

## DELIVERABLE

**Project Acronym:** Brain@Home

**Grant Agreement number:** AAL-2015-1-134

**Project Title:** Brain@home: Moving and enhancing brain training for an active life

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### D3.2 – Exploration and interaction in Virtual Environments and Tours

**Revision:** FINAL

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**Task/WP related to the Deliverable:** W3/Task 3.2

**Type <sup>1</sup>:** R

**Reviewer(s):** PBN, SIVECO

**Contractual Date of Delivery:** 07/2017      **Actual Date of Delivery:** 10/2017

**Abstract:** This paper will describe how the project used the interactions in Virtual Environments as a mean to guide the user through a path of training as well as a way to train the user in spatial orientation tasks and other Serious Games. This paper will also detail how specific information about culturally relevant contents is accessible in the Virtual tours.

**Keywords:** Content development, User interaction

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<sup>1</sup> Deliverable Type: P (Prototype), R (Report), O (Other)

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## Version Control

Version	Description of Change	Date
V1.0	Initial draft released to the Partners	05/09/2017
V1.1	Feedback and expansion by SIVECO	07/09/2017
v2.0	Additions to VT and last chapter	15/09/2017
V2.1	Release Candidate	29/09/2017
V2.2	Formatting and updates	02.10.2017
V3	Release	02.10.2017

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## 1. User interaction

User interaction is one of the fundamental tools for promoting user engagement: involving the user in an active role focus his attention and stimulate interest in continuing an activity independently of the content.

While interactivity is intrinsic in games, they could be avoided during the exploration of virtual reconstruction of environments (VE) or the virtual tour based on 360° images(VT), allowing the user to experience them as sort of video of an exploration; however, letting the user be in charge of the exploration, is beneficial for both the user and the goals of the project, because the user can decide what to explore and for how much time, optimizing its experience in terms of satisfaction and performance, both extremely important for the goals of the project.

Introducing User interaction in these Virtual explorations, opens possibilities for different goals and uses of this interaction.

In this project we decided to use the exploration of Virtual Environments and the interaction within them, as a mean to guide the user through the sessions of training and access other contents, all while exercising him in spatial orientation, challenging him to orientate himself within these environments

### ***1.1. Roles of interaction in Virtual Environments and Virtual tours***

User interaction within VE and VT serves a number of different goals in this project, but it has been implemented in order to appear as natural as possible for the user, but also with a great attention to simplicity of use, since our target user base isn't always the most technology savvy.

The main role delegated to the user interaction is the **control of the spatial exploration**. The user, using the touch interface of the tablet will guide the exploration of the virtual environment and the virtual tours. Spatial exploration is a fundamental part of the experience in VE and VT that constitute one third of the total time spent in activities by the user.

The second most important interaction for the user is available in the VE, where user interaction is used to **change environment and access different contents**, such as the Serious Games or exit the platform. Highlighted objects allow the user to access these contents but only following the pathways defined by the clinical team of the project.

All **the implementation of activities of spatial orientation** (T3.3) will be performed inside the VE.

Some serious games were designed in order to be implemented in the virtual environments, to allow the user to train in a settings that could be as ecologically sound as possible, so interactions to **perform the tasks of the Serious Games set in the VE** will be available once accessed the specific Serious Game.

Within the VT user interaction will allow the user to **access further information** about the places he's visiting and about the art pieces he's exploring.

## 2. VE

Virtual Environments have been chosen as the starting point and central hub for the user to access all the contents provided.

After installation and login, the access to the Virtual Environment will be the first step of the user inside the platform, where minimal written instruction will guide him to explore the environment, to look for the objects that will let him access to the contents provisioned for that specific moment in that particular session.



To move inside the spaces of the virtual environments, the user will use the mouse controls, for windows, and the touch screen for tablets, that will allow him to naturally manipulate his spatial orientation and speed of movement.

In order to access different contents, users shall interact with object placed within the VE. These 3D objects are multiple, dynamic and not linked to the actual environment. These objects shall be catalogued by the LMS and managed by it, as they are training content providers

In order to be able to add and use any kind of 3D object within the VE, SIVECO developed a tool that allow to add 3D object to the VE, linking it directly to the LMS to become a part of a training content ready to be assigned and managed.

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## **2.1. Content Authoring Tool**

Both Virtual Environments, Apartment and Nature, have developed an Authoring Tool (AT) interface. The scope of this AT is to permit the clinicians to set the training path for the users, from the beginning of the trial, to the end. This interface will be available only for the clinicians.

Another very important function of this AT found its goal in the exploitation activity. Without the AT, the pathways of training for the users would have been fixed, both in content and time. The AT module adds dynamicity to this process, allowing the developers to rely on configuration files instead of hard-coding the pathways in the application. This allows the clinicians to reuse a created pathway and modify its starting date, without modifying its internal structure. A series of 3D objects were developed and consequently added in the AT. An interaction can be set by adding the objects into the environment.

A pathway can be defined through a sequence of mandatory interactions that the platform will guide the user to perform.

These interactions can be linked to:

- Virtual Tours;
- Serious games;
- Another VE

The apartment is composed of 2 floors.

- The ground floor is composed of a living room, a library room, an open space kitchen, a big balcony, and a staircase to the 2nd floor.
- First floor is composed of a shower room, a roof top view, a passageway, 2 bedrooms, a dressing and a private bathroom.

In the apartment you can find a lot of details and even more will be added for the clinical sessions, elements like: boots, toothbrush, chemise, armchair, chair and others.

Main screen for the clinicians:

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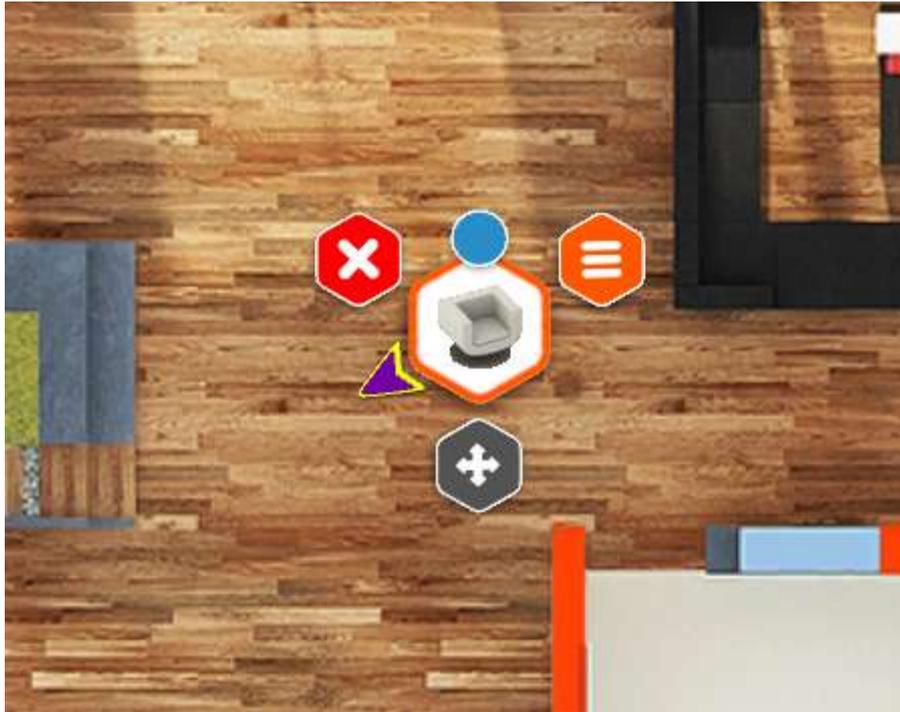


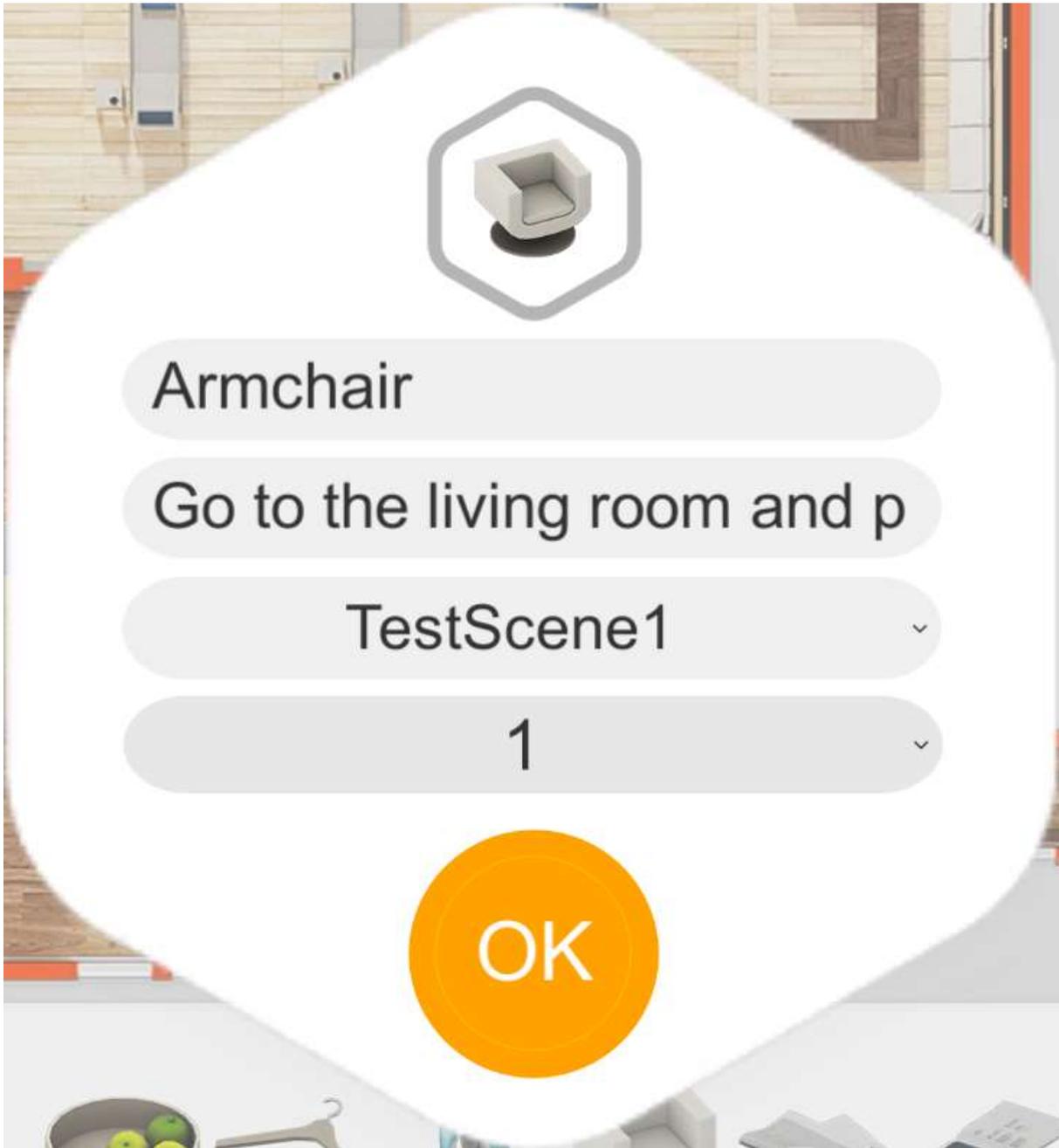
You can set the date for the activities that the users will perform:



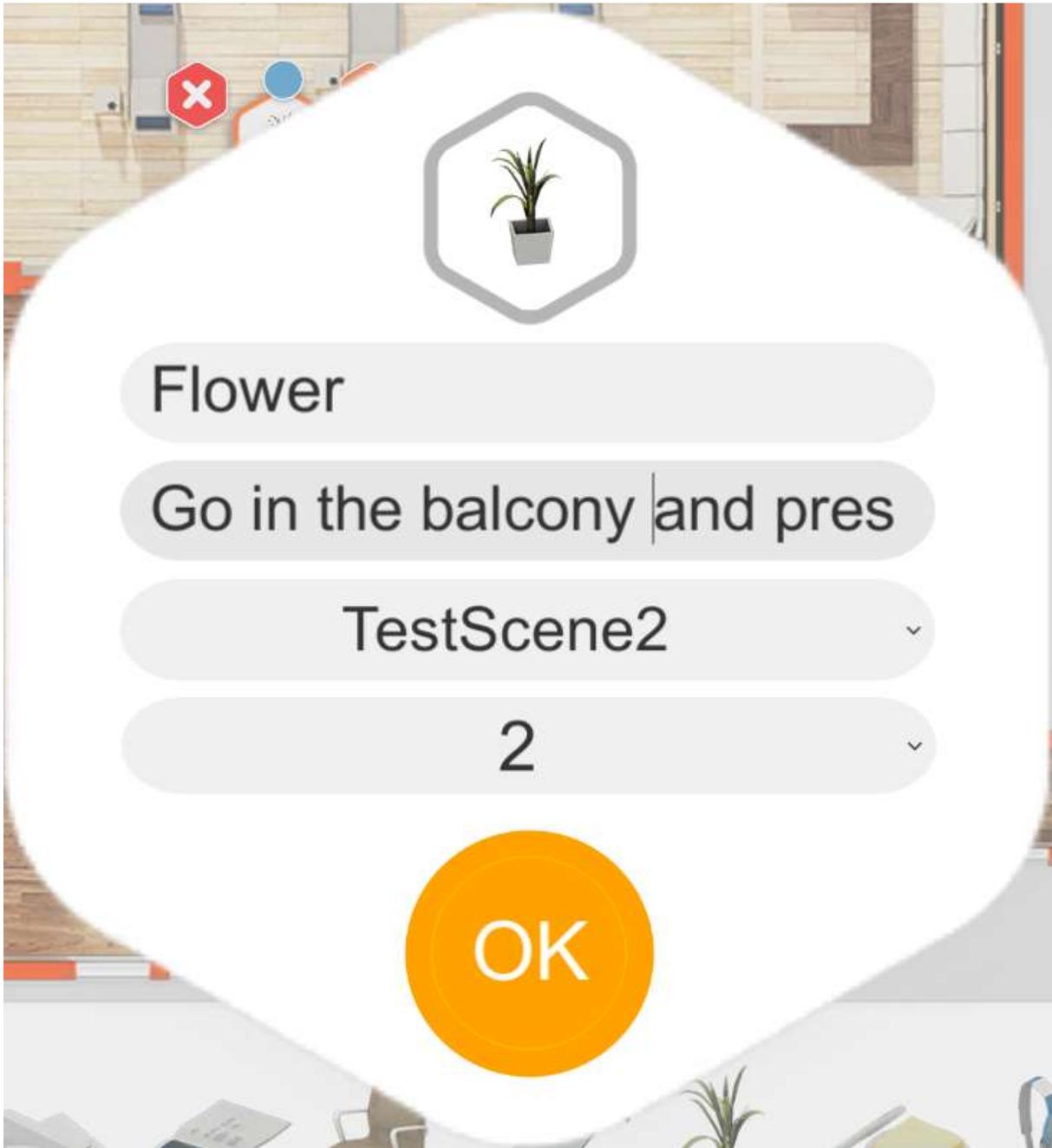
You can add objects into the VE and set activities for the users:

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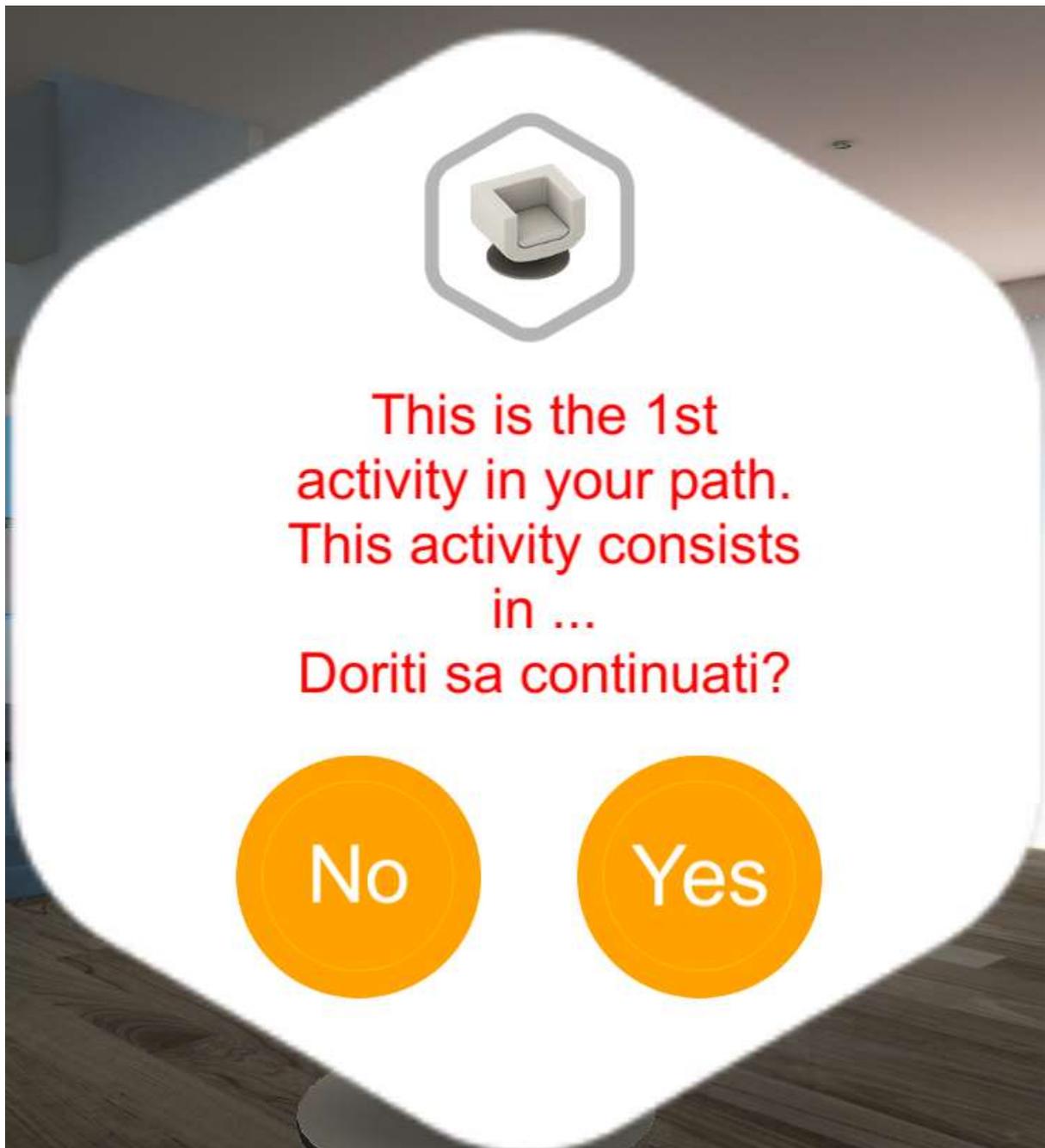
When you have completed the activities for one day, you can save the session and move to the next day:

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After finishing setting the path, in the VE the user will receive instruction with the actions that he/she need to perform:

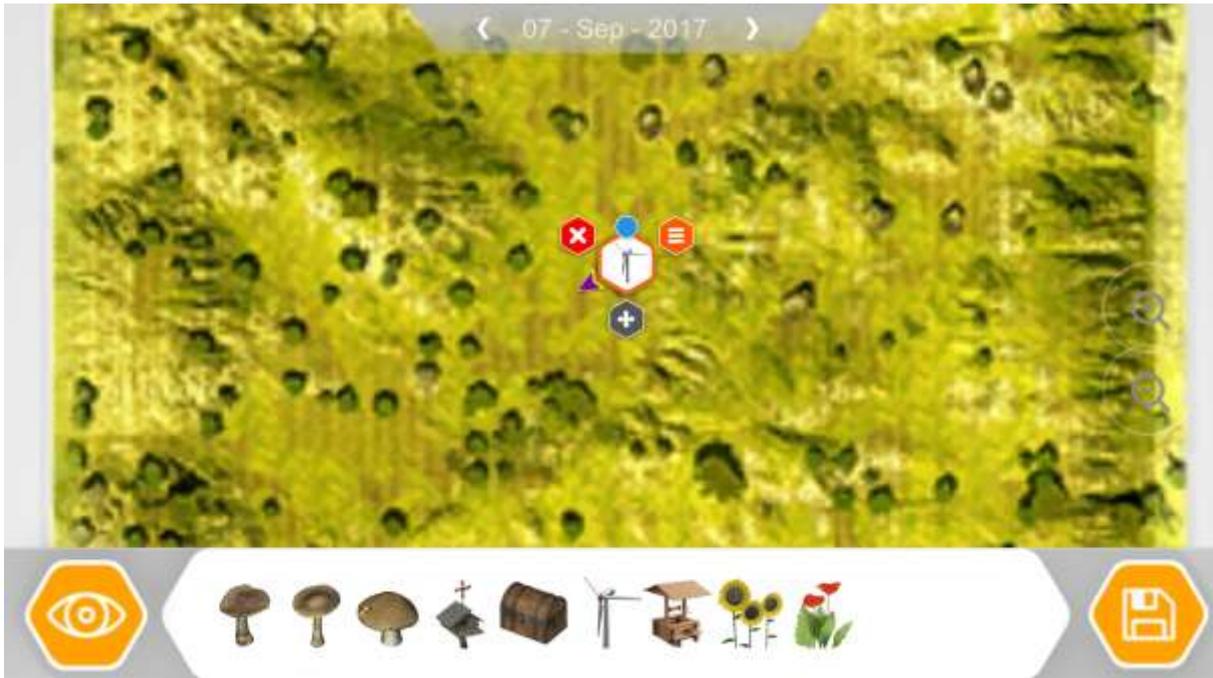




Nature – virtual environment

The Nature is composed from a very big mountain field, with a lot of grass, trees, flowers and cliffs. In the nature, for the clinical sessions, a lot of elements will be added, elements like: flowers, wind turbines, bird house, mushrooms, wooden fountain and others.

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Wooden fountain

In this activity you will

TestScene1



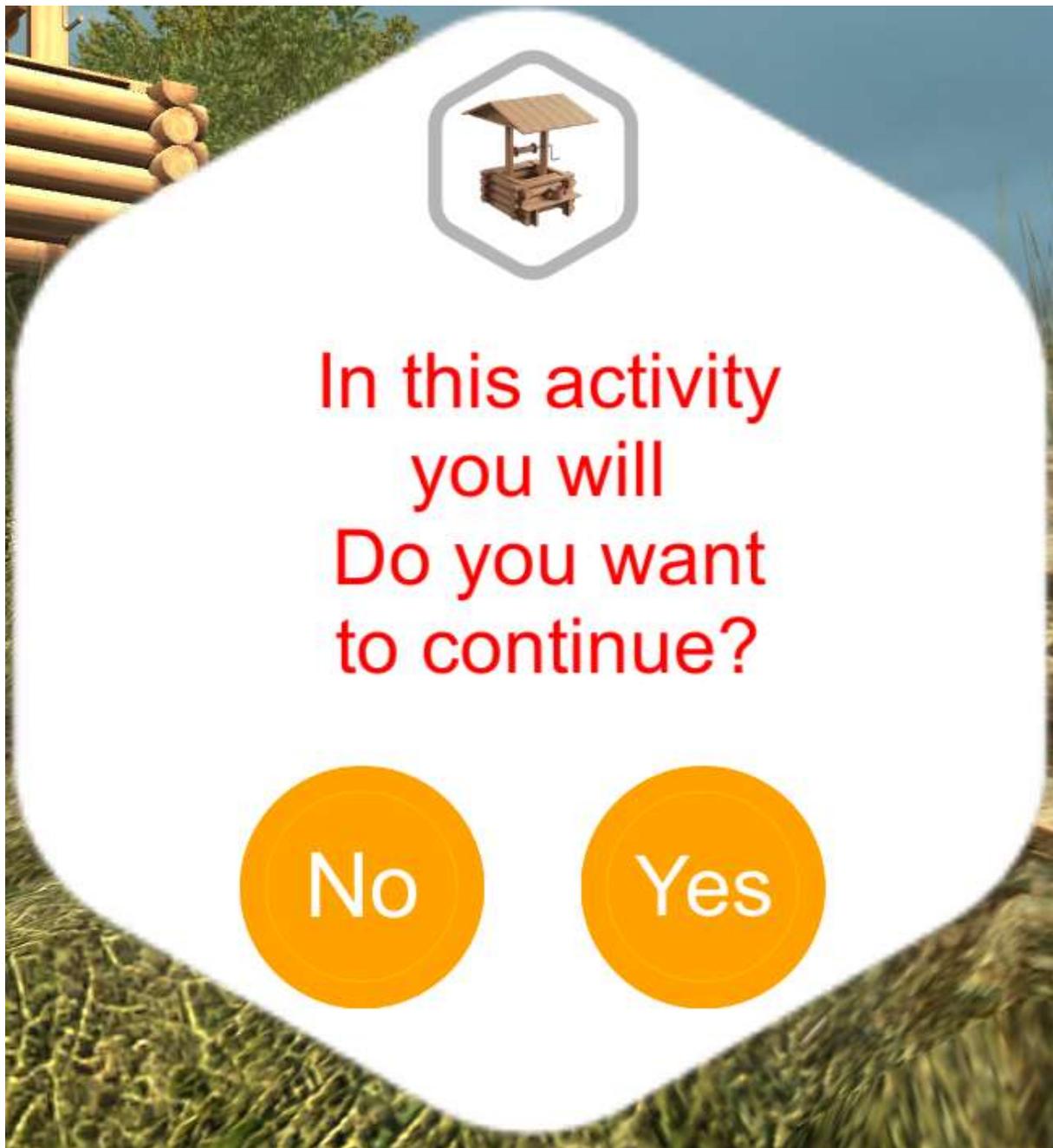
SELECT Task



OK

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### 3. VT

Interaction in VT is much simpler than the one in VE, especially because VT only create the illusion of a reconstructed 3D space, placing a 360° picture on a sphere around the user point of view (see D3.1 for specification).

Once inside this sphere the user will be free to rotate its view of the picture all around him just by dragging the image with a touch interaction, allowing him to freely explore the whole 360° of the picture.

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To move from one step to the other of the VT (the only kind of spatial exploration possible in VT), the user will have to use some arrows on the floor, pointing him in the direction of the next and the previous steps.



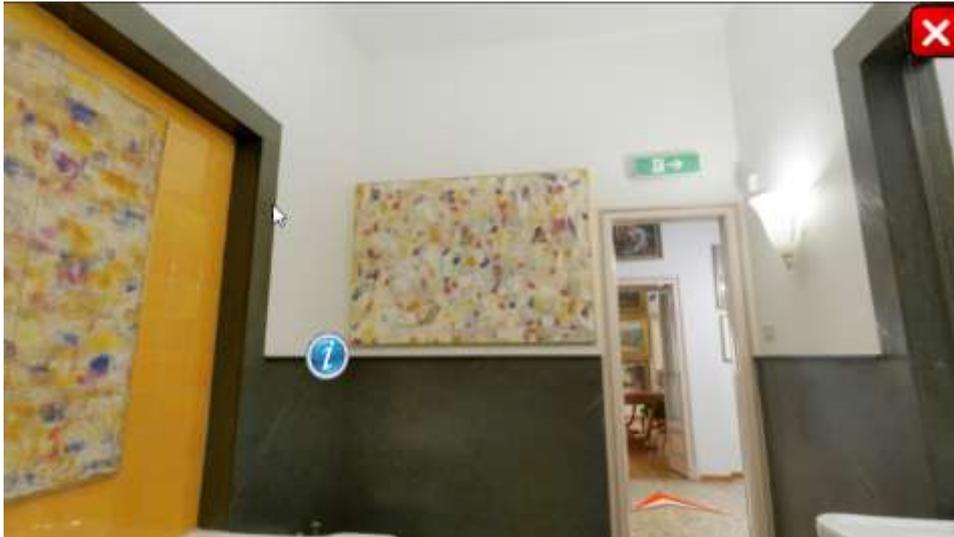
The orange arrow points to the next panorama (moving forward). The white arrow points to the previous panorama (moving backwards)



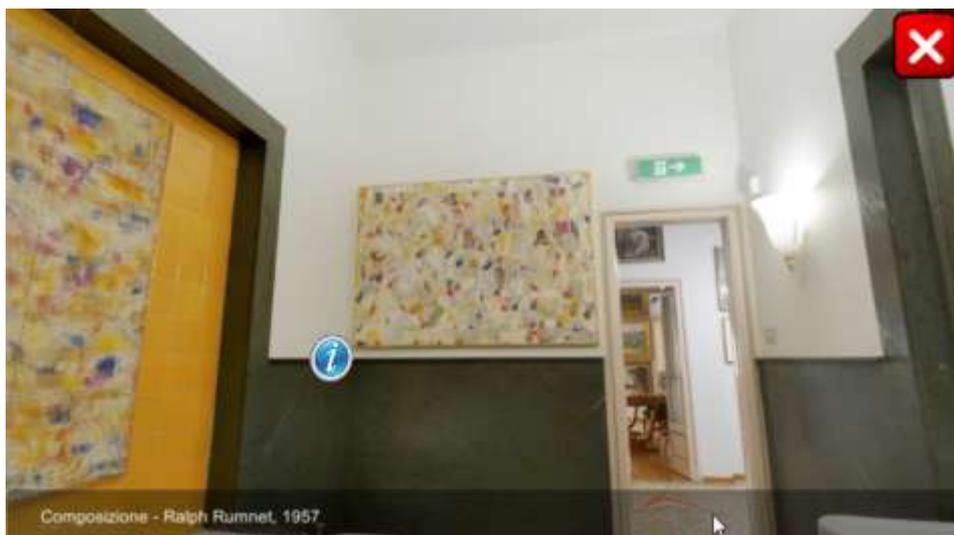
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The user can also zoom on details in some VT, although it doesn't actually change the proposed image, it just scales it, without changing its resolution.

VT are used to provide the user a visit to a culturally relevant site, in our case, 3 museums; To allow a full cultural immersion in the virtual tour, additional information about art pieces, specific rooms and the tours in general will be added into the VT and will be accessible to the user through specific clickable icons we'll call hotspots, placed on top or to the side of a relevant piece, or at the center of the current room for a general explanation of its contents.



These hotspots, once clicked will then activate a tooltip detailing information available for the specific instance, allowing the user not only to visually explore its environment but also to enrich its understanding of the art sites he's touring, in the hope this experience would stimulate him to seek this kind of experience even outside the boundaries of the virtual world.



## 4. Interactions and active participation in Brain@Home

Both passive and active fruition of contents have their benefits and drawbacks, the first being an easier experience but lacking in engaging quality, it could result in boredom, while the latter would stimulate and engage the user in a more proper way, but it could be challenging depending on situations.

In this platform contents will not be presented in a passive form, this is mostly necessary to stimulate the user during Serious Games and exploration, because an active role is required in order for the user to engage in cognitive training.

While an active fruition is the right choice in this situation, it comes with some challenges.

The user is not only required to have an active role, but also to perform activities in order to proceed with his sessions.

His ability to fulfill the request of the platform could interfere with his experience and result in a lack of engagement or even a position of refusal for an experience he doesn't feel at his reach.

This has to be taken very seriously while building interactions and tasks, and the consortium took measures in order to facilitate and guide the user as much as possible during its sessions.

The steps taken during this project to avoid any kind of problem due to user difficulties span from technical shrewdness, to the complete rework of some user interaction, but the most important of all is the message system, providing indications and hints to the user about his current activity, only use to guide him toward his goal, while allowing him to take the final action to reach it.

Interactivity and interactions are the main tool for engagement and training, and therefore it represents one of the most critical aspect of this project.