VREVAL

About

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ABOUT VREVAL

Virtual Reality Evaluation (**VREVAL**) is a toolbox and evaluation framework to evaluate architecture and urban spaces.

The following tasks can be conducted:

- Annotation
- Questionnaire
- Wayfinding
- AB-Test
- Placing Task
- Pointing Task

The goal is to run pre-occupancy evaluations in virtual space in order to gather user behaviour data and user opinions.

The evaluation should lead to a better understanding of how future users will use, participate and move through architecture and urban space.

This approach strengthens and supports the user-centered design method.

VREVAL is developed to support design evaluations. The tool brings a 3D model into an interactive virtual environment.

In this documentation the Evaluation Setup on the VREVAL Platform will be explained.

As an example, parts of the VREVAL User Tutorial will be used.

Further literature.

Ergonomics of human-system interaction –

Part 210: Human-centred design for interactive systems (ISO 9241-210:2019)

Evidence-Based Design for Multiple Building Types, David H. Watkins, D. Kirk Hamilton, 2009

VREVAL – DESIGN EVALUATION CASE

Every evaluation needs a story.

In this case, the opening of the tutorial is chosen to explain the setup of a 3D model, the participant placement and the interaction between storyteller (researcher) and participant.

The Case

The participant is introduced to the oculus controller interface. For this, a diagram with the Oculus Controller and input function is displayed.

Further, information about the input and functions are explained in the handheld display, which is attached to the Left Hand Controller in the virtual environment.

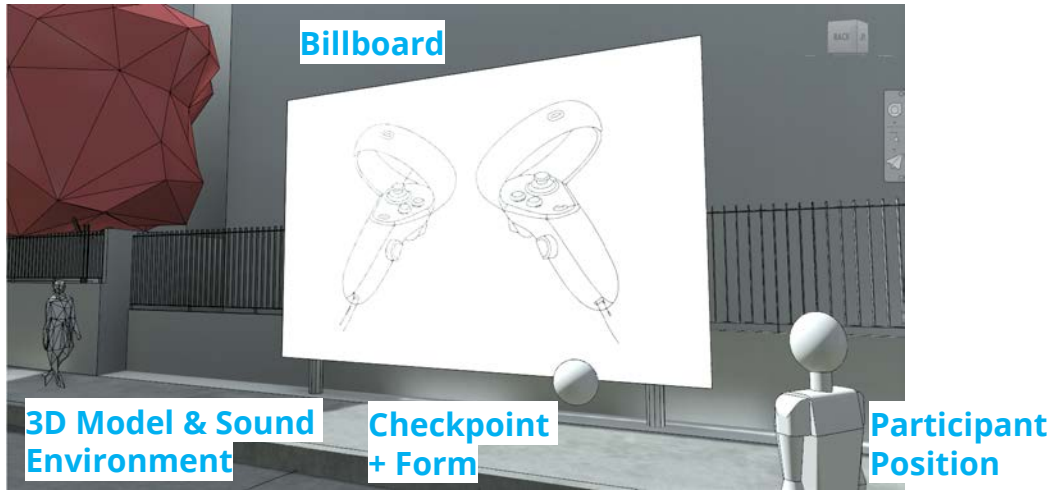
Evaluation Structure

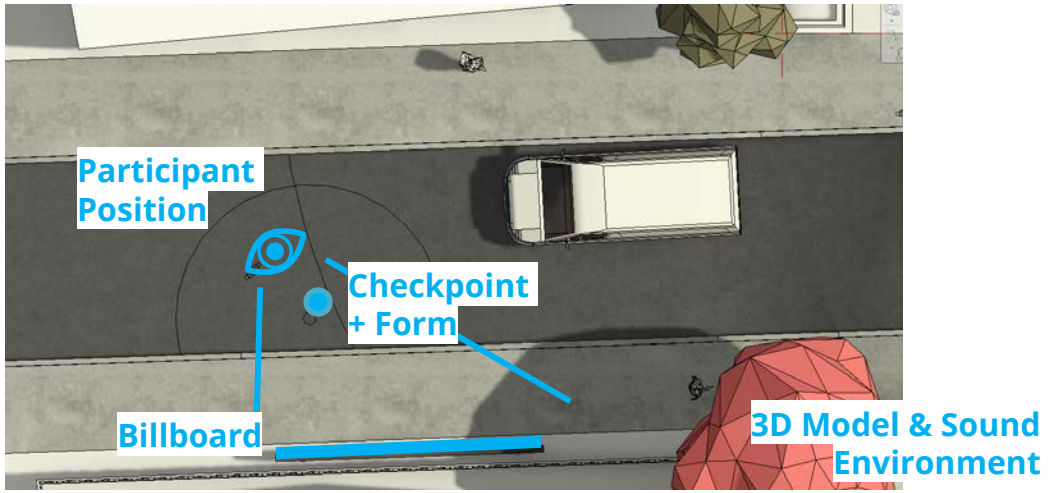
The case tells which elements are needed to construct the interaction between researcher and participant.

The following elements are needed to transport the information about the use of the controllers in the virtual environment.

- 3D Modell
- Checkpoint (location of participant)
- Form with text field
- Scenario with Default Task

How to build up the evaluation will get explained in the next slides.



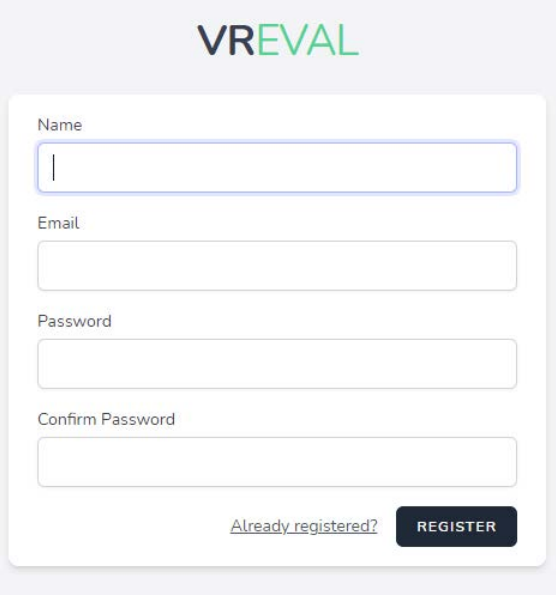


VREVAL – DESIGN EVALUATION: START

The design evaluation will be designed at the VREVAL Website.

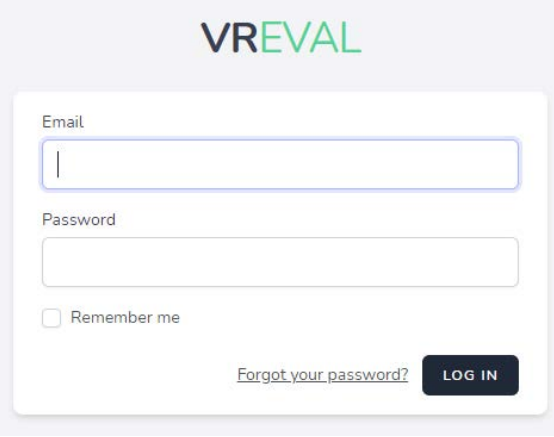
First, a user account is required.

https://database.architektur.uni-weimar.de/register



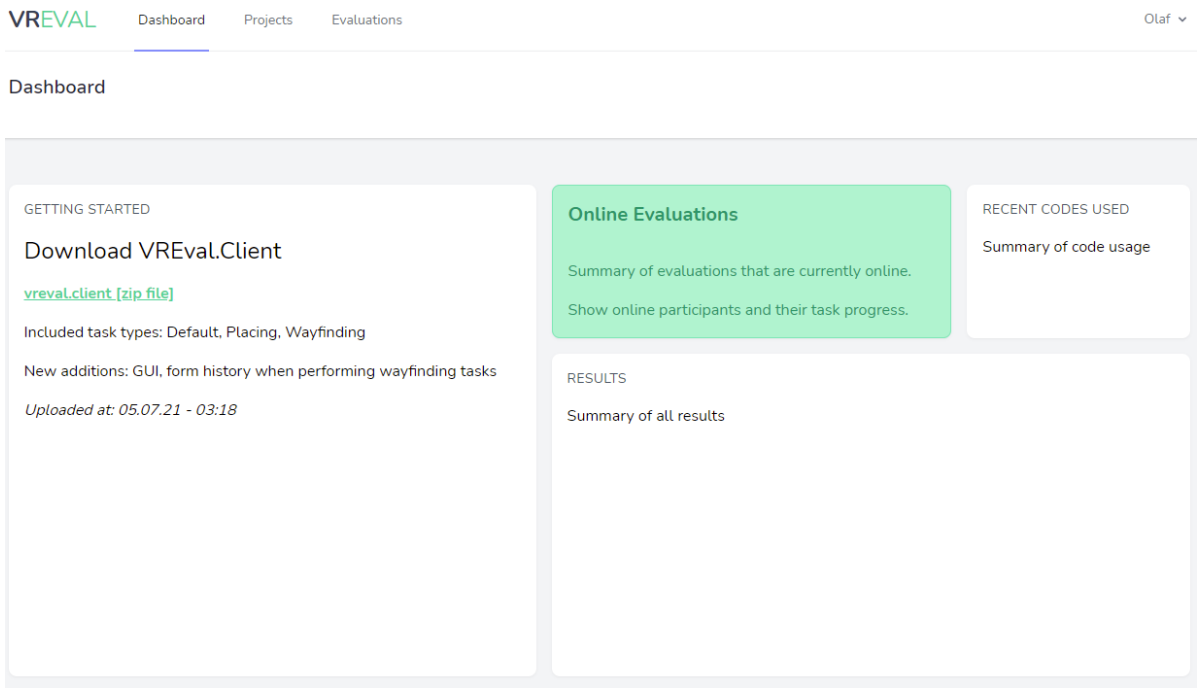
If a user account already exists, simply login.

https://database.architektur.uni-weimar.de/login



After the login, the VREVAL dashboard is shown.

Information about evaluation projects, VREVAL tutorials and more will be displayed.



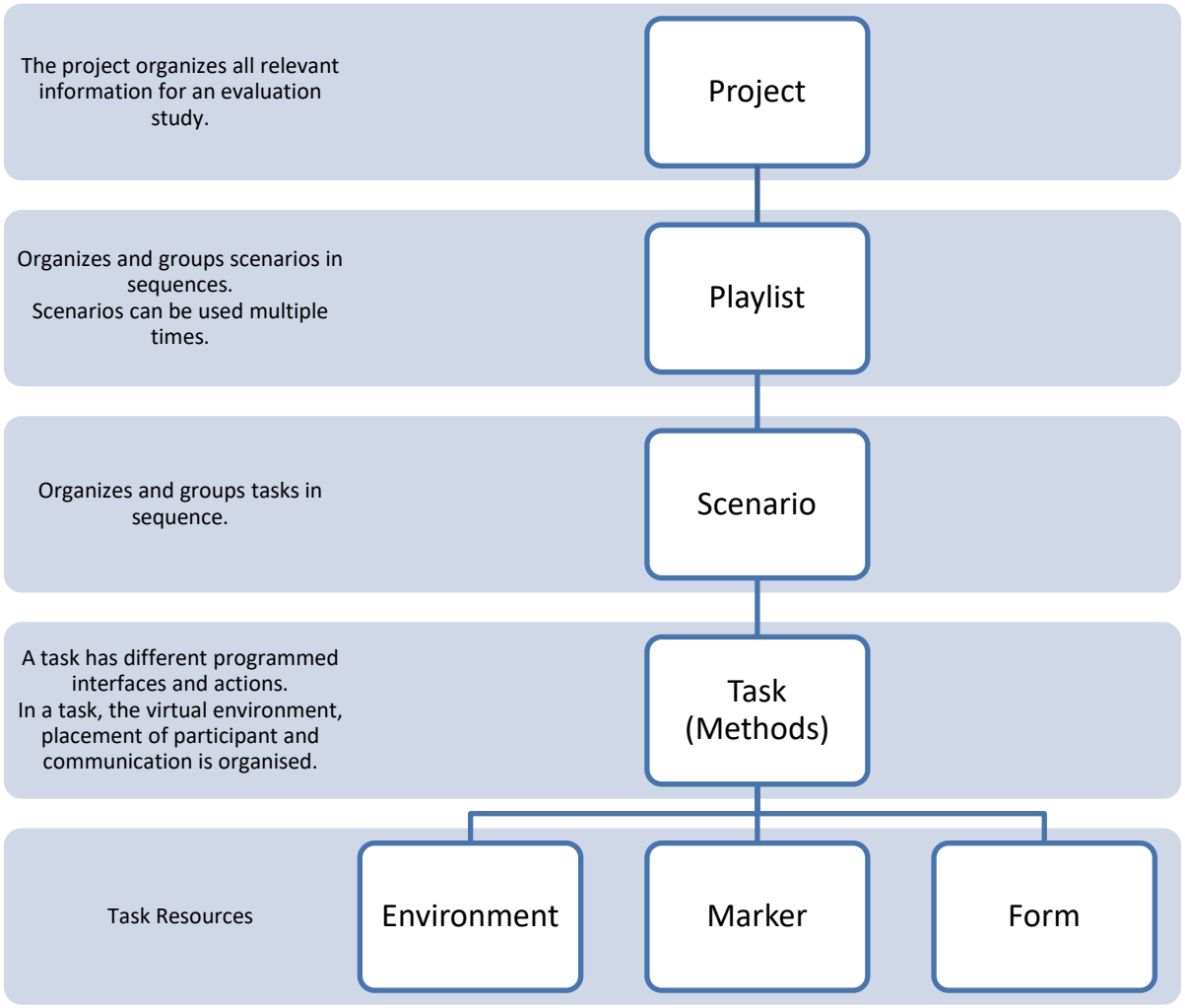
VREVAL – OVERVIEW

A VR evaluation will be run through the VREVAL platform.

A project can produce multiple evaluations with similar or different settings. A project holds evaluation information like playlists, scenarios with tasks, forms, models and markers.

The evaluation itself is built up by a sequence of playlists, which are imported from a project.

Evaluation groups can be created under evaluation settings.



Task types (Methods)

- Default
- Questionnaire
- Placing
- Annotation
- AB Test
- Wayfinding
- Pointing (not implemented)

Environment types

- 3D Models
- Audio / Sound

Marker types

- Checkpoints
- Sound (position required)
- Information (not implemented)
- Gates (not implemented)

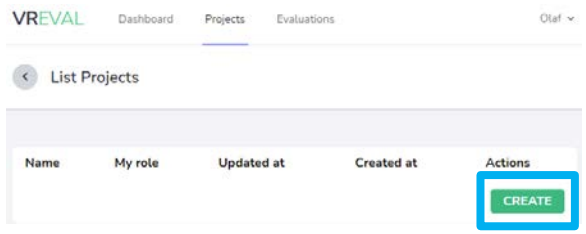
Form types

- Text
- Question
- Selection (single / multi choice)
- Rating

1. CREATE A PROJECT

Step 1

Create a new Project.

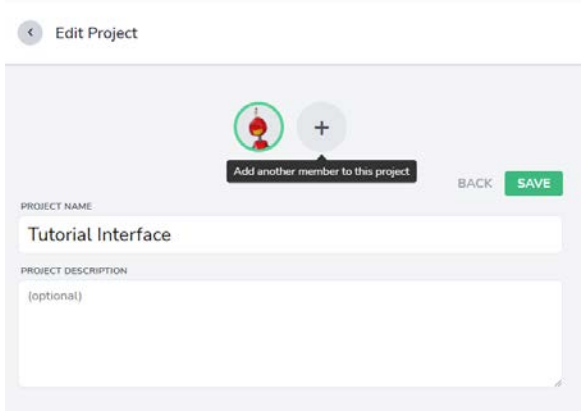


Name the Project.
A description is optional.

“Save” to create the Project.
The project is now open.

Step 2

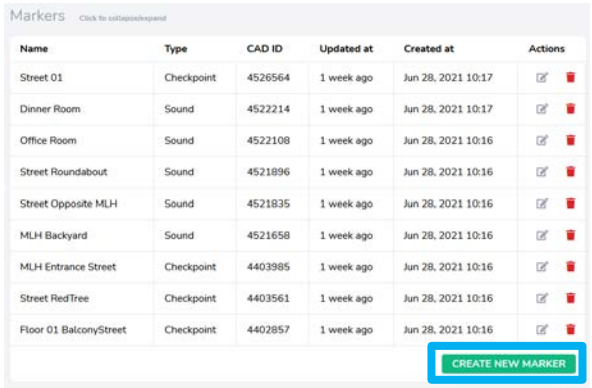
Project Overview.
Add your colleagues to your project.



2. SETUP TASK RESOURCES

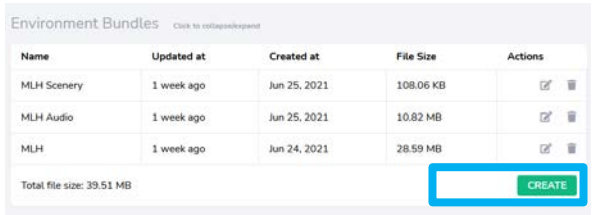
Step 3

Upload marker to your project.
(for more information see tutorial)



Step 4

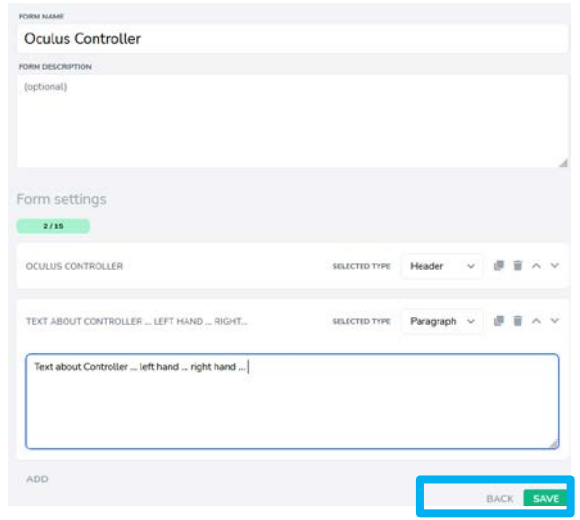
Upload environments to your project.
(for more information see tutorial)



Step 5

Create forms.

Setup forms.



Form types are:

- Header
- Paragraph / Question
- Section
- Selection
- Rating

3. CREATE A SCENARIO

About

A scenario is defined through a sequence of tasks.

A scenario must include at least one task.

Task represents a research / evaluation method.

A task has different predefined interfaces and actions.

In a task, the virtual environment, checkpoints and forms are organised.

Task types are:

- Default
- Questionnaire
- Placing
- Annotation
- AB Test
- Wayfinding
- Pointing (not implemented)

Step 6

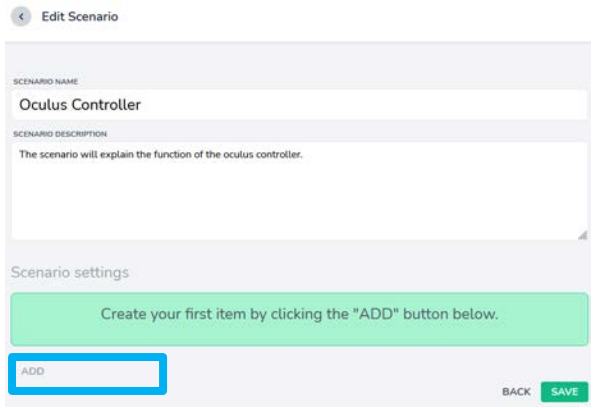
Create a new scenario.

Name the scenario.

Write optional a description.

Step 7

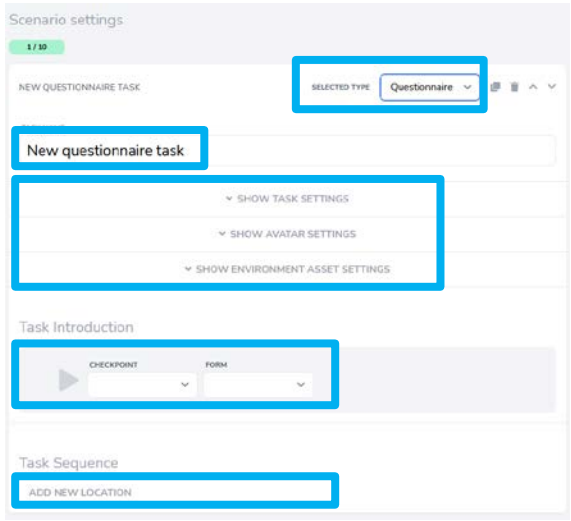
Add a Task Type.



A task is divided in 3 sections.

Top
Settings for Task, Avatar, Environment
Middle
Task Introduction
Bottom
Task Sequence

Setup the task.



1. Select a Task Type.
2. Name the task.
3. Adjust Settings for
   - Task
   - Avatar
4. Select the Environment Settings
5. Setup Task Introduction
6. Setup Task Sequence

3. TASK TYPES

Types

Task types are:

- Default
- Questionnaire
- Placing
- Annotation
- AB Test
- Wayfinding
- Pointing (not implemented)

Each task type is a different tool. For each task a different kind of question can be posed to the participant.

Default

A participant gets placed inside an environment.

Default has no task sequence.

The participant interacts with a form.

Questionnaire

A participant gets placed inside an environment.

The participant gets teleported from one checkpoint to another.

The participant interacts with a form.

Placing

A participant gets placed inside an environment.

The participant gets teleported from one checkpoint to another.

The participant places marker.

The researcher can define a task form.

Annotation

A participant gets placed inside an environment.

The participant gets teleported from one checkpoint to another.

The researcher defines a task form.

The participant places marker.

After a marker is placed, a predefined form can be filled out.

AB-Test

A participant gets placed inside an environment.

The participant gets teleported from one checkpoint to another.

The researcher defines a task form.

The participant browses through models and can select a model.

A form can be filled out after the selected model is confirmed.

Wayfinding

A participant gets placed inside an environment.

The researcher defines a task form.

The participant walks from one checkpoint to another.

The travelled path is recorded.

Waypoints can be optional.

Only one destination point can be found.

Pointing

A participant gets placed inside an environment.

The participant gets teleported from one checkpoint to another one.

The researcher defines a task form.

The participant points in the direction of interest (task).

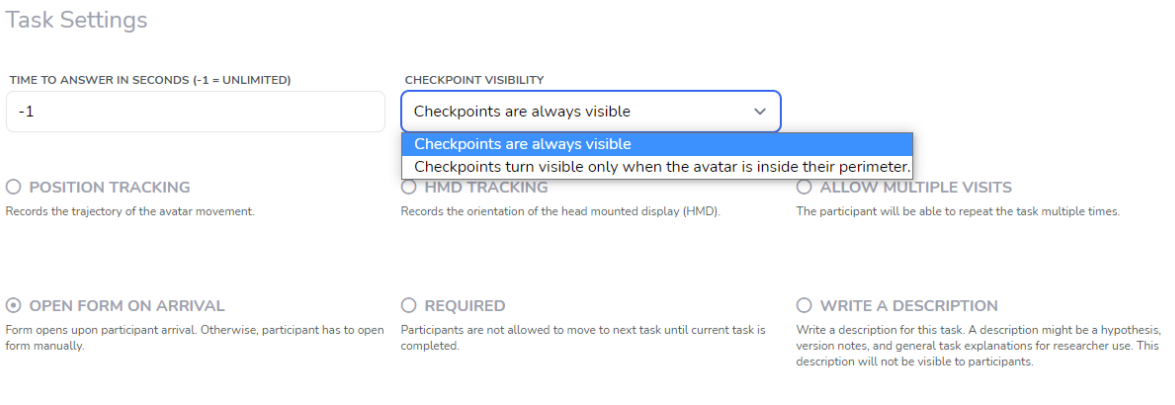
The direction (vector) gets recorded.

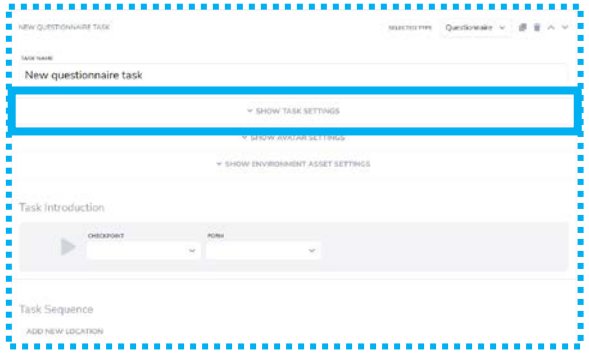
A picture is taking from the target.

3. TASK: TASK SETTING

Task Settings

For each task, an individual task setting can be applied.





Notes

Checkpoint Visibility

"Checkpoints turn visible only when the avatar is inside their perimeter"

-> Checkpoint will be visible, if participant enters range (perimeter) of checkpoint.

Position Tracking / HMD Tracking

Choose Activated, if movement of walk (position tracking) and head (HMD tracking) should get recorded.

Open Form on Arrival

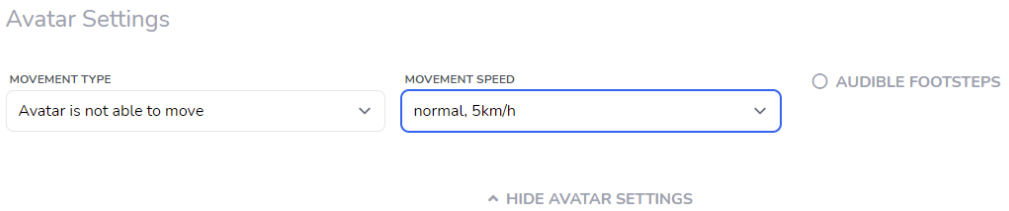
If participant enters the range of twice the placing distance form will open automatically.

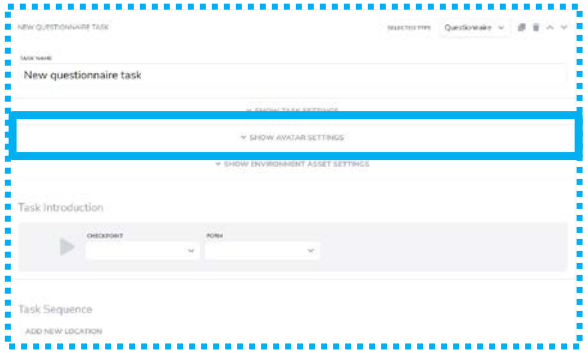
Task Type	**Time to answer**	**Checkpoint Visibility**	***Position Tracking***	***HMD Tracking***	**Allow Multiple Visits**	***Open Form on Arrival***	**Required**	**Write a description**
Default	-1	Checkpoints are always visible	Deactivated	Deactivated	Deactivated	Activated	Deactivated	User defined
Questionnaire	-1	Checkpoints are always visible	Deactivated	Deactivated	Deactivated	Activated	Deactivated	User Defined
Placing	-1	Checkpoints are always visible	Deactivated	Deactivated	Deactivated	Activated	Deactivated	User Defined
Annotation	-1	Checkpoints are always visible	Deactivated	Deactivated	Deactivated	Activated	Deactivated	User Defined
Wayfinding	-1	Checkpoints turn visible only when the avatar is inside their parameter	Activated	Deactivated	Deactivated	Activated	Deactivated	User Defined
Pointing (not implemented)	-1	Checkpoints are always visible	Deactivated	Deactivated	Deactivated	Activated	Deactivated	User Defined

3. TASK: AVATAR SETTING

Avatar Settings

For each task, an individual avatar setting can be applied.





Notes

Movement Type

- Avatar is not able to move.
- Avatar is effected by gravity.
- Avatar is not effected by gravity.
- Avatar can fly and clip through surfaces

Movement Speed

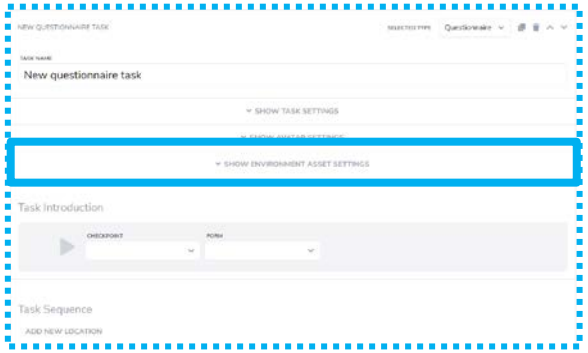
- 5 km/h (normal walking speed - recommended)
- 10 km/h (fast running)
- 30 km/h (very fast – not recommended)

Audible Footsteps

Sound for Footsteps activated/deactivated.

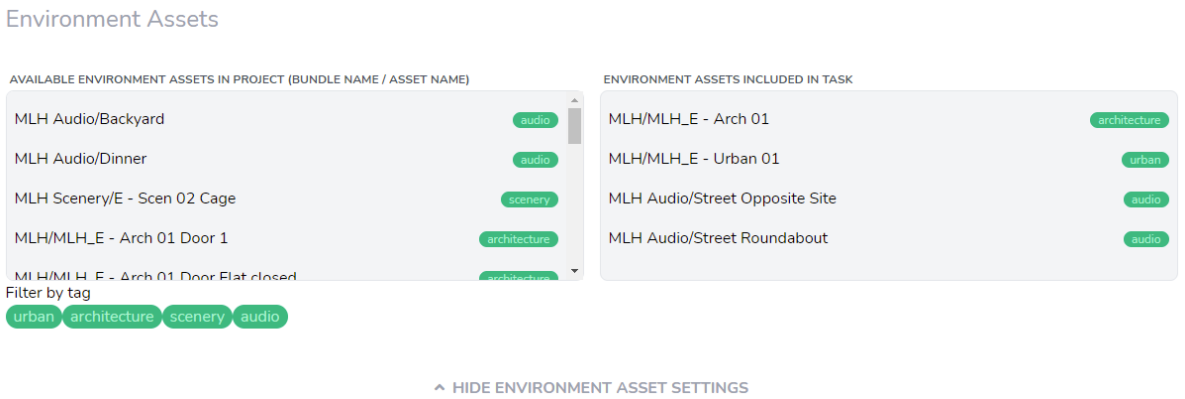
Task Type	**Movement Type**	***Movement Speed***	***Audible Footsteps***
Default	-	5 km/h	Not implemented
Questionnaire	Avatar is not able to move.	5 km/h	Not implemented
Placing	Avatar is effected by gravity.	5 km/h	Not implemented
Annotation	Avatar is effected by gravity.	5 km/h	Not implemented
Wayfinding	Avatar is effected by gravity.	5 km/h	Not implemented
Pointing (not implemented)	Avatar is effected by gravity.	5 km/h	Not implemented

3. TASK: ENVIRONMENT SETTING



Environment Settings

In the section Environment Settings, models and audio (assets) can be loaded for the task.



Library of all Environment Asset Models, which are uploaded to the VREVAL Platform.

Selected Assets, which will be loaded as an environment for the task.

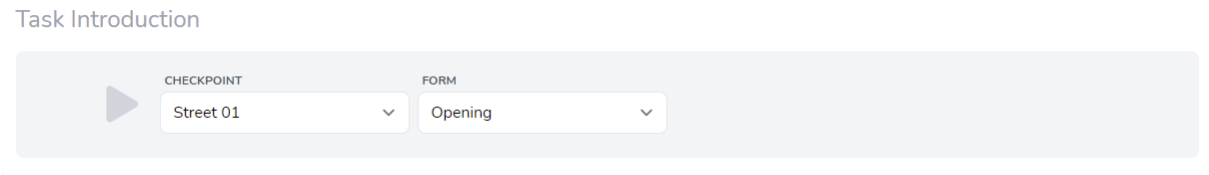
3. TASK INTRODUCTION

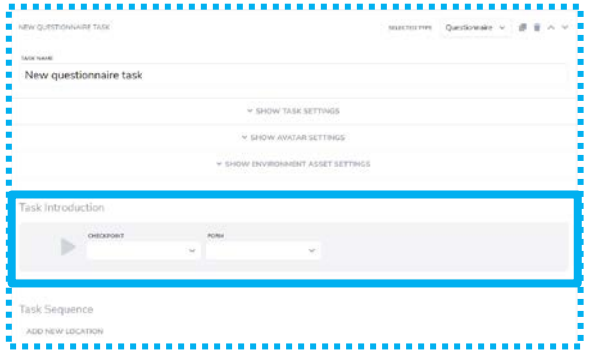
Introduction

The introduction is a checkpoint, where the participant can not move by default.

The participant gets teleported to the task introduction checkpoint.

The form can introduce the task or can include any other form type like questions.





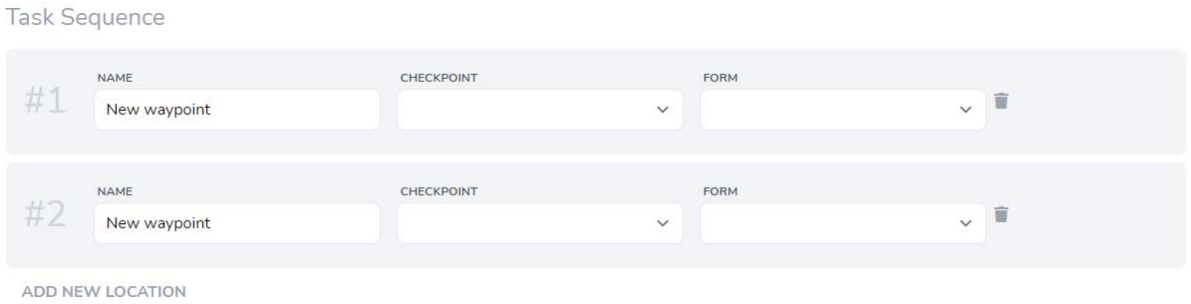
3. TASK SEQUENCE

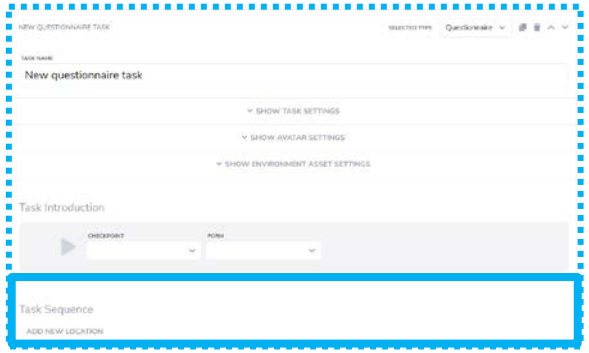
Sequence

The task sequence activates the task tools.

For example, placing of marker will be possible.

Or, an AB-Test can be conducted by switching through different predefined models, which will be added to the scene.





4. PLAYLIST

About

A playlist is defined by a sequence of scenarios.

In a playlist, the scenarios can be shuffled.

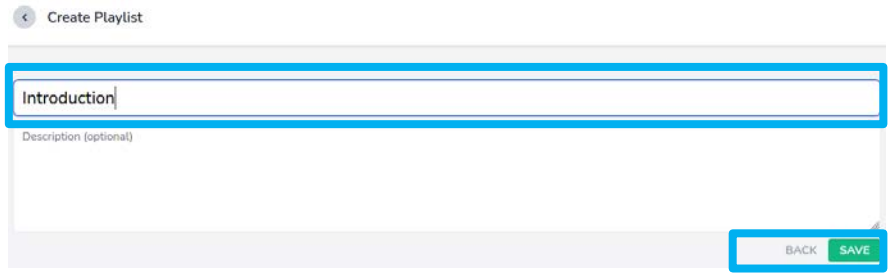
In an evaluation, a playlist is used to create the evaluation sequence in groups.

Step 1

Create a new Playlist.

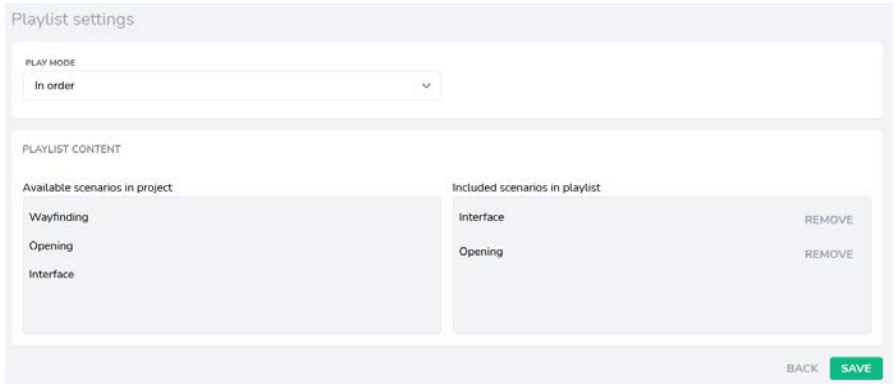
Step 2

Rename the playlist. Optional, add a description. Save.



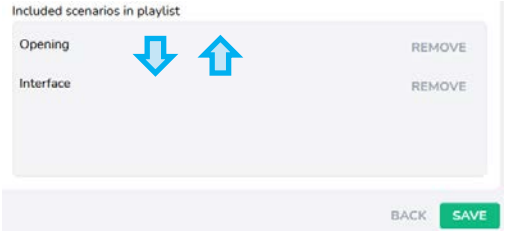
Step 3

Setup the playlist settings



Play mode: In Order OR Shuffle

The sequence of the scenarios can be change via dragging in “Included scenarios in playlist”



TESTING THE SCENARIOS

About

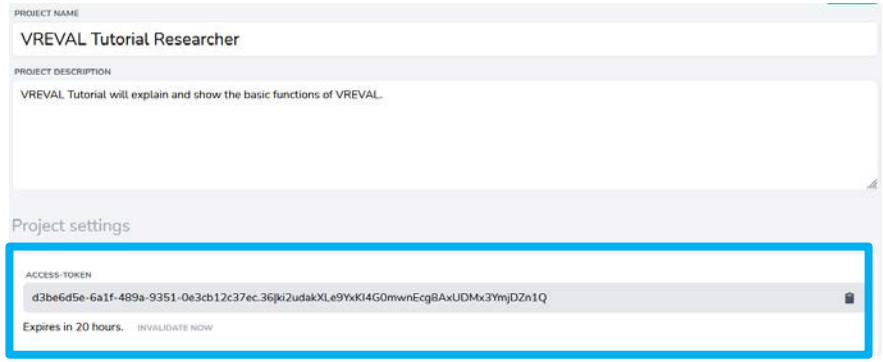
It is recommended to test a scenario before the evaluation goes online.

For this, the VREVAL App must be downloaded.

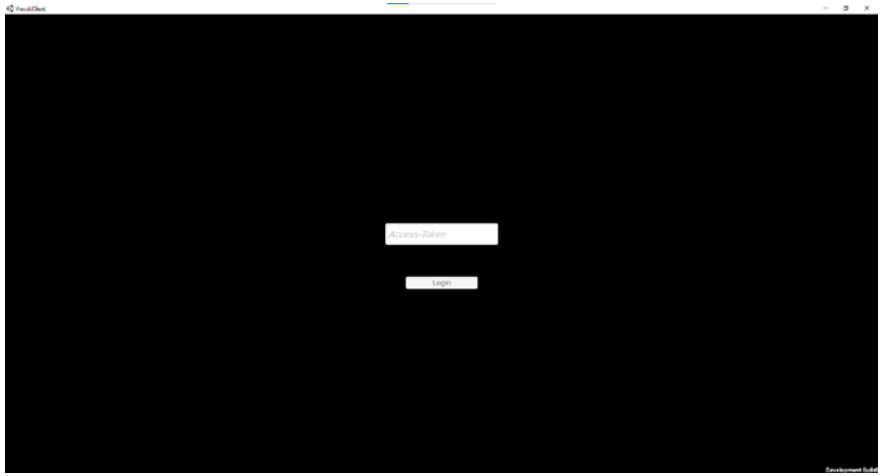
To access the project in the Application, an access-token is needed. The code can be found in Project Settings.

Step 1

Copy the Access-Token.



Paste the Access-Token and Login.



Step 2

Select the Scenario and Load. Test.