https://www.youtube.com/watch?v=U5_x6CgUHMQ
https://www.youtube.com/watch?v=xSZ_VTbyH8w&feature=youtu.be
<https://play.google.com/store/apps/details?id=com.xteamssoftware.pluggygameshunter>
<https://apps.apple.com/gr/app/pluggy-games-hunter/id1467610641>

1 Introduction

The document contains different paragraphs describing the three main components of the Games Hunter app: (1) the editor, integrated in the platform's curatorial tool; (2) the standalone Editor Pro; (3) the player which is a mobile app downloadable from the stores. All these three tools give the possibility to increase the engagement level of museums, exhibitions, open-air shows through some easy games, quizzes challenges all based on cultural contents. Curators or people in charge of the exhibitions could create a wide range of games with no previous programming knowledge. The end-users are represented by the visitors, who will download the app once they get to the museum.

The Editor allows the user to create and program the files for the games. It is freely available and accessible through the curatorial tool. The editor shows the "bricks" (the components of the trials) and the "blocks" (the trials themselves) available for the programmer to create the game.

The Editor Pro is a stand-alone tool which performs the same purpose of the basic Editor but it comprises more functionalities. The users can create games with better control on the logic, the timeline and, overall, he/she has access to more complex trials.

The third tool component is the mobile app: Games Hunter is one of the possible players available for the previously described editors. The app decodes the script created through the editors and shows the ready-to-play game.

Game Hunter adopts HTML, JavaScript (JS) and PHP to create the Editor, while the Editor Pro is programmed with C++ languages. JSON and XML have been used to create the scripts. The UI is developed and designed by XTeam. The app is programmed in C# and with the Unity 3D engine.

2 Editor

The basic editor integrated into the PLUGGY curatorial tool is a web-based editor. It is very straightforward and addressed to those with no (or very little) programming experience. Fig. 1 shows the editor interface with the characteristic blocks and bricks containing the game's components. The editor can visualize a maximum number of 10 trials.

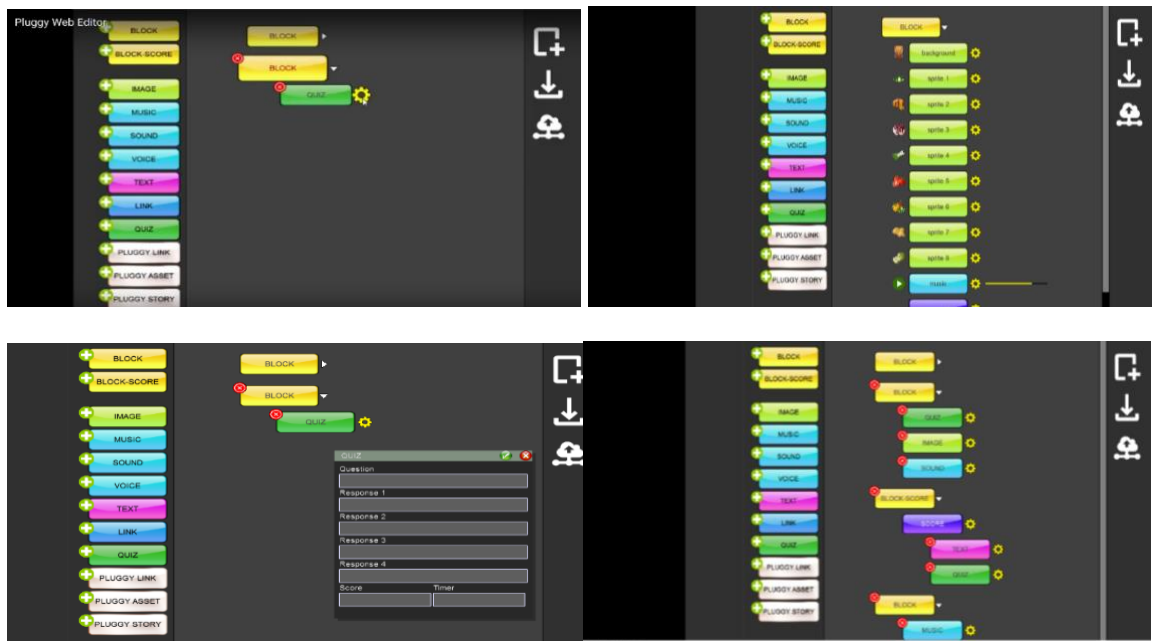


Fig.1: Editor basic

The editor interface shows, on the right, the blocks (upper) and the bricks (lower). The blocks are the trials while the bricks represent the components that create the trial e.g. images, music, texts... After clicking on the block, the user can decide which type of trial he/she wants to add, dragging the chosen bricks. As explained in the video tutorial, if one wants to add a trial quiz, he/she has just to drag from the left and drop to the right window the correspondent brick. Every button requires other actions (e.g. deciding which files to upload or texts to insert).

This basic version does not allow the programmer to choose and change the game timeline because the trials are sequentially activated.

In Figure 1, only one template is shown as an example, but there are various “mini” templates, containing a different type of bricks: by this way, it easier and more straightforward to program the game.

As shown in the video, there are some images, sounds and recordings available directly on the Game Hunter database; the user can either use those items or upload others from another database he/she creates.

At the very bottom left column, there are Pluggy Link, Asset and Story bricks that give access and connect the user to the Pluggy Platform while playing.

Link for Pluggy Basic Editor:

<https://www.youtube.com/watch?v=e-KXbF0pGY&feature=youtu.be>
<https://www.xteamssoftware.com/pluggy/editor/>

3 Editor Pro

As previously mentioned, the stand-alone Editor Pro has the same objectives of the Basic Editor, but it consists of a quite different tool. It is more complex if compared to the Basic version, but it also has more possible trials. It has been developed for curators not only to have the possibility to create more engaging games but also to have an external tool which works standalone. The JSON editor allows a deeper control of the script and all the functionalities.

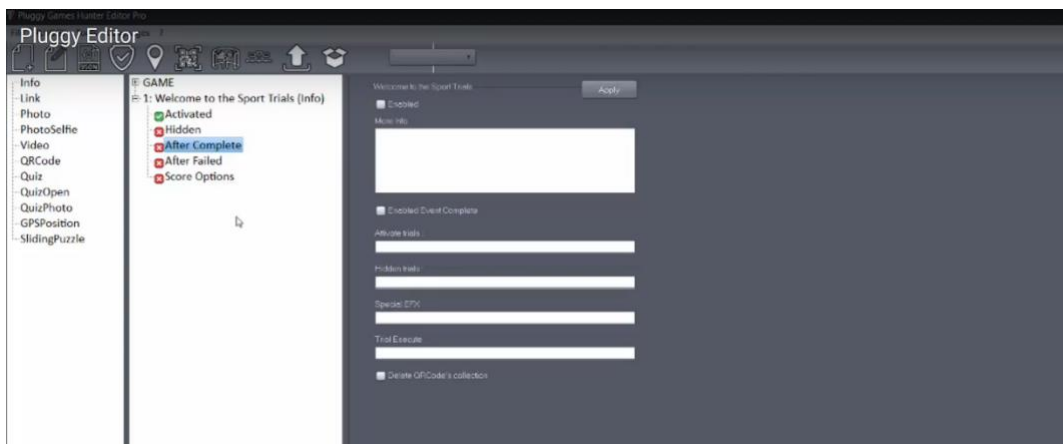


Figure 2: editor pro interface

Figure 2 represents the Editor Pro interface that preserves the typical bricks and block structure: on the left, it shows the blocks (info, link, photo etc..) which already contains all the possible bricks that can be activated. Clicking on a block, the user can decide all the setting of the trial in the right window.

Unlike in the basic editor, the user can control the timeline deciding the sequence of trials through the “activated, hidden, after complete” etc. buttons. A detailed description of the timeline is given in the Reference Manual (Appendix C).

The tool contains a database of images, sounds and other files, which can be directly added by the creator. Otherwise, he/she can upload different files from another database or the pc.

The Editor Pro also optimizes the files uploaded (such as photo, video or mp3 files) to be better visualized on the app.

Editor Pro also allows creating a file .zip that contains all the necessary assets to run the game. By this way, it can be possible to play the game outside the Pluggy Platform and install it on another server (e.g. the museum server).

In the User Manual in Appendix B it will be deeper explained all the various trials and examples of trials combination which can be created. The reference Manual in Appendix C contains a more detailed and technical description of the game creation.

Links for Pluggy Editor Pro:

<https://youtu.be/kkONByDZ2JQ>

<https://www.youtube.com/watch?v=p0wh03XV0R4&feature=youtu.be>

<https://drive.google.com/file/d/17gl1Fq2RP95Uw1is8GRIfT16shpBWYcw/view?usp=sharing>

4 App



Figure 3: Grab of the home screen of the app

The Games Hunter App is the player which visualizes the script created and programmed in the editor. The app contains the scripts, images, sounds and all the other files necessary to play with trials inside the game. The player de-codifies the packages and manages photos, trials, sounds and game timeline. The app is downloadable from Google Play or Apple Store.

There are three possible ways to access the games:

1)The list is available and can be downloaded on the Pluggy platform. In this case, it's possible to filter through a various parameter (e.g. date, location, name, caption)

2)Through geolocation (the ten closest events to the player are shown in the screen)

2)Through the QR code, which activates the link and the user can directly download the game. In this case, the QR code can be set either at the museum entry or inside a book, near an artefact where it can be easily found by the user. Once it is activated, the game is downloaded and executed.

The app is accessible also in "Guest mode" without logging in Pluggy platform. However, in the guest mode, some functionalities (e.g. the photo-sharing) are not available because the user can't play in collaborative mode.

Links for Pluggy Apps:

https://www.youtube.com/watch?v=U5_x6CgUHMQhttps://www.youtube.com/watch?v=U5_x6CgUHMQ

https://www.youtube.com/watch?v=xSZ_VTbyH8w&feature=youtu.be

<https://play.google.com/store/apps/details?id=com.xteamssoftware.pluggygameshunter>

<https://apps.apple.com/gr/app/pluggy-games-hunter/id1467610641>

More Grabs of the App are shown in Appendix A, along with some pictures taken during the pilots.

5 Deviations from Description of Action

We report here the original description of **T4.2 of the DoA: Collaborative Game design and implementation:**

The aim of this task is to design and implement a videogame Rapid Application Development (RAD) app environment to create collaborative games where participants are engaged into asset and story discovering through challenges and other gamification-based engagement techniques. The app should be usable by non-programmers. This task will include developing of the following submodules:

- *Drag and Drop interface for assets*
- *Map editor*
- *Event management game flow design*
- *Database management for character and other game resource handling*

There haven't been any major deviations from the DoA. The main change is the creation of a stand-alone Editor Pro, developed after the feedbacks obtained during the pilots to meet the museums' needs.

Moreover, the map editor is pinned only to the Pro version of the editor and not on the web-based version. This choice is the results of numerous tests, pilots and strong collaboration with the partners.

6 Conclusions

The deliverable contains the description of the Games Hunter applications, showing the design and the functionalities of the tool. Games Hunter is made of three components: the web-based Editor, the standalone Editor Pro and the player itself (the mobile app). The basic version of the editor is integrated into PLUGGY curatorial tool and it is used to create collaborative and interactive games for the visitors of museums and exhibitions. The Editor Pro is a more complex version and it comprehends more functionalities than the basic one. Finally, the player is represented by the mobile application downloadable by the end-user.

Games Hunter app represents a useful and easy-to-use resource for institutions, museums and those working in the cultural heritage. Thanks to its intuitive structure, it allows people with no previous programming experience or knowledge, to create engaging cultural games.

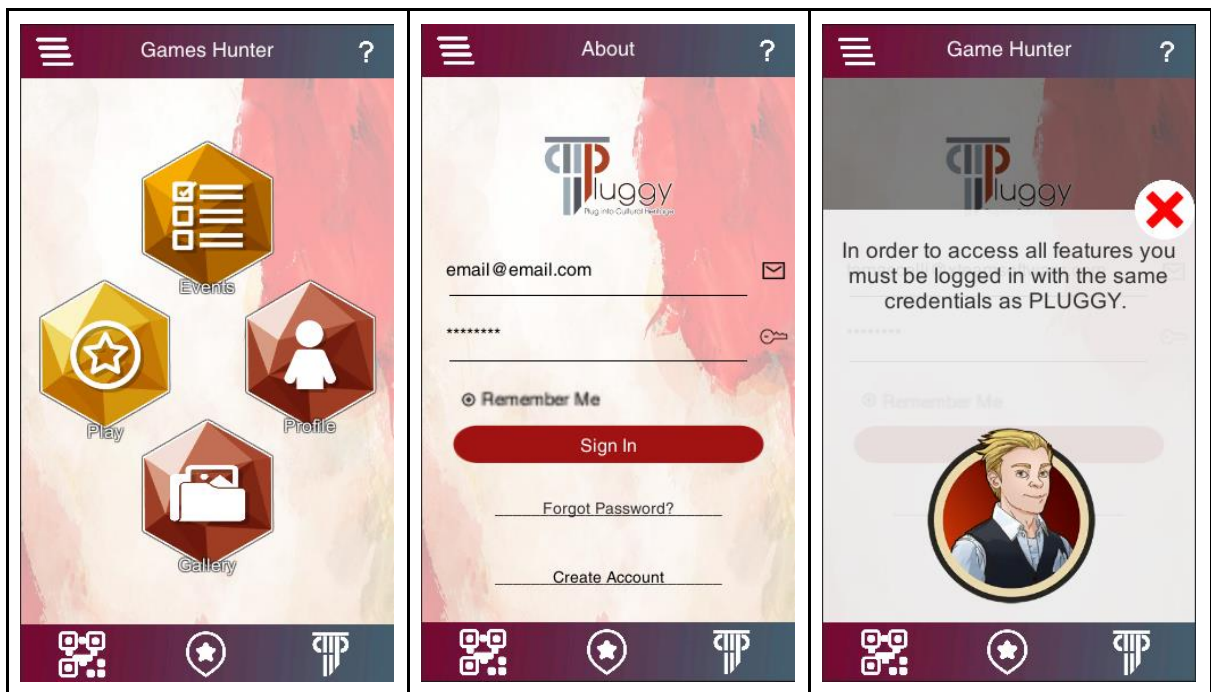
Appendix A

This Appendix is devoted to 1) the pictures representing some of the pilots where Game Hunter app has been used and tested and 2) to some more grabs of the app shown the functionalities.

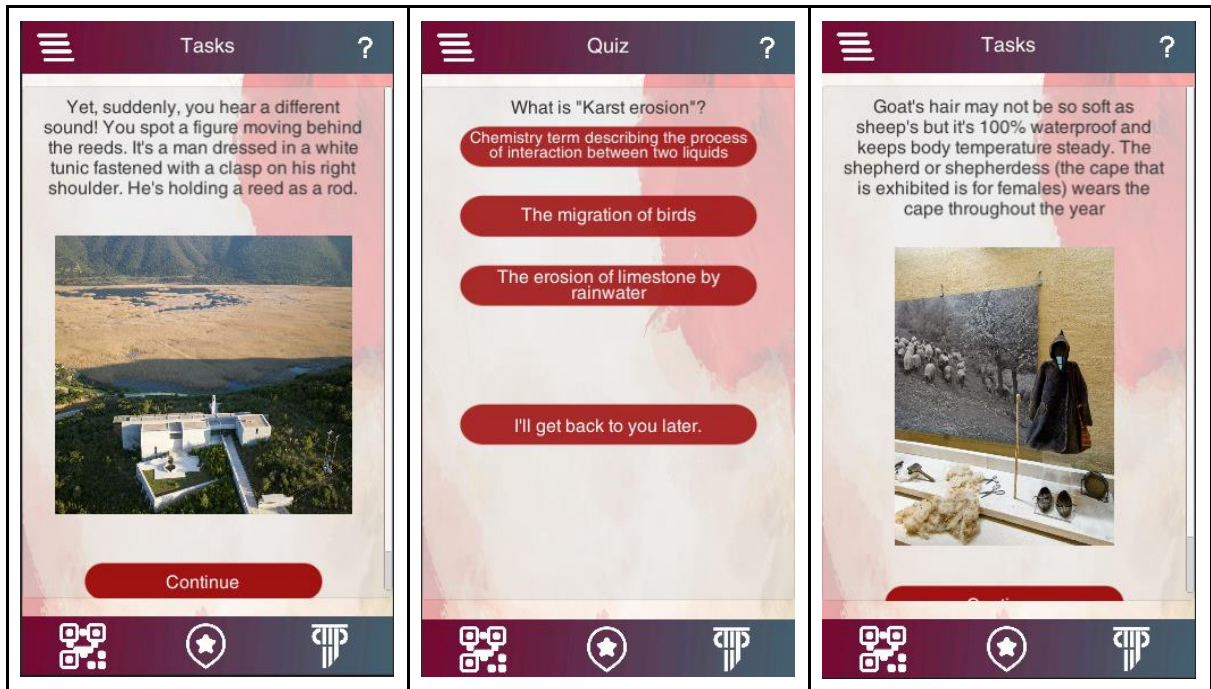




Grabs of the app:







Appendix B

Appendix B contains the User Manual, which deeper describes the possibilities and functionalities of the app.



Introduction

Games represent a very effective way to engage users. Clearly, games can't neither be too serious neither addressed to a niche target or linked to academic content. Firstly, games must be pleasant.

One of the most relevant requirement a game designer must take into account is the product's target. Below are collected some targets among museums' visitors and some respective examples of engaging features.

- **families:** the easiest way to engage families are the GAME HUNTERS, full of various difficult levels of enigmas to solve. This represents a good compromise to involve all the family's members at the same time.
- **children:** (8-14 y.o. or schoolchildren): they need mainly "arcade" games so they have a time limit to finish a trial and this mechanism highly increases the challenge feeling, but in an educational context.
- **average visitors:** what they expect is mostly an interactive aid during the visit, such as more info about artefacts or some curious stories even if they don't buy the audio guide.
- **elderly visitors:** usually they don't look for games. Furthermore, some of them do not feel comfortable with electronic devices. So, a simple but effective solution is a voice synthesis (o mp3 files) which provides easily accessible info.

Below are listed some of the best practices to design and develop an engaging game, highlighted as outcomes of the several pilot:

- **storytelling:** the secret is to create a story and not a game. Indeed, the user feels more involved, as if he were a character in the game and not just an external observer.
- **rewards:** to increase the participation, it's also suggested to give some rewards, e.g. the best players, or the winner of a daily museum challenge... Just to mention, the rewards can be a discount on some tickets, a sale at the gift store...
- **freedom:** *"Man only plays when in the full meaning of the word he is a man, and he is only completely a man when he plays."*, Friedrich Schiller. The player wants to feel free especially when he plays, so the game should not be very strict. He wants to imagine the story.

- **entertainment:** clearly, every game must contain a leisure component, for its deepest meaning. So, it is necessary to develop nice/ funny features.
- **challenge:** there are several alternatives to set a challenge. Among others: challenges based on the photo with the highest number of likes on the social network (Facebook, Twitter), challenges based on the time to complete a trial, challenges based on the score collected at the end on the exhibition...

Contents

This section sums up the contents of the manual. So how to read it. This manual is though to help you through the whole creation of your game. You can always refer to this document during each stage of the work. We suggest you envisioning your idea at the beginning of the work and then, trying to exploit these tools.

The section Game Type describes how to activate your games. This is the first choice you need to deal with.

In Game Building section you'll find all you need about the kind of trials (trials type) and how to combining them to create the game in terms of time (trials timeline).

The Collaborative Games section contains another interesting feature of this toolkit: the chance to play among more visitors. If you want a deep knowledge of more complex games, refer to the section Advanced Games, which include the description of other interactive games.

Finally, the User Interface section shows the app aesthetics. You can also find some examples as an annex.

Game Type

The first thing to know is how the games can be activated by the game creator. There are three possible ways to activate the game.

SEARCH

The user navigates on the Pluggy platform and he looks for various games, among the one available.

GEOLOCATION

As the game contains the GPS coordinates, the 10 nearest events are shown to the player. And he can decide which one to use.

QR CODE

There also the chance to download a script directly from a QR code link. By this way, it's easy to set a QR code either at the museum entrance or on books or brochure (but this is open to more solutions) and the game is automatically activated. QR code feature is suitable if you want your game to be played only in the museum.

Otherwise, geolocation is for those who want more accessible games. The game creator chooses one of these three possibilities, depending on his requirements; moreover, he can decide to let unlock the game through all the previous ways.

WARNING! Photos / Images size

Game building

Here you can find all the possible features your game can have. Please remember that these are only assets but you have great flexibility while building your games; once you come up with the idea which best suits for your museum, you can go on with the development.

The trial types represent all the "tasks" which can be submitted to the end-users, while the trial timeline deals more with the temporal sequence in which the trial can be shown. Actually, the final game is exactly the combination of trial types in a specific order. For example, to create a new game, you can either just set the same trial types in a different sequence or maintaining the same timeline but changing the types of trial.

Trial Type

Suggestion 1

The trials need to be pleasant for the users. the user needs to be engaged and encouraged to get on with the required actions of the play. In this way, she can perceive the cultural activities within the museum as intriguing and appealing. The main suggestion for the game ideator is to create mainly stories and adventures, in which people feel immersed in an "unreal", engaging world which stimulated the fantasy. Moreover, the app for a museum should be an added value both for the museum and the user. So the effective narrator should be the visitor not whom who invented the game itself. The concept is that the player is the main character of the app.

Suggestion 2

The users don't want texts that are too long to read, prefer "emotional" images, as in today's social networks.

It is useful to remember that people use smartphones, which have small screens, and use it with one hand.

PHOTO TRIAL

During the testing, one of the main outcomes is that the trials based on the photo are the most appreciated by the end users. The main advantage of these trials resides on the simplicity because they do not require a deep knowledge of specific topics, and they are easily accessible for every user, independently from the age.

Suggestion

When creating this kind of trial, it's highly recommended to think of something appealing and funny for the task description. This means not only writing "take a picture of the artefact" but also "ask a stranger to take a picture of you while imitating the subject of the painting".

On the second hand, it's also really welcomed by the end users if they are asked to take a selfie. Again, the goal is to create a pleasant task. Furthermore, it's interesting (and tested during pilots with impressive outcomes) to set team trials, which involve more than one person. Clearly, it's better if the task is very engaging and challenging. Just an example "take a picture where you and your team simulate the restoration of the bronze in front in this room".

PHOTO SHARE

Another common and really appreciated trial is the one where people have to share a funny picture on social networks. This kind of trial is also of "dissemination" interest because the museum will appear in several pictures on social networks. Moreover, it's also useful because it shows that people can enjoy also in a museum environment, which is often considered as boring.

Suggestion

Sharing pictures on social networks is a very effective way to generate engagement. Just to mention an example, let's imagine a photo contest

Just to mention, we can imagine a small photo contest where people have to share a pic taken in the museum. The pic which receives more likes wins the contest and respective player gains a free or discount ticket for the following exhibition.

Furthermore, it's necessary to underline that the average end user does not read captions/explanations for more than 2 minutes while visiting a museum. So the usage of images and visual engagement is extremely relevant to promote cultural activities.

VIDEO

Videos contain great potential for various purposes. They are often more intriguing than pictures. However, videos bring also some issues to deal with: their dimension is one of them. It's hard to upload heavy videos; on the other hand, if videos are very small their content is of low quality.

NOTE: at this stage of the project, videos are not supported by the PLUGGY platform

INFO

The info trial is thought to provide certain info to the visitor. They are "read-only" trial, so they are completed when read.

Suggestion

These trials can be adopted either to simply provide info or to activate other trials in succession. Just to provide an example: once the info trial has been completed, a QR code

trial starts automatically. The info trial can contain some suggestions about the artifacts to collect. Another application of the info trials is of the bond within the story chapter. Clearly, they can just contain cultural info, may be connected with the QR code or sensors in the near environment.

LINK

The link trials aim to provide useful info to the visitor through the browser (also questionnaires, forms, videos, web pages, Pluggy pages...). These are read-only trials, so they are completed once the browser becomes active.

Suggestion

Link trials are useful not only to give info to the user but also to activate various trials in succession. Moreover, these are a good instrument to compile the questionnaires, because the user gains points after activating the Google form (NOTE: from the app, it's not possible to monitor whether the Google form has been effectively sent or not). Another functionality of these link trials is to start videos containing the task and instructions necessary to complete the game.

QUIZ

The quiz trials are used to get answers from the user with multiple-choice quizzes (max 4 answers). It is possible to insert max 8 answers to create a greater uncertainty in the questions.

Suggestion

Quizzes are very important to create a path inside the museum or museum site, which can involve and entertain the visitor, putting him to the test, and perhaps creating a sort of "game-challenge" with other visitors.

QUIZ OPEN

In this kind of trials, the user will directly answer to the question (he/she doesn't choose among different answers) typing with the keyboard.

Suggestion

The open quiz is useful to gather direct info from the end-users. The answers need to be concise and clear (even one single word can be fine) to avoid typos.

QUIZ PHOTO

The photo quizzes are trials that create multiple-choice quiz where the answers are represented by pictures.

Suggestion

The photo quiz are useful to interact with children or to submit quizzes that require a visual support (painting, artifacts, locations...).

QR CODE

The QR code Trials are thought as "search games", where the player should find the QR code associated with the secret word. When one finds this word, the trial is completed.

Suggestions

These QR code games are very pleasant, especially if set with an engaging game timeline (e.g. a time constraint to complete the game).

Note: One single QR code can activate a single game, or more than one. It's a creator choice. While framing the QR, a link automatically activates a script. In this way there is a great flexibility when building up the QR code trials.

QRCode Collection

As the name suggests, these are similar to a collection game, where the player must look for the QR codes which contain the collected words. The trial is completed when the user has collected all the words required.

Here you have an example

Task. Collect: Gioconda, Oil, Paint

There are several QR codes within the museum, or inside the room. Each QR code contains various words, such as

QRCode1 : gioconda, da vinci

QRCode2: oil, brush

QRCode3: sculpture, marple

QRCode4: paint, landscape

In order to complete the collection, the user must collect all the QR codes.

It's possible to set more than one Collection Trials at a time: for example, if there is another collection with "brush, landscape", when I find the QR code for the first collection, the system will automatically save this word also for the other collection.

Suggestions

This trial is very engaging, especially if combined with a nice timeline. From our experience, we suggest avoiding many trials like this, because they might make the user to get lost and annoyed by the several words.

QR CODE PAIR

The QR Code Pair Trials are similar to a "memory game": the idea is to play with couples of QR codes, and the user must find the matching ones, in order to complete the game. More specifically, the first QR code activates a trial and the second one completes the trial.

Suggestion

This kind of game could be very effective for children engagement because it's very dynamic. As an example, the first QR code generates some questions; their answer can either be found inside the museum or chosen among several answers. The main

advantage of this trial is that the technology is not invasive at all, because the real focus is on real artefacts. Moreover, children can enjoy the fact to discover the museum and to look for an answer about cultural heritage in an engaging way.

See Advanced Games section

Conclusion






One of the most appealing features about the Game Building resides on the possibility to obtain a significantly different versions of the same game, by modifying only a few parameters. As an example, diminishing the duration of the trial, it becomes more "arcade" and the user experience is dramatically switched.

Trials Timeline

Here you can find some info about the time aspect of the game.

In order to design a dynamic story, the trials can be composed in various combinations. In this way, the player has to complete the requested actions following a temporal sequence, generated by the designer.

Note: here we are proving only some examples but the possible combinations are almost infinite. Indeed, the game creator can decide to mix together as many trials type as he/she wants. Also the creation of the sequence is very flexible, because one can choose to start a trial after a certain amount of time while another trial can start when the user has reached a certain score.






				
Trial 1	Trial 2	Trial 3	Trial 4	Trial 5
On Start	On Start	On Start	On Start	On Start

In the above example, all the trials are activated at the start of the game, so the player can choose both the first trial and the order to follow.

Suggestion






Very strict trial's order is not effective because of their content of obligation. One can feel forced to complete trials in a certain sequence and she may leave the entire game.

TEMPORAL ACTIVATION

				
Trial 1	Trial 2	Trial 3	Trial 4	Trial 5
On Start	On Time 10	On Time 15	On Time 30	On Start

In the above example, the user will see only Trial #1 and #2 already active, while trial #2 will appear after 10 minutes, trial #3 after 15 min and trial #4 after 30 min.

SCORE ACTIVATION

				
Trial 1	Trial 2	Trial 3	Trial 4	Trial 5
score 50	score 20	score 10	score 100	score 1000
On Start	On Start	On Score 50	On Score 60	On Score 180






In this example, the score is the parameter which discriminates the activation of the trials. At the beginning of the game, only trials #1 and #2, are visible.

In order to unlock a trial, the player needs to gain 50 points. So one can decide whether to complete trial #1 alone (50 points) or trial #2 and then #1 (70 points in total) to gain at least 50 points.

To unlock trial #4 the player needs 60 points; so the user can finish trial #1 and, then, complete one among #2 and #3.

On the other hand, to activate the trial #5, the user must complete all the previous ones.






SEQUENTIAL ACTIVATION

				
Trial 1	Trial 2	Trial 3	Trial 4	Trial 5
after complete activate 2	after complete activate 3	after complete activate 4		after complete activate 3

On Start				On Start
----------	--	--	--	----------

Here, the player will see only trial #1 and #5. If she completes trial #1 first, then trial #2 is unlocked. Once trial #2 is done, then trial #3 becomes visible and so on. This trial is useful to develop new paths within the game itself, also including the "hidden" functionality.






MULTIPLE PATHS ACTIVATION

					
Name	Trial 1	Trial 2	Trial 3	Trial 4	Trial 5
activated	after complete activate 2	after complete activate 3	after complete activate 4		after complete activate 3
deactivated	if complete trial 5				if complete trial 1
	On Start				On Start

Similarly to the previous example, completing a certain trial before another one, affect the following sequence. If the user chose the trial #1, he activates trial #2, then #3 and #4, while trial #5 will be missed.

On the other hand, if she chooses trial #5, trial #3 and # 4 will follow subsequently (she will skip trial #1 and #2).




ACTIVATION OF MULTIPLE TIME-BASED PATHS

					
Name	Trial 1	Trial 2	Trial 3	Trial 4	Trial 5
activated	after complete activate 2	after complete activate 3	after complete activate 4		after complete activate 3
deactivated	if time more than 5 minutes			if time more than 15 minutes	if time more than 5 minutes
	On Start				On Start

In the above example, the player must proceed in a temporal base. In this case, in the beginning, only trial #1 and #5 are already active. Both trials are turned down if not completed. Clearly, if both are deactivated, the trial will end. Trial #4 is deactivated after 15 minutes if not completed. The user can choose to start from trial #1 or #5, and the path will change accordingly (if the user takes trial #5, the path will be shorter).

One could wonder what's this managing about. Try to imagine a fictional setting where the user must defuse a device before all the artifacts inside the museum are destroyed. Clearly, the temporal requirement adds a thrilling factor to the whole story.

QR CODE ACTIVATIONS

					
Name	Trial 1	Trial 2	Trial 3	Trial 4	Trial 5
qrcode		Trial 2	Trial 3	Trial 4	
type	info	photo	photo	photo	info
	On Start				On Start






Here, the user must find some QR codes inside the museum. Linked to the QR code there are some words which unlock the trials. In this example, only trial #1 and #5 are visible, while all the others are unlocked by the QR code, which contains the keyword related to that trial. This is the format to include the keyword within the QR code: @PLUGGYACTIVATE=Trial 1



The player will see trial #1 and #5, where he will find the instructions to look for the QR codes necessary to unlock the trials.

This kind of trial is simply switched on only through the QR code: this means that the QR code makes the trail visible to the user but it does not mean the trial is completed. In the above example, once the trial is unlocked by the QR code, another photo trial is automatically activated.






QR CODES COLLECTIONS ACTIVATION

					
Name	Trial 1	Trial 2	Trial 3	Trial 4	Trial 5
collected		2 picasso	1 cat	2 landscape	3 oil
	On Start				

In this trial, the user must collect some QR codes, near which they find some words: in this example, the keywords are hello, cat, dog. @PLUGGYCOLLECTED=1,hello,cat,dog

The player will see trial #1, where she will receive info about the kind of QR codes collect. Based on the amount and kind of words collected, the trials will be respectively completed.

REPEAT A TRIAL IF FAILED

				
Trial 1	Trial 2	Trial 3	Trial 4	Trial 5
Quiz 1 - first attempt	Quiz 1 - second attempt	Quiz 1 - third attempt	Quiz 1 - fourth attempt	Info
score: 100	score: 75	score: 50	score: 25	
aftercomplete: execute trial 5	aftercomplete: execute trial 5	aftercomplete: execute trial 5	aftercomplete: execute trial 5	
afterfailed: execute trial 2	afterfailed: execute trial 3	afterfailed: execute trial 4	afterfailed: execute trial 5	

In some cases it is necessary to repeat a trial (for example if the user gives an incorrect answer). The procedure is quite simple: it is enough to clone a trial and modify the field "afterfailed->execute" by entering the number of the trial to be performed in case of wrong answer. In this examples, the user start with the trial number 1, if he/she enter the correct answer execute the trial number 5 (an info trial), if he/she enter the incorrect answer execute the trial number 2 (a clone of the first trial, with a lower score).

Suggestion

It is possible to reduce the number of possible answers (for example from 4 to 3 and then to 2) or to give suggestions.

QR CODES COLLECTIONS ACTIVATION

					
Name	Trial 1	Trial 2	Trial 3	Trial 4	Trial 5
collected		2 picasso	1 cat	2 landscape	3 oil
	On Start				

In this trial, the user must collect some QR codes, near which they find some words: in this example, the keywords are hello, cat, dog. @PLUGGYCOLLECTED=1,hello,cat,dog

The player will see trial #1, where she will receive info about the kind of QR codes collect. Based on the amount and kind of words collected, the trials will be respectively completed.

Collaborative Game

Each game can be executed independently or concurrently with others. The choice resides on the game creator user, who can decide which approach suits better. This functionality allows quite a flexibility; it's worth mentioning that one can create several games for single users or groups, through the same script. The concept of "collaborative" means that it is possible to create a team and a unique code, accessible and editable by all the member, in order to better develop the game. The aforementioned feature allows the trials to be completed by a different team member.

NOTE: in the previous testing version it was possible for the user to work together only sequentially

Trial 1 => user 1

trial 2 => user 2

trial 3 => user 3

trial n => user n

...

This mechanism is quite valid on theory. However, during the testing, some relevant issues have been underlined; as an example, if an user cannot join his trial (low battery,

mobile doesn't run well, health issues...) all the other team's members are forced to interrupt the game.

Recovery Mode

To improve the gaming experience, in case of application crashes, phone shutdowns, etc., you will be able to use the... The app has a recovery system that allows the user to recover the game.

The system is automatically activated with each completed/failed trial.

Game times are not reset to prevent users from turning off the app to complete a trial without wasting time.

So if the player plays 10 minutes, turns off the phone for 5 and then reactivates the game, the game will have been played for 15 minutes.



Advanced Games

The advanced games are more complex than the previous ones. They are though for some special events, or a specific target (e.g. people with visual impairments). The main added value is that they require interaction with physical objects.

A CARD GAME

One of the funniest games which can be created through Games Hunter is a Card Game. It consists of real cards, printed for a particular event (they can be even sold as gadgets). Just to mention one of the hundreds of possibilities, think of a cards bunch with various levels of difficulty. A school class can be divided into collaborative teams. In turn each team draws the card, read the question and the members must find the answer in the museum, through the associated QR code.

That team which collects more points wins the challenge.



Example of a game card with the descriptive caption of the trial and the QR code.

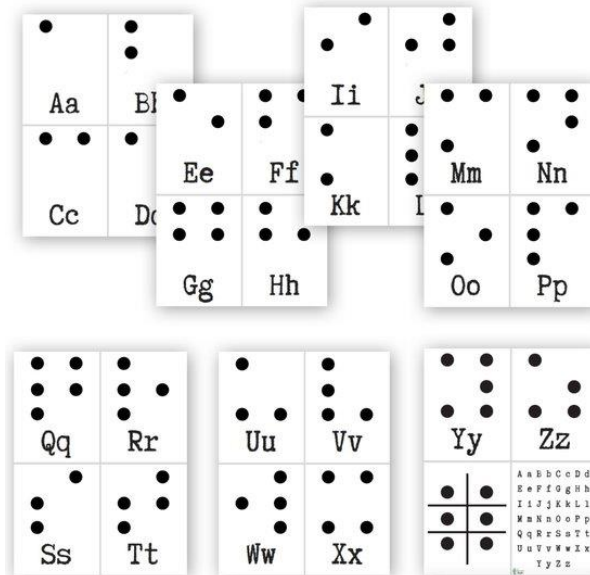
Another idea is based on the collection games (e.g. Magic The Gathering, Pokemon etc..) coupled with nice graphics and an educational but dynamic game.

In this scenario, the game becomes a challenge between two players. So the museum can also sell various cards bunches, where every card has a QR code on it. Each of them shows a little "monster/animal/fantastic character" associated with a specific value of strength/power/defence...Using a combination of more than one card, one can also evocate legendary/more powerful characters.

From an educational point of view, the team members can make the cards, through scratches etc. and start a challenge against another class.

A CARD GAME FOR BLIND PEOPLE

A supplementary and useful way to use the cards addresses to blind people. Indeed, if the cards are printed with Braille codes on them, these will let blind people to play as well.



INTERACTIVE ARG

An alternate reality game (ARG) is an interactive networked narrative that uses the real world as a platform and employs transmedia storytelling to deliver a story that may be altered by players' ideas or actions.

This is a very interactive as well as demanding game to develop. It requires also an intensive collaboration between an- users and game creators to achieve a nice outcome. The basic idea is to develop some "adventures" involving both real world (museum, artefacts, exhibition, cities...) and social networks (Pluggy platform, Facebook, Twitter...) and Collaborative Games app.

The above-mentioned adventure will be unfolded through chapters, each of them will be unlocked after solving various enigmas. The player will find some tasks and clues through the social networks (in a video, pictures and so on), while another section could be played with the app (e.g. inserting QR codes in a Facebook post) and the real Point of interest (museums, monuments ...) are the means to solve certain enigmas.

A BOARD GAME



It's also possible to develop real board games where the players interact with game maps, thumbnails, dices etc.

More than others, the “goose game” is one of the favourites among children. Each player, in turn, rolls the dice and, depending on the associated box, the player has to perform some actions. Moreover, it's also possible that the action will activate a trial on the app through the QR code.

Ex. BattleShips, Crosswords (this can be collaborative or not).

Monopoly: this is suitable for almost all children beginning from the primary school. This is the typical Monopoly game, except for the aim of the game: each player should collect more artifacts as possible. In this scenario, the tenders are extremely realistic. The game can be created ad-hoc for the single museum in order to highlight the pieces of art within the single museum (maybe providing the entire multimedia catalogue of the artifacts, through the app, possibly with a link directly activated by the QR code on the game box) . Another possibility would be to create the Monopoly envisioning a wider collection of artifacts: for example, the paintings to buy and sell might come from different museums, and the multimedia catalogue contains all of them (this is easier and more feasible for those museums which have more than one headquarters all over the world).

BOOK



It's also interesting to interact with QR code inside books pages. The trial type (especially quiz) will depend on the page topic.

The book can be a gadget for children visiting the museum, for example.

Another idea could be the adoption of Coloring books with tablets: while browsing the book's pages, one can focus on the QR code and the it will show how to color the drawing. Here you can find some ideas about this kind of interactive games.

Artistic Doodles

Children of all ages generally like to draw, reproduce what they imagine or portray what they see. They can be watching a painting (but this is not mandatory) and the task is to imagine to be the artist who painted the artifact. So the children should portray the subject as similar as possible to the real painting.

A second way is to convince children to reproduce a painting using as much as imagination as possible. For example, the child is standing in front of the "*Le bar aux Folies-Bergère*" by Edouard Manet, and focusing on the QR code, his tablets will display the following task: draw on the screen what this painting makes you feel.

Find the differences: children are in front of an artefact while they bring a tablet or a phone with them. The same artefact will appear on the screen; however, this virtual one is a bit different from the real one. The user must find these differences touching (with fingers or a touch pen) the areas of the screen where he thinks the two paintings differ from each other. For every correct found spot, he will see a green tick. On the other hand, a red cross will appear, and he can try other times.

Frescos-Books

An activity addressed to secondary school students can be called the Frescos-Book. The book given at the entrance of the museum contains certain photos of the frescos or paintings which a student should recognize (e.g. the title and the author). If one recognizes it, the app interacts with him/her in AR modality. For example, the figure of the author in AR is superimposed and this starts speaking about the artefact. Another simpler concept is that, once the student recognizes the artefacts, the app will show an interactive tour inside the museum, leading the student through certain rooms related to that while he can also read info about it on the phone.

BROCHURE

This is given at the museum entrance, for example. It contains the museum itinerary and for each room, in the associated page, the user finds a QR code which shows some Alternate Reality Info regarding a certain artifacts in a specific room. So you scan the QR code and the phone will superimpose some description over the suggested painting for example.

This is suitable also for adults.

Another possibility to achieve engagement is to set a series of ibeacons next to a certain artifact (e.g. the most interesting in a room), which will activate as soon as the visitor steps in the room: at activation, the visitor will be in front of the author of the work itself, who will describe what he created, through targeted information or curiosities that will arouse interest in the user.



7 Exploitation

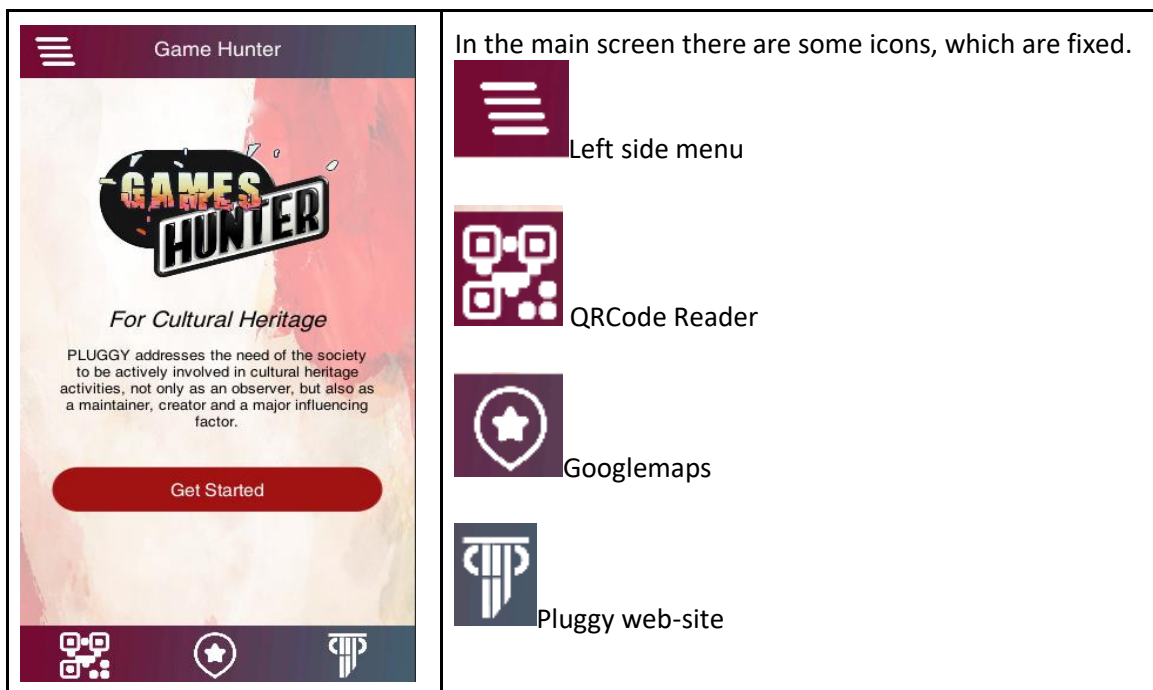
Those called here as "Advanced Games", which interact with Pluggy, allow deep exploitation of the platform because they also open the possibility to new sectors of the market.

XTeam is an entertainment company, focused on developing video games and gamification for mobile phones, desktops and consoles. Pluggy will give XTeam the opportunity to expand its commercial offering and streamline the production process. That's why we decided to design and create for Pluggy games that can entertain, entertain and engage visitors to a museum or archaeological site, or any other cultural asset. All in function of the simplicity, immediacy, attractiveness regarding the recreational aspect but also the cultural and educational importance of the game itself, in relation to the focus of this project, namely to bring citizens closer to the European cultural heritage,

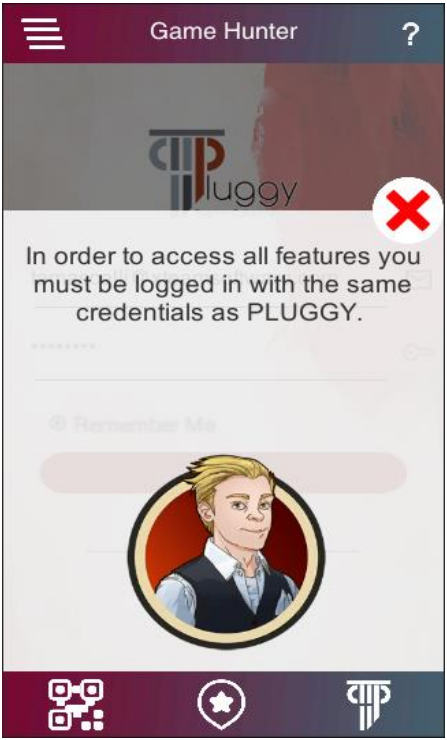
and at the same time help them to convey the culture and the importance of the common cultural heritage, making sure that users feel a fundamental part of the history of Europe, promoting inclusiveness, commonality and the exchange of values and knowledge. A collaborative game, in which participants will work together to compose a complete story on a specific cultural heritage theme. This game will be distributed on mobile phones and will use their cameras and processing power to implement an Augmented Reality or Virtual game.

Application UI


START SCREEN




ONLINE TUTORIAL

	<p>It Is present a on-game tutorial system.</p> <ul style="list-style-type: none"> • Start • Login • Play • Trials
--	--

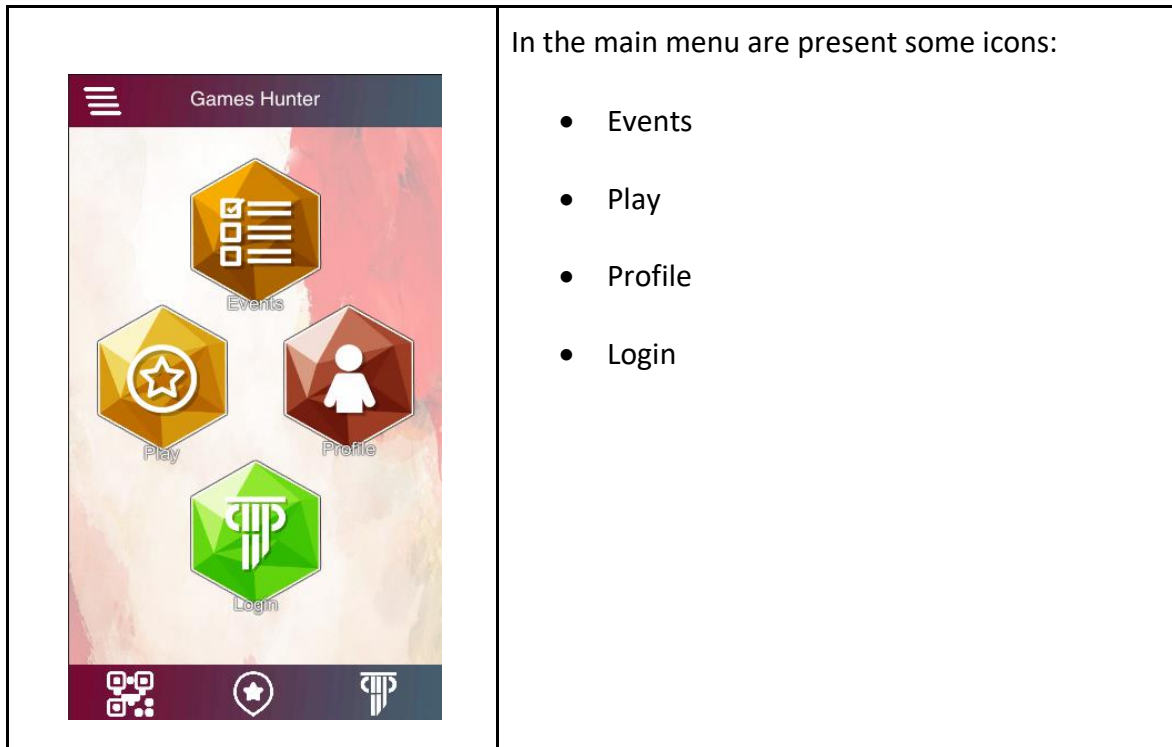
SIDE MENU

	<p>It Is present a Side Menu, with the main functionalities of the application:</p> <ul style="list-style-type: none"> • User Profile • Play game • About • Contact us • Settings <p>It is also possible to change the language: English, Italian, Greek, Slovakian and Spanish</p>
---	--

7.1.1 Login (PLUGGY)

	<p>The user can log in with Pluggy account to save the score, manage the team's play, get the event and use the Pluggy assets.</p>
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Main Menu



Appendix C

Appendix C contains the technical characteristics of the script languages.

GAME ACTIVATION

There are three possible ways to access the games:

The list is available and can be downloaded on the Pluggy platform. In this case, it's possible to filter through various parameter (e.g. date, location, name, caption)

Through geolocation (the ten closest events to the player are shown in the screen)

Through the QR code, which activates the link and the user can directly download the game. In this case, the QR code can be set either at the museum entry or inside a book, near an artefact where it can be easily found by the user. Once it is activated, the game is downloaded and executed.



The format is @PLUGGYSCRIPT=url

The parameter url represent the link to download the script

GAME DESCRIPTION

Function	Description	Format	Note
ID	game id	integer	

UUID	game uuid	string	
Enabled	If this game is enabled	bool	
Icon	Icon path	string / url	
Name	name of the game	string	
SubTitle	short subtitle	string (128 char)	
Description	description of the game	string (255 char)	
Duration	duration of the game (minutes)	integer	If "0": no time limit
Data start	date of enabling	data/string	
Data end	date of disabling	data/string	
Place	place name	string	e.g. Rovigo
GeoCoord	Location Coordinate	lat:float long:float range:float (all this are converted from strings)	Useful to create the list of games near the user Range : distance to activate in auto-mode if is different from 0
Visible	if the game is visible	bool	
Private	if this game is private	bool	Only in the museum (for examples)
Trials	list of trials	json array	
Complete	the result if a game is completed	json object	

Failed	the result if a game is failed	json object	Only with duration != of 0 or if the player leaves the game
Voice	This activates the vocal synthesis	bool	WIP activates a voice with the current culture if is possible and present on the device. To be used with attention.
StartScore	start score	int	start score
Debug	if start for debug mode	bool	if debug
Alone	se viene giocato da solo	bool	if play alone, not a collaborative game
Package	if is a zip internal package for offline mode	bool	
Package_ref_url	reference url for the package	string	
Package_ref_internal	reference internal position for the package	string	
Kiosk	if start like a kiosk / totem	bool	if activate work only in totem mode.
MapMode	if use a map mode	json object	if != null activate the map mode
Created	creation date	string	
Modified	modified date	string	

```
{
  "data": {
    "id": 0,
```

```

"uuid": "",
"enabled": false,
"icon": "",
"name": "",
"subtitle": "",
"description": "",
"duration": 0,
"datestart": "",
"dateend": "",
"place": "Rovigo",
"geocoord": {
  "latitude": "45.50",
  "longitude": "11.15"
},
"visible": false,
"private": false,
"trials": [
  ],
"debug": false,
  "complete": null,
  "failed": null
"startscore": 100,
}
}

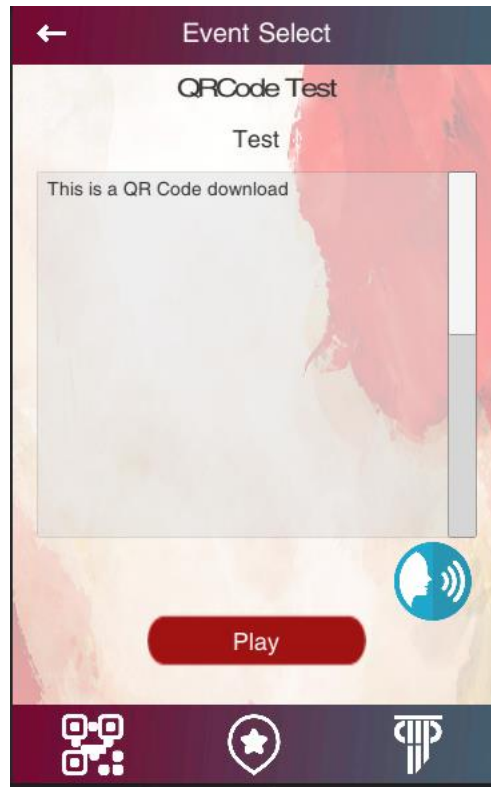
```

VOICE PARAMETER

The VOICE parameter activates a button which allows the conversion of texts into synthesized audio files (it's the device itself which does the conversion without the aid of any pre-registered audio files e.g. mp3).

The conversion system appears in two sections: when the user chooses the event and when he chooses the trial. Both title and description are converted.

The system adopts the voices embedded on the device and it is able to change between different languages and pronunciations available: English, Italian, Greek and Slovak.



7.2 GAME COMPLETE

This structure is used when the game is complete. The info should be captivating and engaging. Is possible to show a prize or a reward to the user.

OPTIONS

Function	Description	Format	Note
info	a description for the game complete, show on feedback screen	string	
link	a link to redirect the user (for examples for a prize)	string	
photo	a link to a photo	string	
sound	a link to a sound	string	mp3
score	score to added	integer	

GAME FAILED

This structure is used when the game is failed.

OPTIONS

Function	Description	Format	Note
info	a description for the game complete, show on feedback screen	string	
link	a link to redirect the user	string	
photo	a link to a photo	string	
sound	a link to a sound	string	mp3
score	score to added	integer	

GAME MAP MODE

This structure is used when the game use a maps (an image) and POIs (point of interest) to execute the trials.

OPTIONS

Function	Description	Format	Note
photo	a link to a photo	string	
sound	a link to a sound	string	mp3
pois	list of json with the pois	json object array	int x int y int trialid

TRIAL DESCRIPTION

Each game consists of a list of trials, every trial has a name and a description. Each type of trials has specific purposes which can be interchanged through different ways to create stories

Function	Description	Format	Note
ID	trial id	integer	
Type	type of trial	string	see below

Name	trial's name	string	
Description	trial's description	string	
Score	a score of the trials if completed	integer	
activated	activated structure	json object	see below
hidden	hidden structure	json object	see below
options	option structure	json object	see below
aftercomplete	aftercomplete structure	json object	see below
afterfailed	afterfailed structure	json object	see below (not used with editor)
scoreoptions	scoreoptions structure	json object	see below (not used with editor)

```
{
  "id": 0,
  "type": "",
  "name": "",
  "description": "",
  "score": 10,
  "activated":{
    },
  "hided":{
    },
  "options": {
    },
  "aftercomplete": {
    },
  "scoreoptions": {
    }
}
```

}

TRIAL TYPE

This trial let the user take pictures. More specifically, the user is asked to take a photo of something described in the trial task. The description should be captivating and engaging.

This trial activates the camera directly, to provide information on the task enter a trial info before this trial

OPTIONS

Function	Description	Format	Note
share_facebook	The trial is complete only after sharing the photo to facebook	boolean	
share_twitter	The trial is complete only after sharing the photo to Twitter	boolean	
share_instagram	The trial is complete only after sharing the photo to Instagram	boolean	
share	The trial is complete only after sharing the photo (facebook or twitter or)	boolean	
share_optional	if the share is facultative and not mandatory	boolean	
share_score	Point added if shared	int	

```
{
  "share_facebook": false,
  "share_twitter": false,
  "share_instagram": false,
  "share": "false"
}
```

TYPE: "PHOTOSELFIE"

This trial let the user take pictures. More specifically, the user is asked to take a selfie of something described in the trial task. The description should be captivating and engaging.

This trial activates the camera directly, to provide information on the task enter a trial info before this trial

OPTIONS

Function	Description	Format	Note
share_facebook	The trial is complete only after sharing the photo to facebook	boolean	
share_twitter	The trial is complete only after sharing the photo to Twitter	boolean	
share_instagram	The trial is complete only after sharing the photo to Instagram	boolean	
share	The trial is complete only after sharing the photo (facebook or twitter or)	boolean	
share_optional	if the share is facultative and not mandatory	boolean	
share_score	Point added if shared	int	

```
{
  "share_facebook": false,
  "share_twitter": false,
  "share_instagram": false,
  "share": "false"
}
```

TYPE: “VIDEO”

In this case, the trial makes a video of something like suggesting the description of the trial. It is better if it's something's pleasant.

This trial activates the camera directly, to provide information on the task enter a trial info before this trial

OPTIONS

Function	Description	Format	Note
share_facebook	the trial is complete only after sharing the video to facebook	boolean	

share_twitter	the trial is complete only after sharing the video to twitter	boolean	
share_instagram	the trial is complete only after sharing the photo to Instagram	boolean	
share	the trial is complete only after sharing the video	boolean	
share_optional	if the share is facultative and not mandatory	boolean	
share_score	Point added if shared	int	

```
{
  "share_facebook": false,
  "share_twitter": false,
  "share_instagram": false,
  "share": "false"
}
```

TYPE: "LINK"

In this case, the trial opens a link with a browser (it is possible to attach sites link, info..)

OPTIONS

Function	Description	Format	Note
url	link url	string	
url_photo	link to a photo	string	
url_sound	a link to a sound	string	mp3

TYPE: "INFO"

In this case, the trial consists of reading the text. It's possible to use this type of trial to give some additional information or to create storytelling between 2 trials.

OPTIONS

Function	Description	Format	Note
url_photo	link to a photo	string	
url_sound	a link to a sound	string	mp3

TYPE: “QRCODE”

In this case, the scope of the trial is to find a QR code.

The QR code needs to start with @PLUGGYQRCODE=word

@PLUGGYQRCODE=gioconda

If “complete” is set, this means that all trials with the word “gioconda” are completed.

This trial activates the camera directly, to provide information on the task enter a trial info before this trial

OPTIONS

Function	Description	Format	Note
word	word to find	string	



@PLUGGYQRCODE=gioconda

TYPE: “QRCODEPAIR”

In this case, the scope of the trial is to find 2 QR Codes (like a memory game).

The QR code needs to start with

@PLUGGYQRCODEPAIR1=word / @PLUGGYQRCODEPAIR2=word

@PLUGGYQRCODEPAIR1=gioconda

@PLUGGYQRCODEPAIR2=gioconda

At the first QR Code Enabled, the screen displays the suggestion to find another QR Code with Gioconda.

At the second QR Code completed, the trial is completed.

This trial activates the camera directly, to provide information on the task enter a trial info before this trial

OPTIONS

Function	Description	Format	Note
word	word to find	string	



@PLUGGYQRCODEPAIR1=gioconda

@PLUGGYQRCODEPAIR2=gioconda

TYPE: "QRCODECOLLECT"

In this case, the scope of the trial is to collect words with the use of QR codes.

The QR Code needs to start with @PLUGGYCOLLECTED=id, word, word, word

@PLUGGYCOLLECTED=3, picture, oil, da vinci

The id (e.g:3) identifies the unique trial's id in order to avoid duplicate QR Code Collected

OPTIONS

Function	Description	Format	Note
word	words to collect	string	NOTE: In order to collect the same word, it is necessary only to repeat the same word. example: oil, oil, oil. This means that one needs to collect 3 "oil" to complete the trail
time	Committed time to complete the trial	integer	This number represents the minute from the start of the game. If "0" appears it means that the time to complete the trial is unlimited. If time is up but the trial is not completed yet, the trial changes status to "invisible"



@PLUGGYCOLLECTED=1, hello, cat,dog



@PLUGGYCOLLECTED=2, hello, ciao



@PLUGGYCOLLECTED=3, cat

TYPE: “UNUSED”

This trial’s type is made to remove a trial from the game, is set from the application, to remove a trial from the game.

If a trial is not completed, it changes the type to “unused”, so it not considered anymore. This is especially true for those trials with the timer: indeed, when the time stops and the trial is not completed yet, is become unused.

OPTIONS

Function	Description	Format	Note

TYPE: “GPSPOSITION”

In this case, the trial will be completed if the user approaches to the GPS position. Trough this trial, it is possible to set games around the city or in points of interest.

OPTIONS

Function	Description	Format	Note
gps	geolocalization position and range	object json	range in meters, we suggest 10mt-25mt

```
“gps”:{
“latitude”:"45",
“longitude”:"11",
“range”:"3”
```

}

TYPE: “QUIZ”

In this case, the trial activates a quiz with some closed answers.

OPTIONS (QUIZ JSON OBJECT)

Function	Description	Format	Note
photo	photo to use/download	string	
sound	a link to a sound	string	
question	question	string	
answer	list of answer	strings array max 8 answers, max 4 answer showed, the correct is the first on the list.	

```

“quiz”:{
“photo”：“url”,
“question”：“”,
“answer”：“”,“”,“”,“”}
}

```

TYPE: “QUIZOPEN”

In this case, the trial activates a quiz with a open answers.

OPTIONS (QUIZ JSON OBJECT)

Function	Description	Format	Note
photo	photo to use/download	string	
sound	a link to a sound	string	
question	question	string	
answer	list of answer	strings array use multi “right” answer	
casesensitive	if is case sensitive	boolean	

```

“quiz”:{

```

```

“photo”:“url”,
“question:””,
“answer”:{“”,””,“”},
“casesensitive”:false
}

```

TYPE: “QUIZPHOTO”

In this case, the trial activates a photo quiz with some closed answers (photos).

OPTIONS (QUIZ JSON OBJECT)

Function	Description	Format	Note
photo	photo to use/download	string	
sound	a link to a sound	string	
question	question	string	
answer	list of url	strings array with url, is possible insert 8 answer but only 4 are showed	

```

“quiz”:{
“photo”:“url”,
“question:””,
“answer”:{“url”,“”,“”}
}

```

TYPE: “PUZZLE”

The trial activates a puzzle of images.

OPTIONS (PUZZLE JSON OBJECT)

Function	Description	Format	Note
photo	photo to use/download	string	
pieces	number of pieces	string	9/16 pieces, number

```

“puzzle”:{
“photo”:“url”,
“pieces:””
}

```

TYPE: “PUZZLESLIDER”

The trial activates a puzzle slider of images.

OPTIONS (PUZZLE JSON OBJECT)

Function	Description	Format	Note
photo	photo to use/download	string	
pieces	number of pieces	string	9/16 pieces, number

```

“puzzle”:{
“photo”:"url",
“pieces:""
}

```

TYPE: “PHOTO360”

The trial activates a 360 photo, only for view

OPTIONS (JSON OBJECT)

Function	Description	Format	Note
url_photo	url photo to use/download (360 photo)	string	

Trials Type Advanced (only usable with code)**NEAR-FIELD COMMUNICATION (NFC)**

Near-field communication (NFC) is a set of communication protocols that enable two electronic devices, one of which is usually a portable device such as a smartphone, to establish communication by bringing them within 4 cm of each other.

NFC tags contain data and are typically read-only. They can be custom-encoded by their manufacturers or use NFC Forum specifications. The tags can securely store personal data such as debit and credit card information, loyalty program data, PINs and networking contacts, among other information.

TYPE: “NFCREAD”

The aim of the trial is to find a NFC.

The NFC message needs to start with @PLUGGYNFCREAD=word

@PLUGGYNFCREAD=gioconda

set “complete” all the nfc trials with word equal to “gioconda”

OPTIONS

Function	Description	Format	Note
word	word to find	string	

IBEACON

iBeacon is based on Bluetooth low energy proximity sensing by transmitting a universally unique identifier picked up by a compatible app or operating system. The identifier and several bytes sent with it can be used to determine the device's physical location, track customers, or trigger a location-based action on the device such as a check-in on social media or a push notification.

iBeacon can also be used with an application as an indoor positioning system, which helps smartphones determine their approximate location or context. With the help of an iBeacon, a smartphone's software can approximately find its relative location to an iBeacon in a store. Brick and mortar retail stores use the beacons for mobile commerce, offering customers special deals through mobile marketing, and can enable mobile payments through point of sale systems.

Another application is distributing messages at a specific Point of Interest, for example a store, a bus stop, a room or a more specific location like a piece of furniture or a vending machine. This is similar to previously used geopush technology based on GPS, but with a much-reduced impact on battery life and better precision.

TYPE: “IBEACON”

The aim of the trial is to find an iBeacon (or compatible system).

It is possible to identify any ibleacon with the UUID (Universally Unique Identifier).

If you set “complete” all the trials with the required UUID become completed.

OPTIONS

Function	Description	Format	Note
----------	-------------	--------	------

UUID	iBeacon UUID	string	
range	range to activate	integer	value in cm

COMMON OPTIONS

WAITING

OPTIONS

Function	Description	Format	Note
wait_timer	timer in seconds	integer	Then, activate the execute on the after complete section (if it is not present, one should return to the trial's list)
wait_click	wait for a click	boolean	Then, activate the execute on after complete section (if it is not present, one should return to the trial's list)

TRIAL ACTIVATED STRUCTURE

This structure describes which trials are activated.

If the structure is null, one should not start, instead, he should wait to activate from another trial or other events.

Function	Description	Format	Note
invisible	If it is true, this trial can't be visible to the user	boolean	
onstart	It is activated at the start of the game	boolean	

ontimer	It is activated after a few minutes from the start of the game	integer	
onscore	It is activated after the user collected points => of this value	integer	
onqrcode	if the user collects a special QR code, this will start with @PLUGGYACTIVATE=word	string	This is the word that activates the trial: example QRCode @PLUGGYACTIVATE=example
ongps	activate if the user is near to a gps location	json object	latitude longitude range
onibeacon	activate is the user is near to an ibeacon	json object	

```
{
  "onstart": true,
  "ontimer": 0,
  "onscore": 0,
  "onqrcode": "",
  "ongps":{
    "latitude":"45",
    "longitude":"11",
    "range":"3"
  }
}
```

TRIAL HIDDEN STRUCTURE

This structure describes in which ways the trials are hidden (deactivated) if not completed.

If the structure is null, do not deactivate the trial.

Function	Description	Format	Note
<u>oncomplete</u>	It is <u>deactivated</u> if another trial has been completed before this one.	string	WIP The next functionality will allow executing some boolean operations. E.g. If trial #1 and #2 are completed (trial 1 && trial 22), turn off trial #5 (trial 5)
<u>ontimer</u>	It is <u>deactivated</u> after a few minutes from the start of the game	integer	After a certain amount of time, the trial is hidden
<u>ontimerfromactivate</u>	It is deactivated after a few minutes from the activate of the trial.	integer	
<u>onscore</u>	It is <u>deactivated</u> after the user collected points => of this value	integer	After reaching a precise score, the trial is deactivated
<u>ongps</u>	It is deactivated if the user is near a gps location	json object	"ongps":{ "latitude":"45", "longitude":"11", "range":"3" }

```
{
  "oncomplete": "",
  "ontimer": 0,
  "onscore": 0,
  "ongps":{
    "latitude":"45",
    "longitude":"11",
    "range":"3"
  }
}
```

SPECIAL COMMANDS

TRIAL QR CODE AUTO-EXECUTE

It is possible to execute a trial through a QRcode which needs to contain the command @PLUGGYEXECUTE=name

Where the parameter “name” is simply the trial name.

The requirement is that the trial name must be unique. Otherwise, the first trial will be activated with that name, even if it is not yet complete.

This previous feature could be also adopted to create different trials with the same name, if, for instance, the goal is to execute them randomly. This feature has not been tested yet.

TRIAL AFTER COMPLETE

This structure describes some action after a trial is complete.

Function	Description	Format	Note
more info	This permit to add a string with suggestions, feedbacks, engage messages	string	
eventcompleted	This complete the event, used to complete an event	boolean	if true the event is completed
activate	This activates the following next trial ID to activate in the list of trials	string	NOTE: in next version it will be possible to insert more ID separated with a comma id1,id2,id3
hidden	this hide some trial ID	string	NOTE: in next version it will be possible to insert more ID separated with a comma id1,id2,id3

special fx	This introduces a special effect to create more engagement	string	WIP
sound	This introduces a sound (mp3) to create more engagement	string	WIP
music	This introduces a music (mp3) to create more engagement	string	WIP
execute	This is a trial ID to be executed in autoplay	string	only one trial can auto-execute
qrcollectionclear	Clear the current QRCode collection	boolean	WIP
executerandom	This is a trial ID to be randomly executed in autoplay	string	WIP NOTE: it will be possible to insert more ID separated with a comma id1,id2,id3 only one will be execute
activaterandom	This is a trial ID to be randomly activate	string	WIP NOTE: it will be possible to insert more ID separated with a comma id1,id2,id3 only one will be activate

```
{
  "moreinfo": "",
  "activate": "",
  "specialefx": "",
  "execute": "" }

```

TRIAL AFTER FAILED

This structure describes some action after a trial is failed.

Function	Description	Format	Note
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more info	This permit to add a string with suggestions, feedbacks, engaging messages	string	
activate	This activates the following next trial ID to activate in the list of trials	string	NOTE: in next version it will be possible to insert more ID separated with a comma id1,id2,id3
special fx	This introduces a special effect to create more engagement	string	WIP
sound	This introduces a sound (mp3) to create more engagement	string	WIP
music	This introduces a music (mp3) to create more engagement	string	WIP
execute	This is a trial ID to be executed in autoplay	string	only one trial can auto-execute
qrcollectionclear	Clear the current QRCode collection	boolean	WIP
score	score lose	integer	
eventfailed	if the event failed	bool	if the event failed

```
{
  "moreinfo": "",
  "activate": "",
  "specialefx": "",
  "execute": "" }
```

TRIAL SCORE OPTIONS

This structure describes the score options in a trial.

Not to be used with the editor. It is possible only with manual coding.

Objects	Description	Format	Note
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success	If the trial is completed with success	json object	
failed	If the trial is failed	json object	
unused	If the trial is set to “unused”	json object	

Function	Description	Format	Note
score	Add score to the game’s score	integer	set a negative value to subtract the score
time	Add time (minutes) available to complete the game	integer	set a negative value to subtract the time

```
{
  "success":{ "score":0,"time":0},
  "failed":{ "score":0,"time":0},
  "unused":{ "score":0,"time":0}
}
```