



Hera Software Manual v1.1h

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HERA USER MANUAL

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INTRODUCTION

HERA aims to develop high order problem solving skills among engineering and economics higher education students, building their capacity to address emerging 21st century societal and industry challenges. HERA introduces active learning design to expose students to complex challenges inspired by real life, the solution to which requires the integration of interdisciplinary knowledge, emulating industry problem solving processes. HERA deploys digital serious games to enrich classroom engagement and interaction, promoting experimentation, collaboration, independent learning, communication, and presentation skills desirable.

In order to achieve those goals, the HERA project deploys a Unity-based city builder type serious game (that we will refer to as the Hera Software or Hera from now on) showcasing to groups of students concrete city-sized issues that need to be tackled on by different experts with different point of view and different objectives. They will need to communicate, synchronize and collaborate in order to achieve and their goals and the goals of everyone else in the team with the limited resources available. Each of the specific point of view and expertise defined in a scenario is called a **role**.

Both the teacher and the student experience happen entirely inside the Hera software, which contains the city builder, a learning management system for the teachers to create and manage their courses and a collaborative work environment for students offering a host of communication, organization and coordination tools such as a chat, a Kanban-style list making system, a virtual sticker board and others.

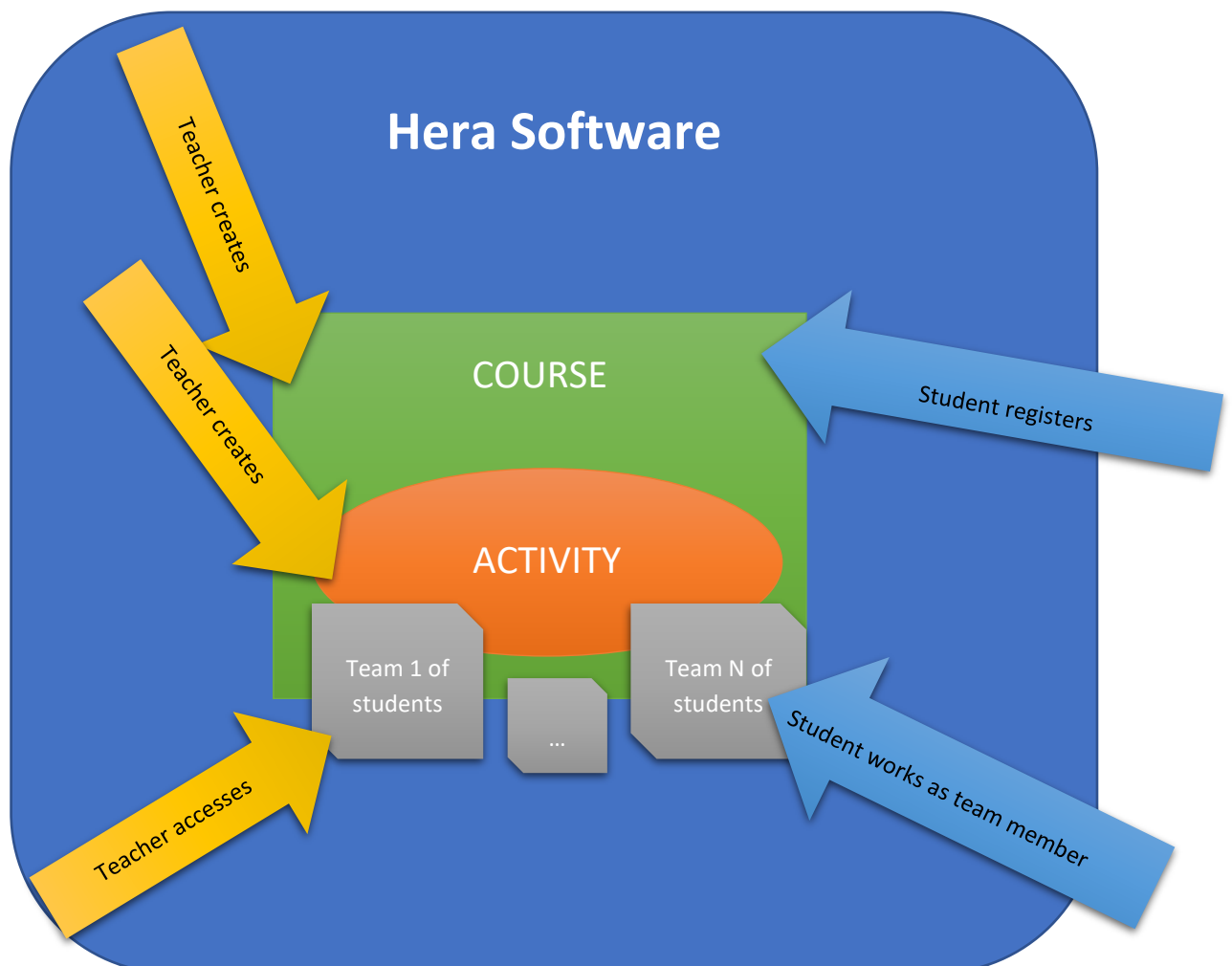


Figure 1: Students and Teachers actions in the Hera software

The atomic element in the course structure is called a **scenario**. A scenario contains a map of a certain city and a definition of a related challenge to be tackled by a team of players. Each team can consist of 1 to 4 students, each of them playing a different a distinct role. Each of the roles has a distinct set of objectives to reach. Each of the defined roles can access to specific tools, which might or might not be available to the other roles. For example, a student playing the role of a city's public work manager might be able to construct some roads, a capacity a student playing the city's treasurer might not have.



Figure 2: The teacher's workflow

Scenarios are created by teachers and can be made public to offer fellow teachers examples of interesting courses. Any public course can be duplicated and then customized and used by any teacher who desires to do so, fostering the development of a community of content creators around Hera. Once a scenario has been created or duplicated by a teacher, it is available in their private scenario folder. Teacher can then create a course (with a starting and an ending date) and slot inside the course any scenario they see fit. Only one scenario can be studied in a certain course, working with several scenarios requires to create several courses. The teacher will associate a unique code (auto-generated for them by the system) to their course and will distribute this code to the students they want to see working on that course. The choice of letting the students create their own group is left to the teachers, who can for example create one course for 50 students (up to the students to organize and populate the teams) or constrain students to work in teams they designed themselves (in that case one course will be created for each of the teams).



Figure 3: The student's work flow

Once a student starts Hera, they can check their existing course or enroll into a new by entering a new code. Selecting a certain course, they can see what the activity is about, select a role, communicate with their teammates through all the organizational tools and of course play the game itself.

The current manual aims to explain how to use Hera whether you are a teacher or a student and will show and explain all the facets of the software.

From now on, students will be referred to as students or players and teachers as teachers and content creators. The term user will be employed if the experience is the same for both students and teachers.

CONTACT

If you have any question, please feel free to send an email to the lead developer at this email address, he will answer you promptly: olivier.heidmann@gmail.com.

FIRST STEPS IN THE GAME

SETTING THINGS UP

The game is available at this URL: <http://heraproject.eu/index.php/results/>

The Hera software is compiled to run on computer using the Windows operating system in a 64b edition. The file downloaded at the above URL is an archive containing all the files necessary to play the game.




Name	Date modified	Type	Size
Hera_Data	28/09/2020 13:33	File folder	
MonoBleedingEdge	28/09/2020 13:33	File folder	
Hera	28/09/2020 13:33	Application	636 KB
UnityCrashHandler64	18/06/2020 00:32	Application	1 069 KB
UnityPlayer.dll	18/06/2020 00:32	Application exten...	42 765 KB
WinPixEventRuntime.dll	18/06/2020 00:09	Application exten...	33 KB

Figure 4: Hera archive content

Once the archive is downloaded, extract all the files and double click on the **Hera.exe** file to start the game.

MAIN MENU

You will be greeted with an animated main menu broadcasting an animation of a roundabout bird's eye tour in a city. Three actions are available at startup:

- select the game language by clicking 
- open the authentication window to log in or register by clicking 
- open the option menu. by clicking 

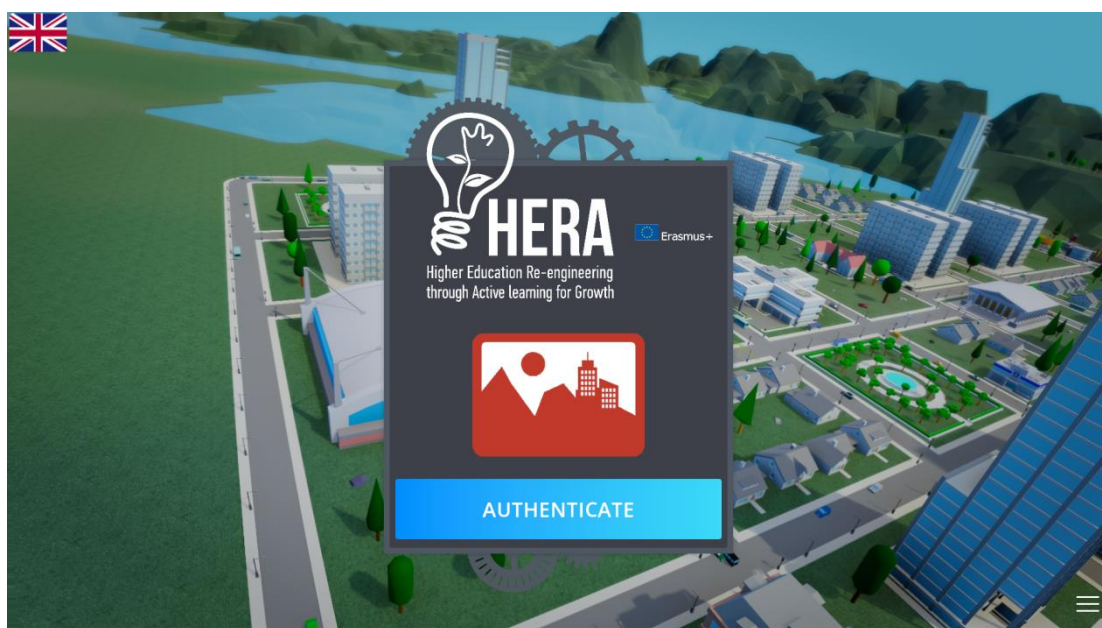


Figure 5: Hera Main Menu

By clicking on the flag, a ribbon of all the available languages will appear. Click on the flag related to the desired language to make the interface switch languages. This choice will be valid throughout the game.



Figure 6: The language ribbon

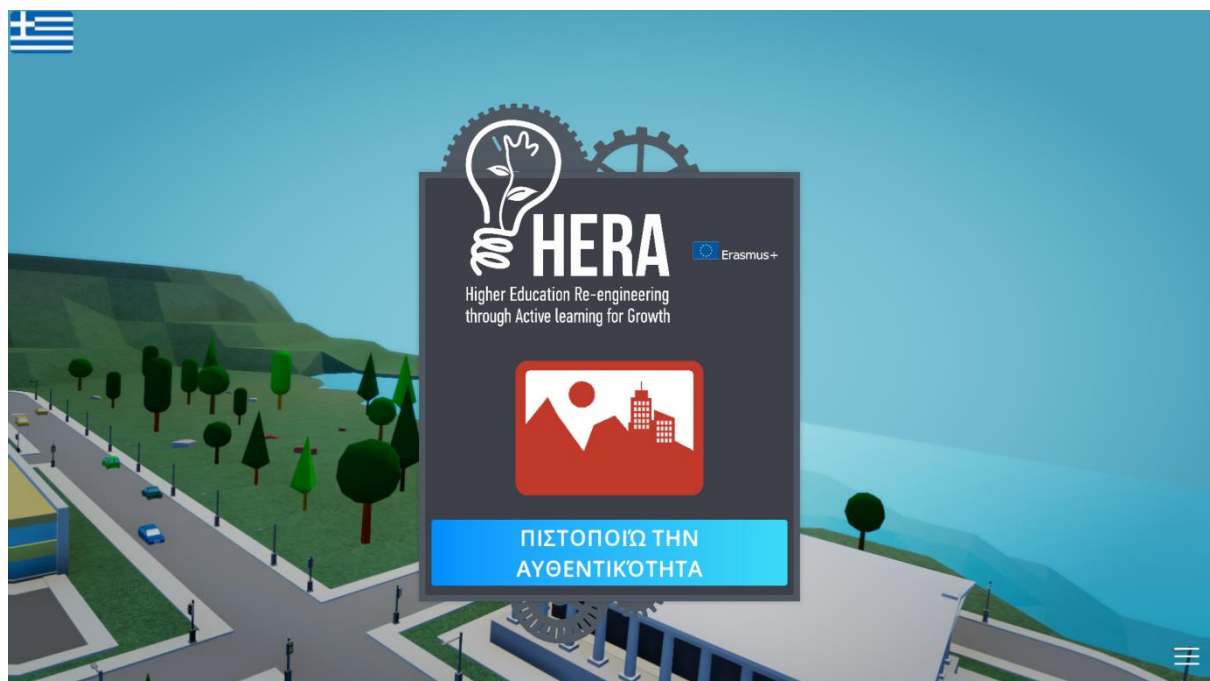



Figure 7: The authenticate button in Greek

Clicking on the three parallel lines on the bottom right side  triggers the opening of the option menu.

Once the option menu is open, the three lines have transformed into a cross  that you can click to close the menu.

The option menu is available throughout the entire Hera software experience and dynamically displays content adapted to the screen currently displayed.

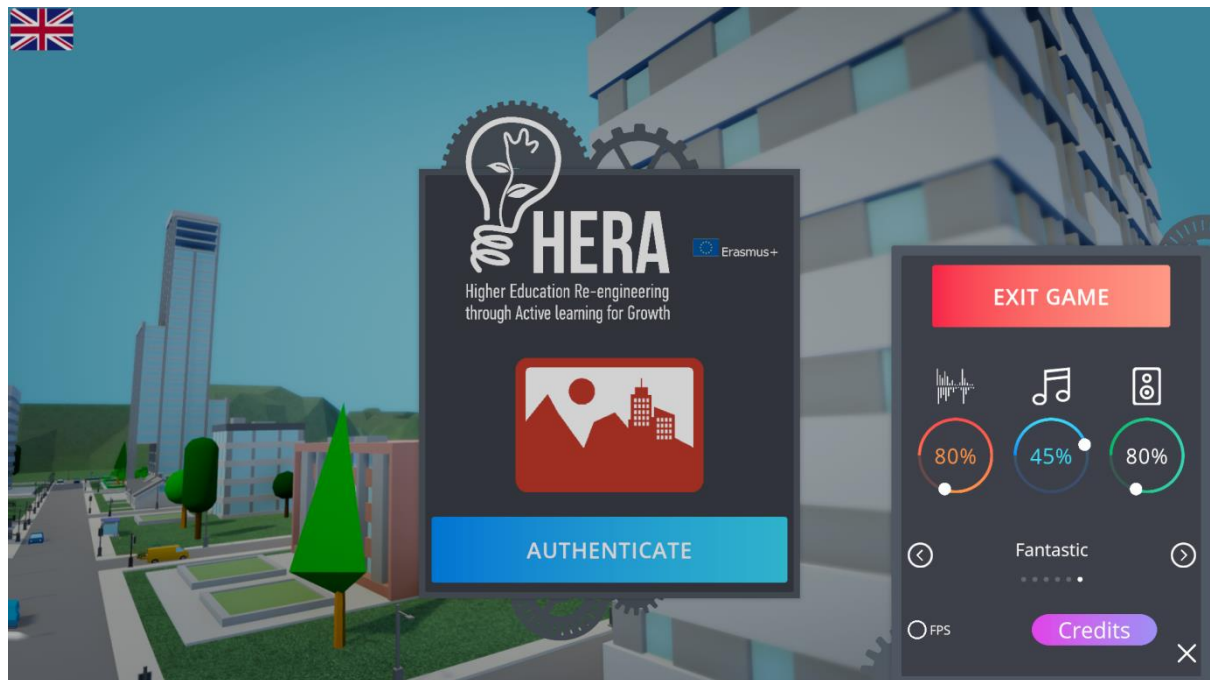








Figure 8: The option menu

The option menu offers a host of parameters to modify, as described in details below.

ACTION BUTTONS

Those buttons allow the user to perform a decisive in-game action, such as leaving the game or saving. Which button exactly is displayed depends on which screen the user is seeing.

- Log Out allows the user to log out from the account they have logged in with 
- Exit game closes the game altogether 
- Tools allows the user to display the communication and organizational tools 
- Save scenarios allows the user to save the scenario they are currently working on 
- Save and exit saves the scenario and exits 
- Exit editor closes the scenario editor and goes back to the main menu 

SOUND MANAGEMENT

Three radial sliders are available for the user to customize their sound experience in the game.

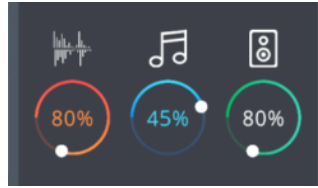
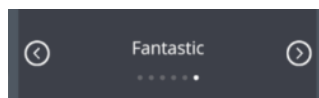


Figure 9: Sound management

The first sliders manages all the sound effects volume the second one the music volume, and the last one manages the overall sound volume. The sound volume can be set anywhere between 0 and 100%.


GRAPHICAL QUALITY MANAGEMENT

The user can influence the overall quality of the game graphics by interacting with the following selector:



Six different values are available for the graphical quality, ranging from Very Low to Fantastic. If you have issues with the game playing slowly, try to lower the overall graphical quality.

In order to help the user check how well the game is running, a FPS (frame per seconds) counter can be


displayed by clicking on the  button. If the FPS counter is displayed, it will appear as three numbers on

The image shows a vertical stack of three numbers. The top number is '100' in green. The middle number is '097' in blue. The bottom number is '014' in red.

top of each other on the top right corner of the screen. The top number indicates the highest number of FPS displayed. This number is capped at 100 maximum no matter what, in order not to tax too much computers. The middle number indicates the average number of FPS, and the bottom one indicates the lowest amount of FPS displayed. All numbers are colored according to their value, following this convention:

- Green indicates FPS above 60
- Blue indicates FPS between 45 and 60
- Yellow indicates FPS between 30 and 45
- Orange indicates FPS between 15 and 30
- Red indicates FPS below 15

CREDITS

The Credit button  displays the Erasmus+ disclaimer, the partners involved in the project and of all the participating individuals.

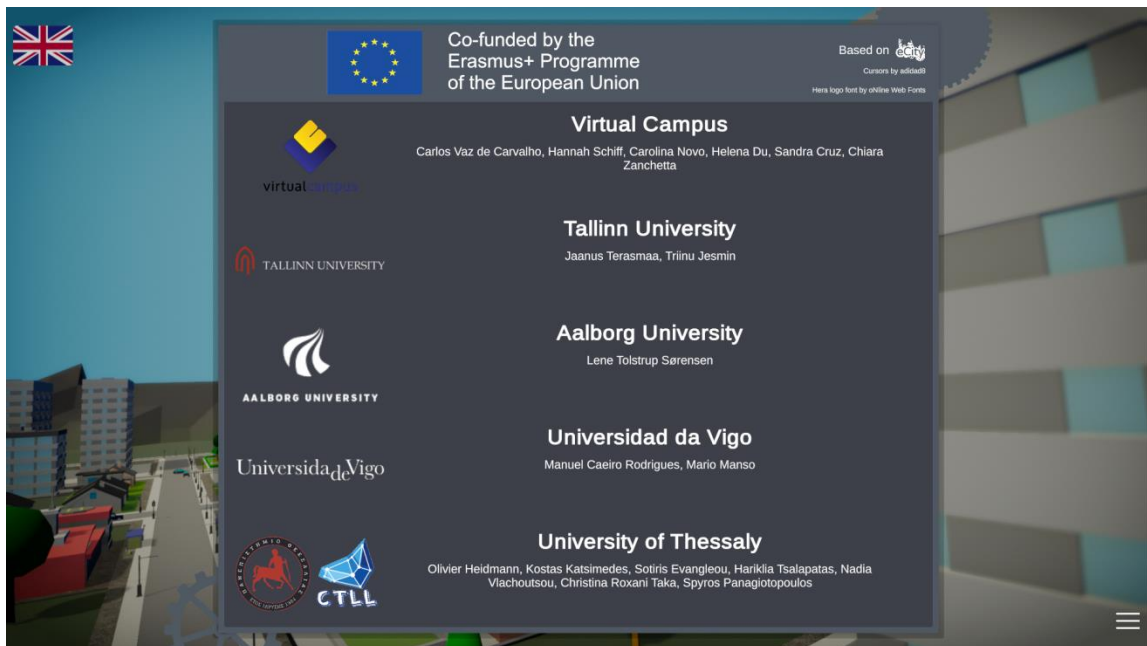


Figure 10: Hera credits screen

LOGGING IN

Clicking on the Authenticate button brings up the Authentication window.

If the user already has a username and password, they will enter them and click on the sign in button to be authenticated.

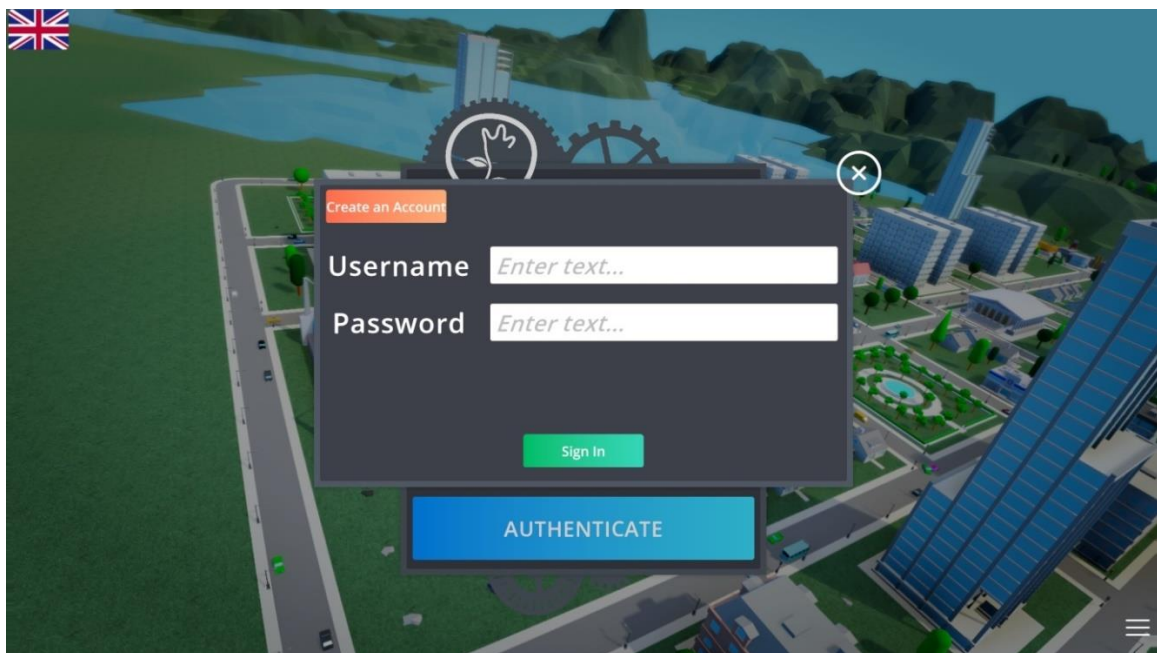


Figure 11: Authentication window

If it's the first time the user is using the Hera software, they need to create an account.

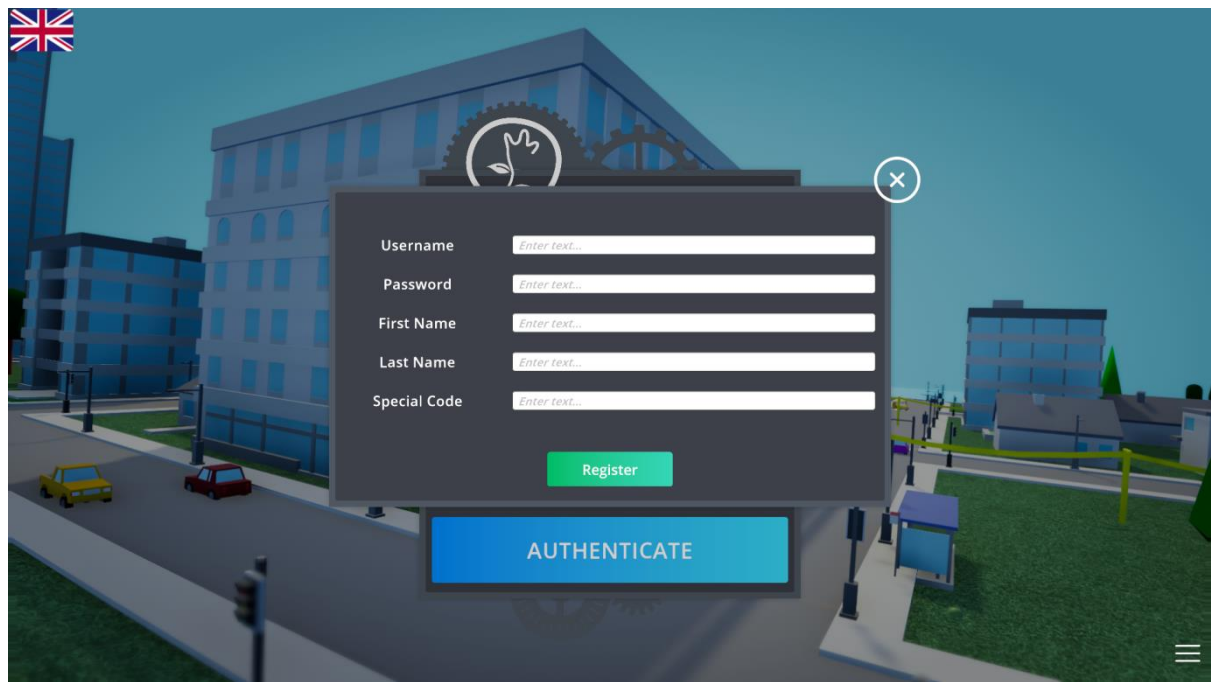


Figure 12: Account creation

When creating an account, the user needs to enter a Username, a Password and their First and Last Name. No email address will be asked in order to minimize (down to zero) the number of personal data kept on our servers. If the user is a teacher, they can enter a special code to get access to the teacher side of the Hera platform. Contact us to get the teacher code.

THE TEACHER EXPERIENCE

Once you are connected as a teacher a new window appears showing you the current courses you have in your name.

Three tabs are displayed in the course window:

- Courses
- Scenarios
- Public scenarios

COURSES

Each of the boxes displayed in the course tab corresponds to one of your courses. You can see at a glance the name of the course, a description, the language of the course and some meta-tags.

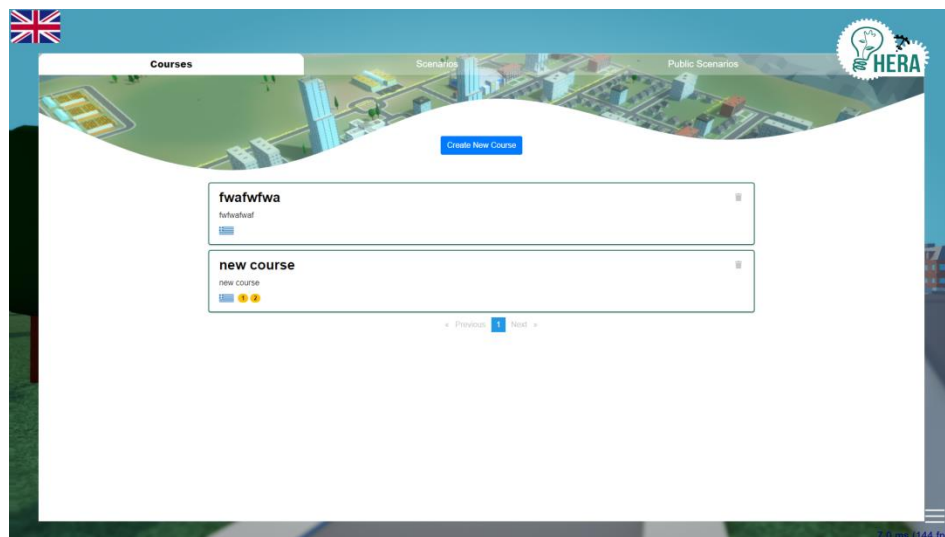


Figure 13: The Course tab

To enter into a course and see it in details, you need to click on the course box.

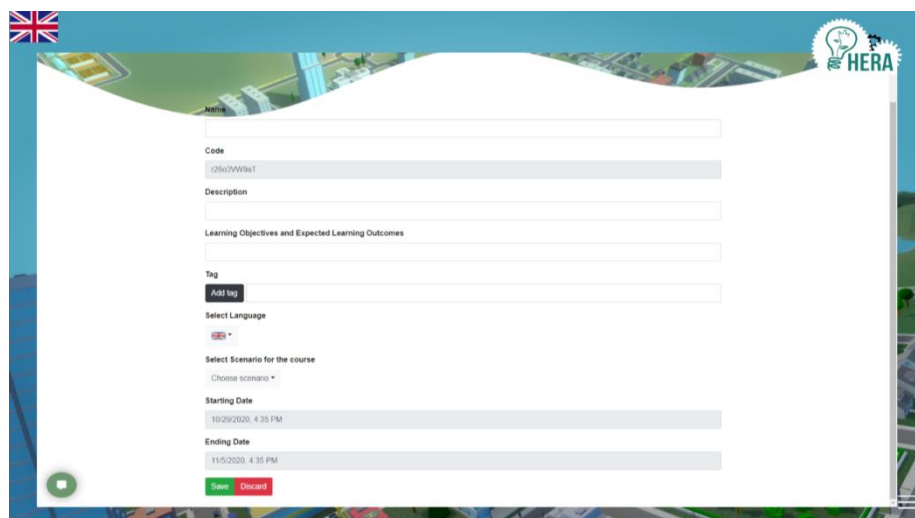


Figure 14: Creating a course

When you click on the blue button Create a New Course, a new window appears where you need to insert some information about this new course. First you need to give a name and a description, along with the learning objectives and expected pedagogic outcomes. A code for the course is automatically and randomly generated. Afterwards you can insert some meta-tags and select the course's language. You need to select the name of the scenario you want to slot in this course from a selection box. All the scenarios that appear in the scenario tab will appear in this box. You finally need to select a start and an ending date for your course.

Be advised that the city game described in the scenario will start at the starting date and stop at the ending date. So if your course lasts for 10 days and the scenario on which it is based is described as being 240 days long, the students will experience the passing of 24 game days for each day in real life, one game day per real life hour. The game calculates everything automatically based on your course's starting and ending dates and the duration of the scenario. The time in the game will continue to flow whether the students are playing it or not. This means that if we take the preceding example, a team of student playing the game for the first time on the very last day of the course will start the scenario at day 216 (on 240) already.

SCENARIOS

The scenario tab shows you all of the scenarios that are in your name. Any scenario displayed here can be immediately slotted into a new course that you would want to create. Scenarios can be edited, cloned or deleted.

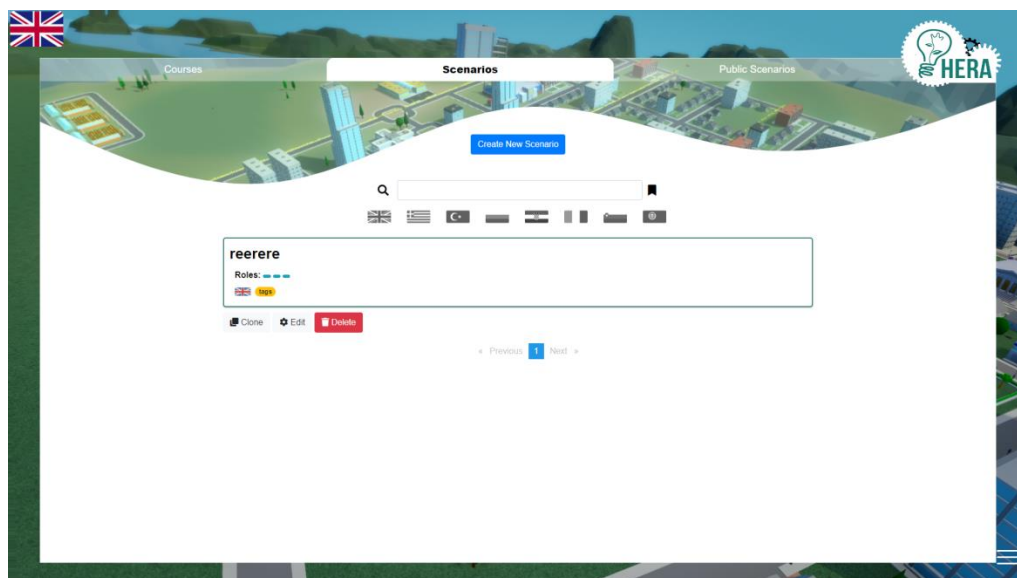


Figure 15: The Scenario tab

You can see at a glance the name of the scenario, a description, the number of roles available, the language and some meta-tags.

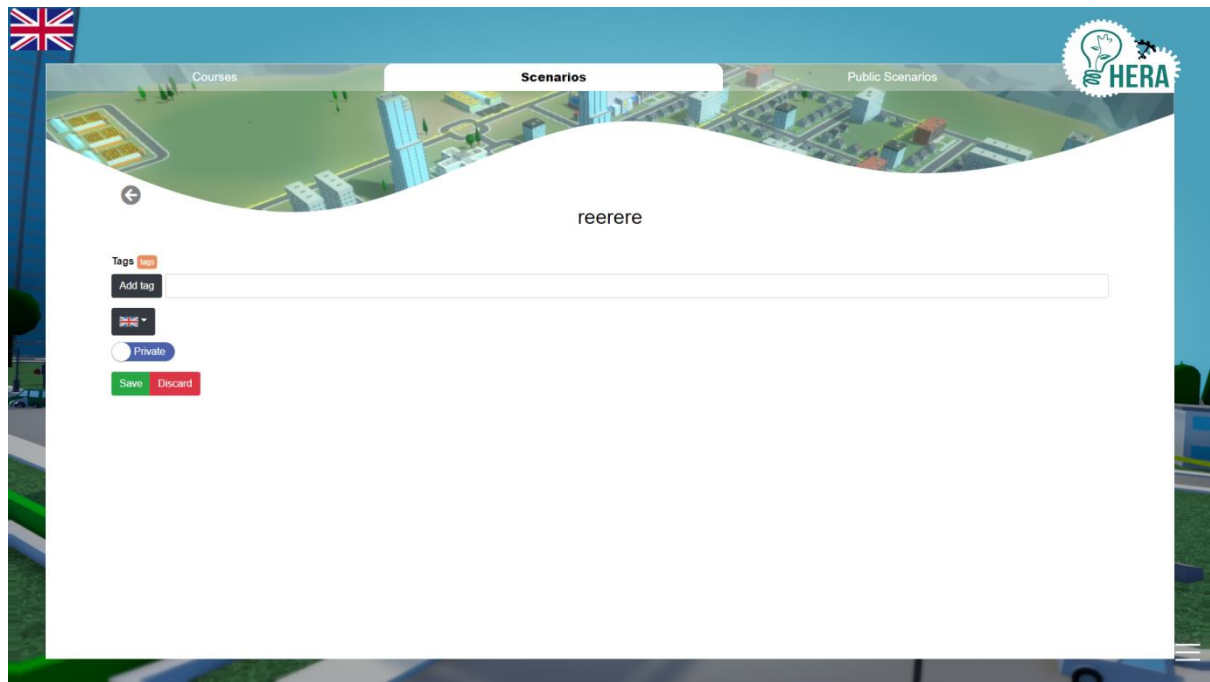


Figure 16: Editing a scenario

When editing a scenario, you can add meta-tags, change the scenario language and select if it's a scenario that will appear only to you (private) or be shared with all users (public). All the other changes to a scenario (name, description, map, roles, etc...) can be done by clicking on the scenario box in the scenario tab. This will start the game in scenario mode.

PUBLIC SCENARIOS

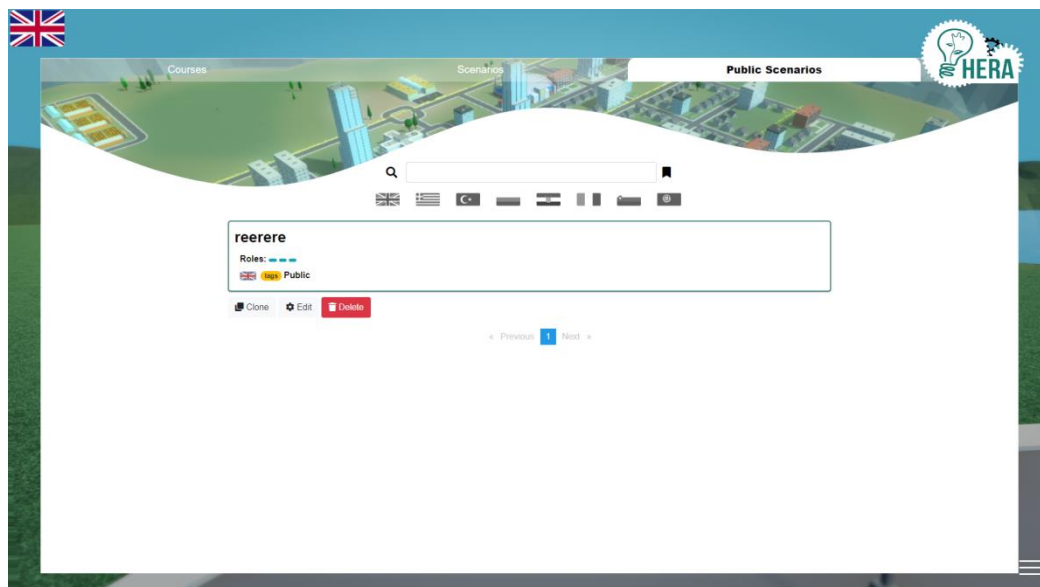


Figure 17: The Public Scenarios tab

The public scenario tab shows you all of the scenarios that are available to all the teachers and content creators of the Hera platform. Any scenario displayed needs to be duplicated (Clone button) before you can be able to slot it into a new course that you would want to create. Scenarios can be edited or deleted only if you are the scenario author. Any public scenario that has been cloned will appear in the Scenario tab.

You can see at a glance the name of the scenario, a description, the number of roles available, the language and some meta-tags.

INSIDE A COURSE

When clicking on a course, you enter in a new window showing the details of the course.

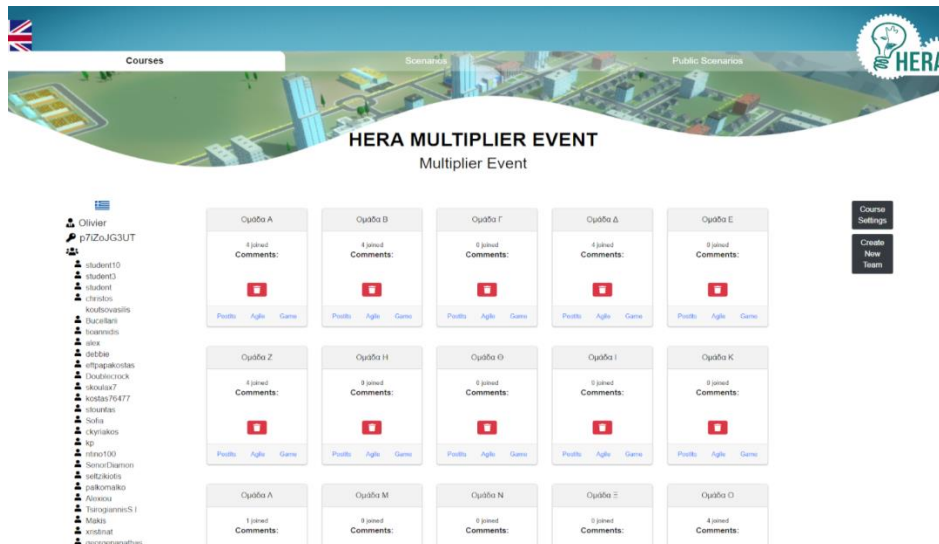
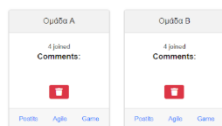


Figure 18: Course details

The left hand side of the screen shows the language of the course and the associated meta-tags. The name of the teacher **sevangeliou** appears, along with the course code **5otCourse**. Finally at the bottom a list of students having enrolled in the course is displayed .



Each of the grey boxes on the screen corresponds to one team of players. You as a teacher are responsible for creating those Teams. The students will first enroll to the course using the course code that you are giving them and will then enroll into any of the available teams, at their liking.

This system allows both for the students and for the teacher to select their teams. If the teacher wants to keep total control and name specific people to specific teams, they simply have to create as many courses as there are team, but with only one team per course. They then give to each of the members of the teams that they selected one of the course codes. On the contrary, if a teacher wants to let the students completely free of choosing their teams, they simply have to create one single course with as many teams as needed inside. Then they give the course code to the students who will populate the teams at their liking.



Figure 19: Creating a team

The Postits, Agile buttons in the grey boxes allow the teacher to access to the communication and organization tools available to that particular team of students. We detail those tools in the annex of this manual. The Game button allows the teacher to enter into the game and see what their students are doing. The red and white trashcan icon allows the teacher to delete a created team.

The black buttons on the right hand side allow to check the course settings and to create new teams. Checking the course settings allows seeing the name, description, learning objectives, scenario used, meta-tags and language of the course.

The screenshot displays the 'Course edition' interface in the HERA system. The interface is divided into three main sections: 'Courses', 'Scenarios', and 'Public Scenarios'. The 'Courses' section is active, showing a form for editing a course named 'HERA MULTIPLIER EVENT'. The form includes the following fields:

- Name:** HERA MULTIPLIER EVENT
- Code:** p7n2u030JT
- Description:** Multiplier Event
- Learning Objectives and Expected Learning Outcomes:**
- Select Scenario:** Hera Multiplier Event
- Tag:** Add tag
- Starting Date:** 4/16/2021, 11:00 AM
- Ending Date:** 4/16/2021, 4:00 PM

At the bottom of the form, there are two buttons: 'Save' (green) and 'Discard' (red). The background of the interface features a stylized cityscape and the HERA logo.

Figure 20: Course edition

Best practice: Once you have created a course as a teacher, your first move should be to create as many teams as you see fit. It's only afterwards that your course will be ready to use for your students.

CREATING A SCENARIO

When as a teacher you click on the scenario box of a scenario, you access to the scenario settings inside the game. If you create a new scenario you'll first be prompted with a screen asking you to define the size of the map used in the scenario. Three size are available,: medium, large, huge.

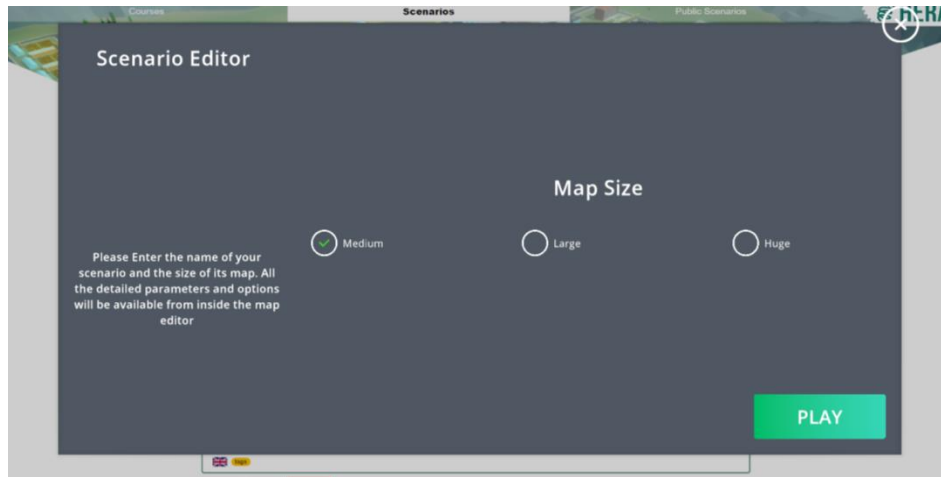


Figure 21: Selecting the size of the map

The interface of the game is the shown below and will be described later in this manual.

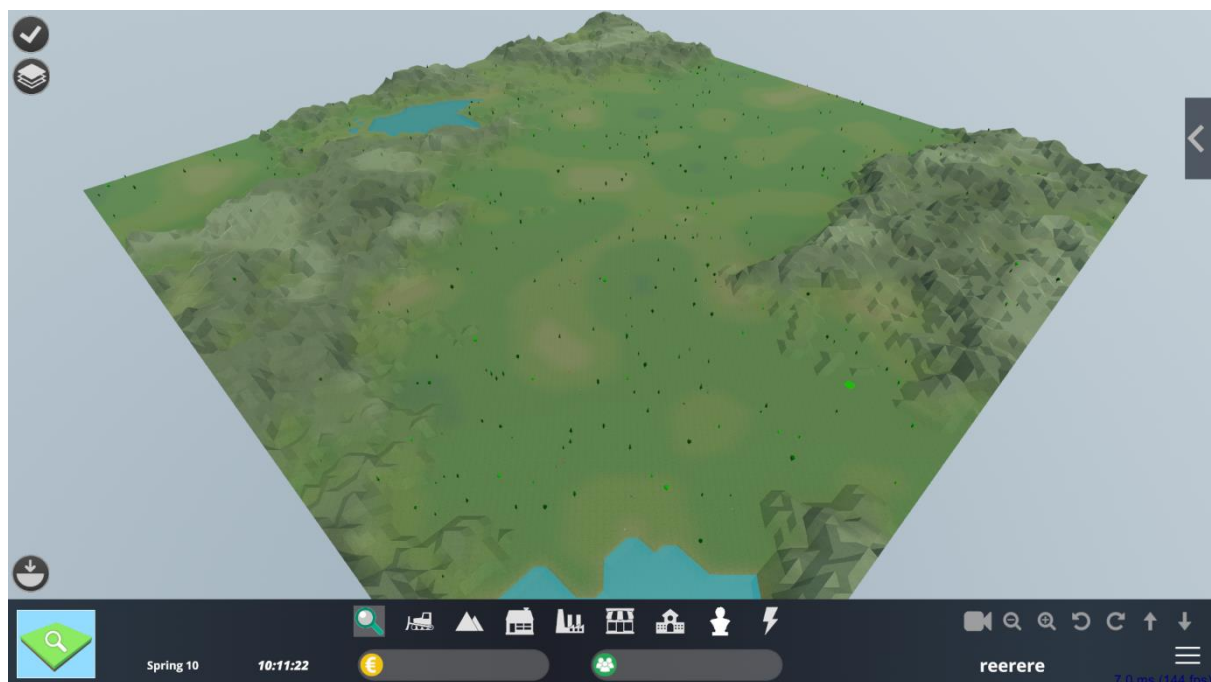



Figure 22: Game interface

Clicking on the arrow button on the right  makes the scenario editor window pop open. Clicking on the same button will make it disappear.

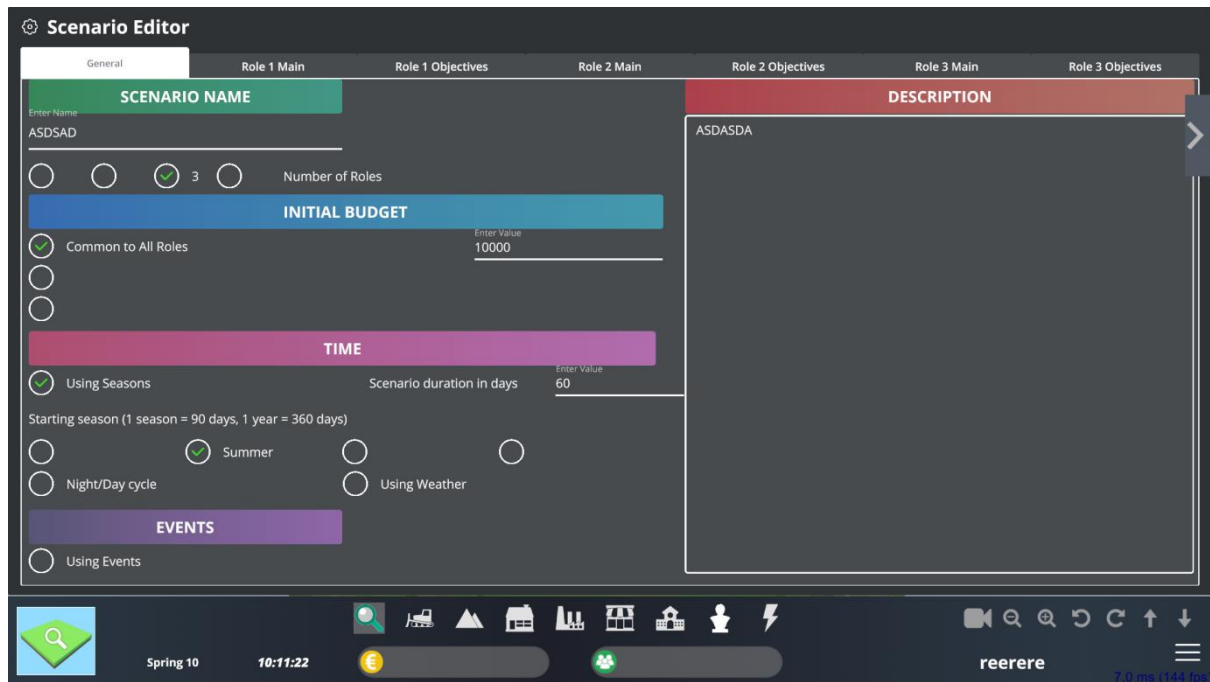


Figure 23: Scenario Editor

The scenario editor is divided into several tabs, each containing:

- The general information about the scenario
- The general information about a role (from 1 up to 4)
- The specific objectives information about a role (from 1 up to 4)

Given there can be anywhere between 1 and 4 roles in a given scenario, this means there will be between 3 (1+1x2) and 9 (1+4x2) tabs in the scenario editor window.

The general window allows the teacher or content creator to insert the following information about the scenario:

- The scenario name
- The scenario description
- How many roles does the scenario have
- How is the city budget managed in this scenario? It can either be common to all (and its value needs to be specified here) or it can be specific per role but then it can either be the same amount for all (and its value needs to be specified here) or a different amount of each (and its value needs to be specified in the role tab).
- How long in game days is the scenario lasting? According to the subject at hand, the scenario duration can vary between 1 day and as many as needed.
- Is the game using a season system or are all days exactly the same? If a season system is used, then which season are we starting from? Each month of the in-game year will last 30 in-game days exactly. This means there's only 360 days in a year in-game.
- Is the game using a day and night cycle? If not, the days are always lit by the sun no matter the time, and if the night/day system is in use, the sun will rise and fall during the days, casting shadows and leaving the night dark, lit only by the moon and stars. The city will react accordingly, with the lights being turned on at night for houses, streets and cars.

- Is the game using the weather system? If not, all days will be always bright and sunny. If not, a complex weather system with rain, storm, thunder, snow, will be set in game. The weather will vary according to the season.
- Is the game using events? Events are incidents that can happen to the city in game. It could be a flood, an incident at the nuclear power plant or others.

Once the general information has been filled by the teacher or content creator, each of the roles need to be defined and explained.

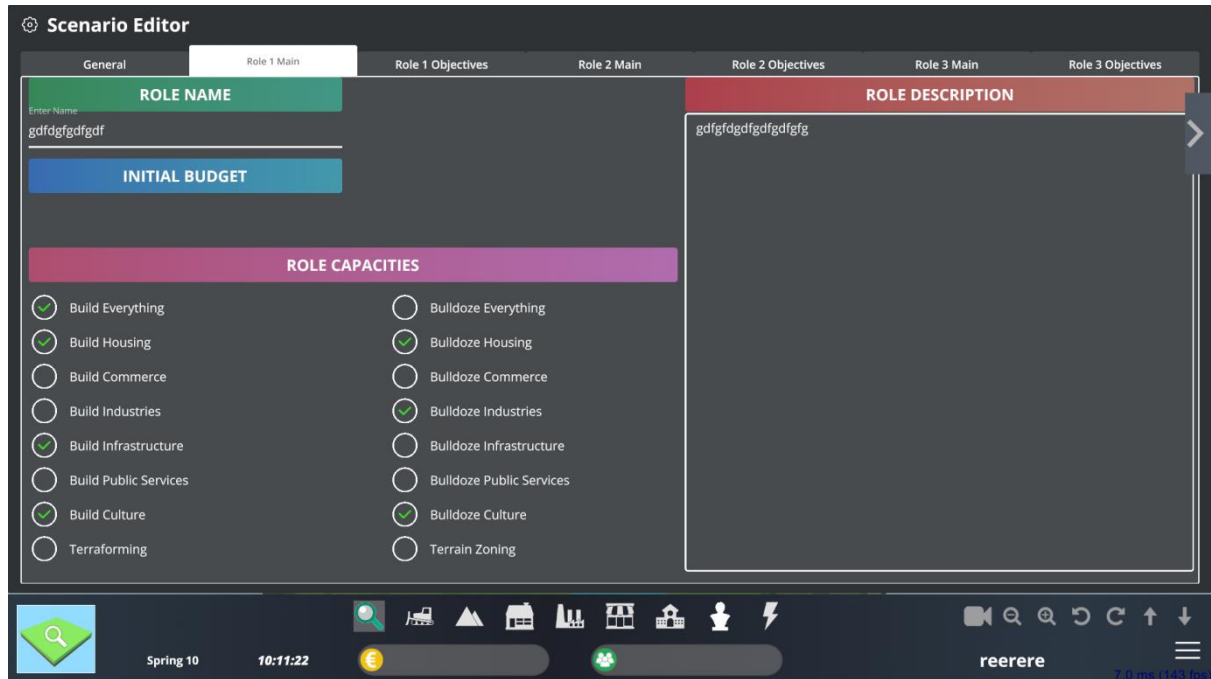


Figure 24: Scenario Editor Role details

The first tab of a role contains the following information:

- The role name
- The role description
- The specific role budget if it was not defined as common to all
- The capacities the student playing the role can have. Typically in a city builder game the player is omnipotent and can do everything. We wanted to introduce limitations to the capacities of players so they would need to collaborate to succeed.

The capacities of a role are the following:

- Being able to build all the available buildings in game
- Being able to destroy any of the buildings on the map
- Being able to build housing buildings
- Being able to destroy housing buildings
- Being able to build commercial buildings
- Being able to destroy commercial buildings
- Being able to build industrial buildings
- Being able to destroy industrial buildings
- Being able to build public services buildings
- Being able to destroy public services buildings

- Being able to build cultural buildings
- Being able to destroy cultural buildings
- Being able to do terraforming of the map, leveling mountains or creating them
- Being able to define specific zones on the map, especially useful for terraforming

Finally, the teacher/content creator will need to define the objectives for the role to fulfill at the end of the scenario. Typically, the success of each player and of the global team can be evaluated through how many pre-defined objectives they managed to reach. If a player reached all its goal but at the detriments of all the other in the team, they will have failed in the global framework of the teamwork.

General	Role 1 Main	Role 1 Objectives	Role 2 Main	Role 2 Objectives	Role 3 Main	Role 3 Objectives
ROLE OBJECTIVES						
<input type="radio"/> City Treasury	Enter Value 0		<input type="radio"/> Phone Coverage	Enter Percentage 0		
<input type="radio"/> City Income	Enter Value 0		<input type="radio"/> Energy Coverage	Enter Percentage 6565		
<input type="radio"/> City Expenses	Enter Value 554645		<input type="radio"/> Internet Coverage	Enter Percentage 0		
<input type="radio"/> Population	Enter Value 0		<input type="radio"/> Police Station Coverage	Enter Percentage 0		
<input type="radio"/> Happiness	Enter Percentage 0		<input type="radio"/> School Coverage	Enter Percentage 0		
<input type="radio"/> Health	Enter Value 0		<input type="radio"/> Fire Station Coverage	Enter Percentage 456		
<input type="radio"/> Culture	Enter Value 0		<input type="radio"/> Hospital Coverage	Enter Percentage 0		
<input type="radio"/> Education	Enter Value 4564		<input type="radio"/> Accumulated Air Pollution	Enter Value 0		
<input type="radio"/> Crime	Enter Value 0		<input type="radio"/> Accumulated Water Pollution	Enter Value 0		
<input type="radio"/> Commercial Income	Enter Value 565465		<input type="radio"/> Accumulated Ground Pollution	Enter Value 656		
<input type="radio"/> Industrial Income	Enter Value 0		<input type="radio"/> Tourism amount	Enter Value 0		
<input type="radio"/> Housing Proportion	Enter Percentage 0		<input type="radio"/> Traffic amount	Enter Value 0		
<input type="radio"/> Commercial Proportion	Enter Percentage 0		<input type="radio"/> Intact Buildings	Enter Percentage 5656		
<input type="radio"/> Industrial Proportion	Enter Percentage 0		<input type="radio"/> Enter Value 0	of	Stadium	

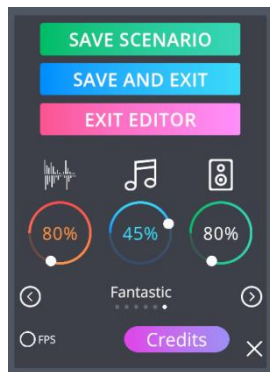
Figure 25: Scenario Editor Role objectives

The objectives that can be defined for the players' role are the following:

- Make sure the city treasury contains a certain amount of money
- Make sure the city gets a certain amount of income by taxes
- Make sure the city expenses are below a certain threshold
- Make sure the population of the city reaches a certain number
- Make sure the population's happiness rises to a certain percentage
- Make sure the overall health of the population reaches a certain number
- Make sure the cultural level of the population reaches a certain number
- Make sure the education level of the population reaches a certain number
- Make sure the crime level stays below a certain threshold
- Make sure the city tax income from commerce reaches a certain amount
- Make sure the city tax income from industries reaches a certain amount
- Make sure the amount of houses reaches a certain target percentage compared to the total buildings in the city
- Make sure the amount of commerce reaches a certain target percentage compared to the total buildings in the city
- Make sure the amount of industries reaches a certain target percentage compared to the total buildings in the city

- Make sure a certain target percentage of the city has access to phone
- Make sure a certain target percentage of the city has access to energy
- Make sure a certain target percentage of the city has access to Internet
- Make sure a certain target percentage of the city is covered by the reach of police stations
- Make sure a certain target percentage of the city is covered by the reach of schools
- Make sure a certain target percentage of the city is covered by the reach of fire stations
- Make sure a certain target percentage of the city is covered by the reach of hospitals
- Make sure air pollution is not soaring above a certain target threshold
- Make sure ground pollution is not soaring above a certain target threshold
- Make sure water pollution is not soaring above a certain target threshold
- Make sure there is a certain target amount of tourism in town
- Make sure there is no more than a certain threshold value of traffic anywhere in town
- Make sure a target percentages of buildings are still intact
- Make sure there is a certain amount of a specific building that is present in the city

Once all those information have been set by the teacher/content creator, they can begin building the town in the game interface to perfectly suit the scenario.




Once both the town and all the data are ready, the teacher/content creator can save the scenario and exit the game creation tool by using the main menu.

THE STUDENT EXPERIENCE

Students will start the game and log in the same way teachers do and as it was described above.

Once a student is connected, they can access the courses they are registered to. Adding a new course code in the box at the top of the screen and clicking the Join button allows for joining additional courses.

At a glance, the students can see for each course their name, language and description. They can unsubscribe to any course they want at any time by clicking the  button in the corresponding course box.

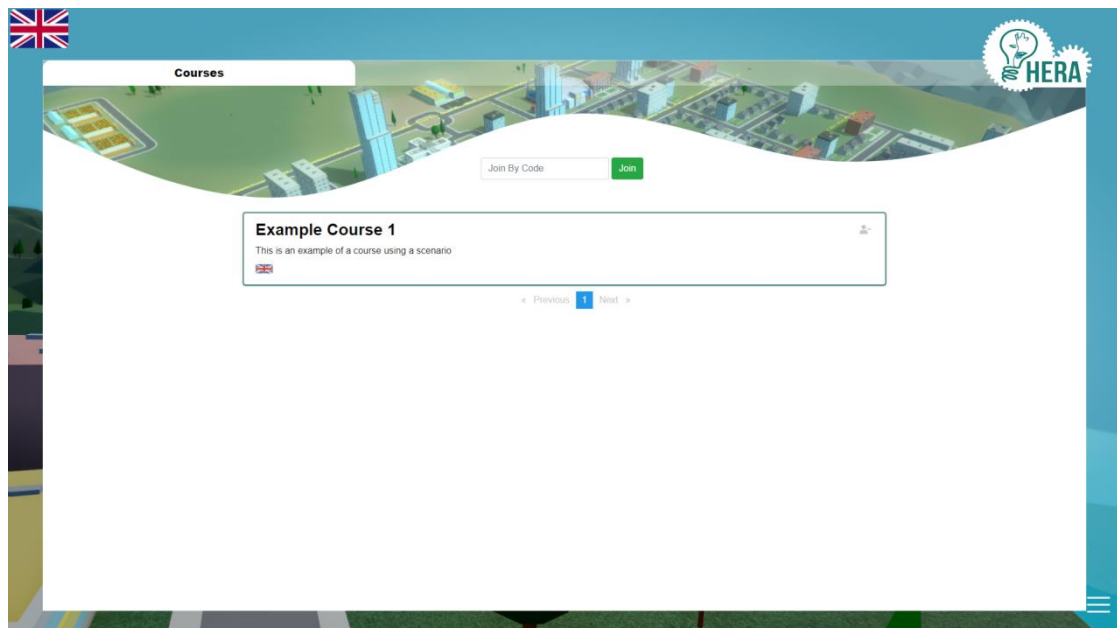


Figure 26: The students' course list

Once a student has entered a course, they are greeted by the screen shown in Figure 26.

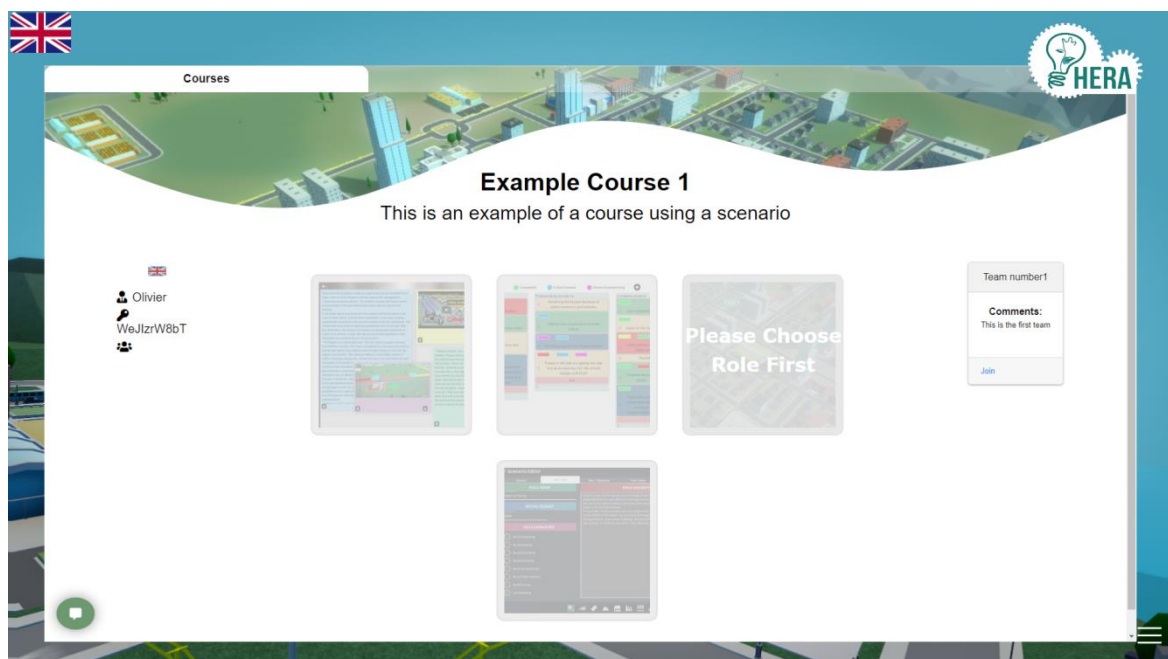




Figure 27: Inside a course

This screen has been partly described above in the teacher's interface, so let's focus on the differences, namely the images/icons in the middle and the team list on the right hand side.


The  button on the bottom right allows the player to display the chat box, in which they can have a live dialog with their team mates.

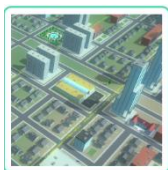
There are 4 images in the middle, each corresponding to one action.



Clicking on  starts the whiteboard interface (described in the annex) where students can communicate together by posting post-it notes on a virtual board. The notes can contain text, photos or videos.




Clicking on  starts the agile tool (described in the annex) where students can plan and organize their work together.



Clicking on  starts the city management game.



Clicking on  allows the student to choose their role in the team, as per described in the scenario. The player cannot start the game or access any organization tool before having chosen a role.

Team number1	Team number1
Comments: This is the first team	Comments: This is the first team
Join	Leave

The boxes on the right of the screen represent the teams created by the teacher. The player can join a team by clicking the Join button on any team and leave them by clicking the Leave button that replaces the Join button once a team is joined.

If the player wants to go back to the list of courses, they simply have to click on the course tab on top of the screen.

The interface for choosing a role is displayed in Figure 28. The different available roles are shown on the screen and the player can pick one they like. Naturally they can only pick a role which is still available. They can also change role at any point in time, by selecting another free role (or by selecting the No Role option) first and then picking their favorite role.

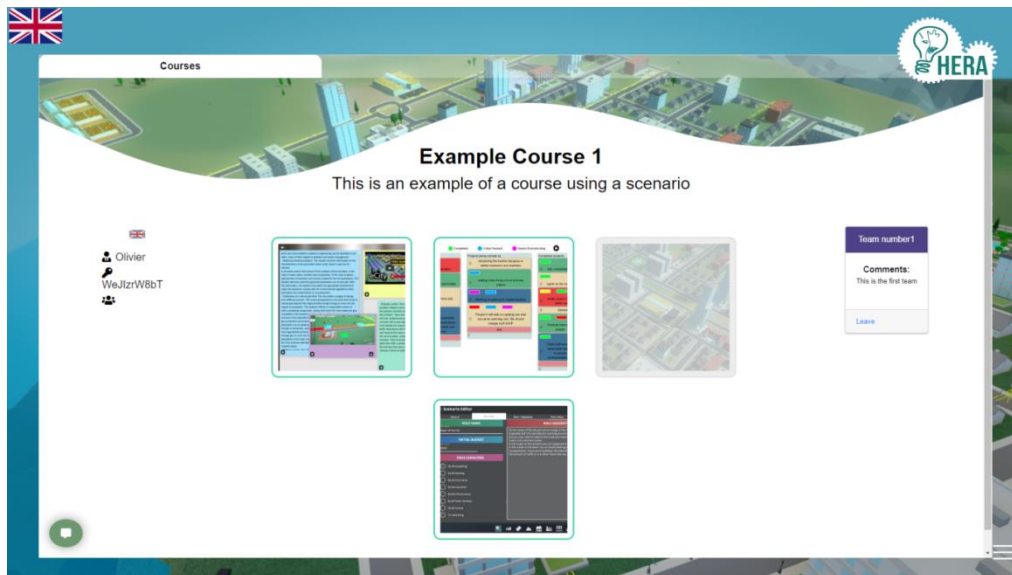


Figure 28: The player has joined the team

When picking a role, the player can select any of the displayed roles. If the button Choose this role is greyed out, this means the role has already been taken and you cannot choose it. If you want to switch role with another member of your team, please first select No Role, let your team mate pick up the role you just abandoned and then select the role you wish.

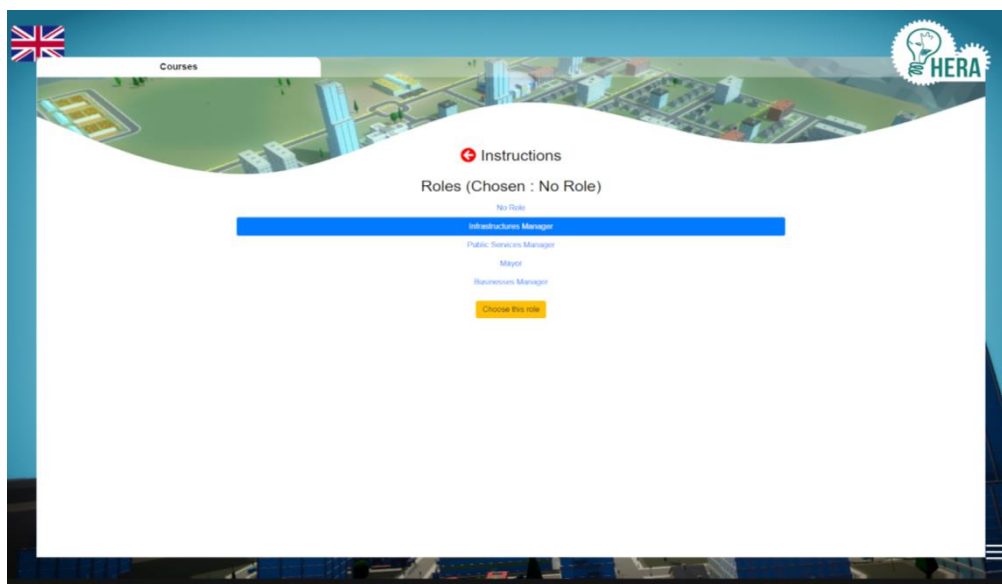


Figure 29: The player has chosen a role

THE GAME INTERFACE

The in game interface (shown figure below) allows the player to get many details about the city and its environment and interact with it.

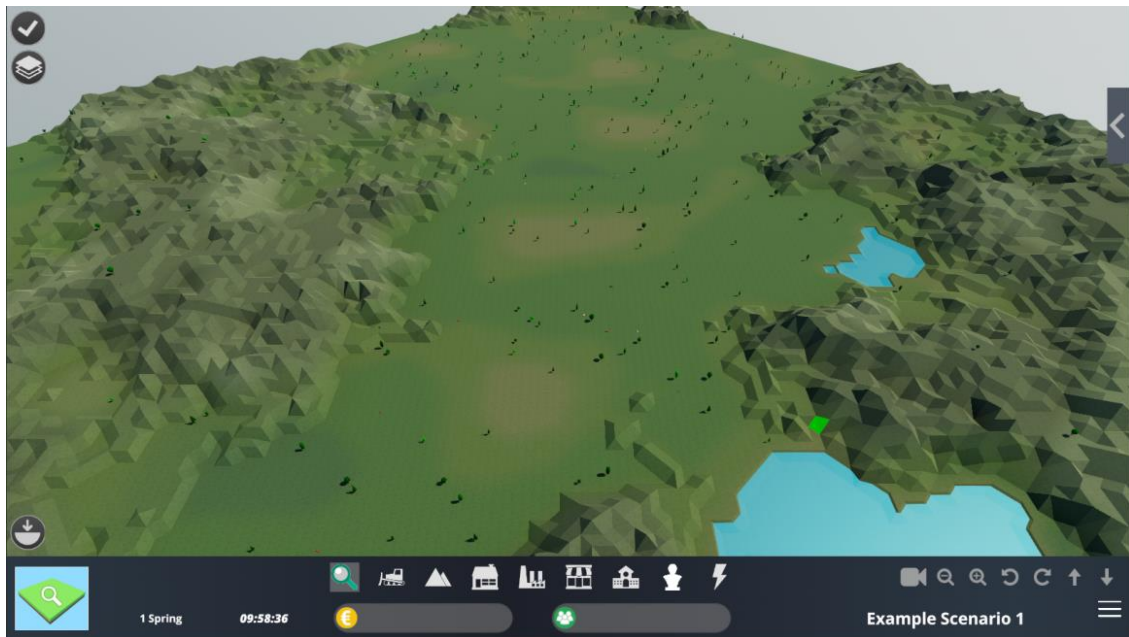


Figure 30: In game interface

The interface is divided in two main zones: the bottom bar and the left-hand buttons.

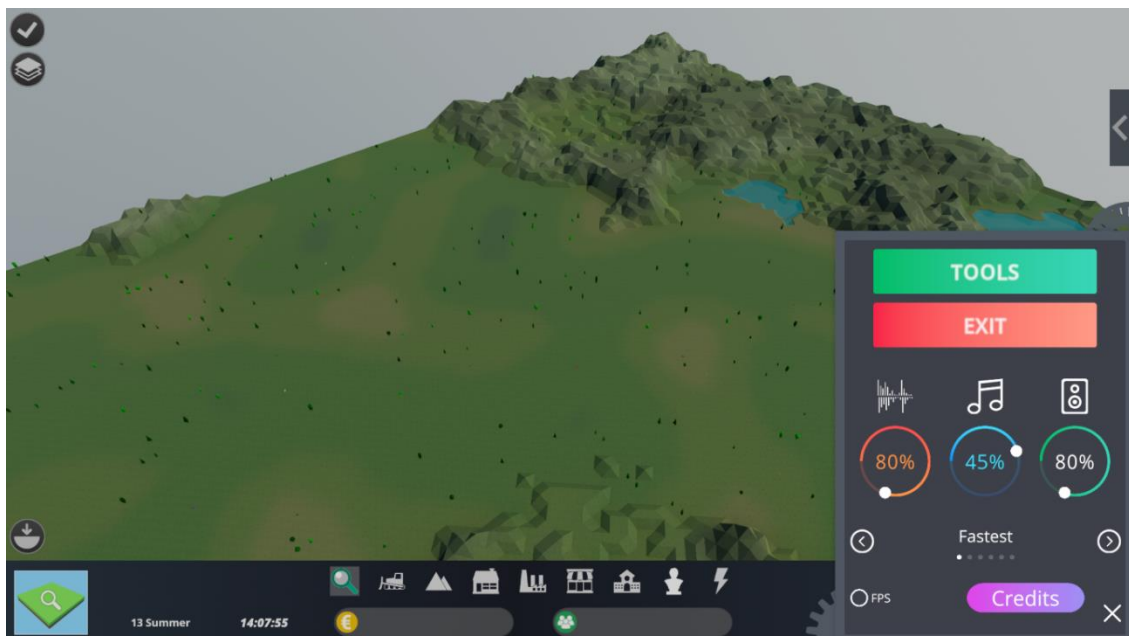


Figure 31: Option menu

At any moment the player can leave the game and go back to the Amin menu by clicking on the exit button. The Tools button will make the browser appear, where they are able to access the organization tools.

The entire game interface is using tooltips, so the players should let their mouse hover objects for a second to get additional information about that object's role.

THE LEFT HAND BUTTONS

There are 3 buttons available to the players:



Displays the different information layers available to the players.



Displays the underground of the map.



Displays the objectives for all the roles and how close they are from completion.

INFORMATION LAYERS

The information layers display the map by showcasing a special type of information, shown as a layer on top of the current map. This helps the user to better understand the situation quickly by displaying data which might not be easily available otherwise.

To illustrate the different color codes used by the layer system, an explanative legend is displayed on the bottom right of the screen.

Figure 32 shows a city displaying its energy layer. The player can immediately see what zones are using low voltage energy (yellow on the map), what zones are using medium voltage energy (orange on the map) and where the power factory is (red on the map corresponding to high voltage energy).



Figure 32: Showing the energy layer

Figure 33 shows the same city seen through the pollution layer, and the player can immediately see that some industries and power plants are causing pollution issues in the town.

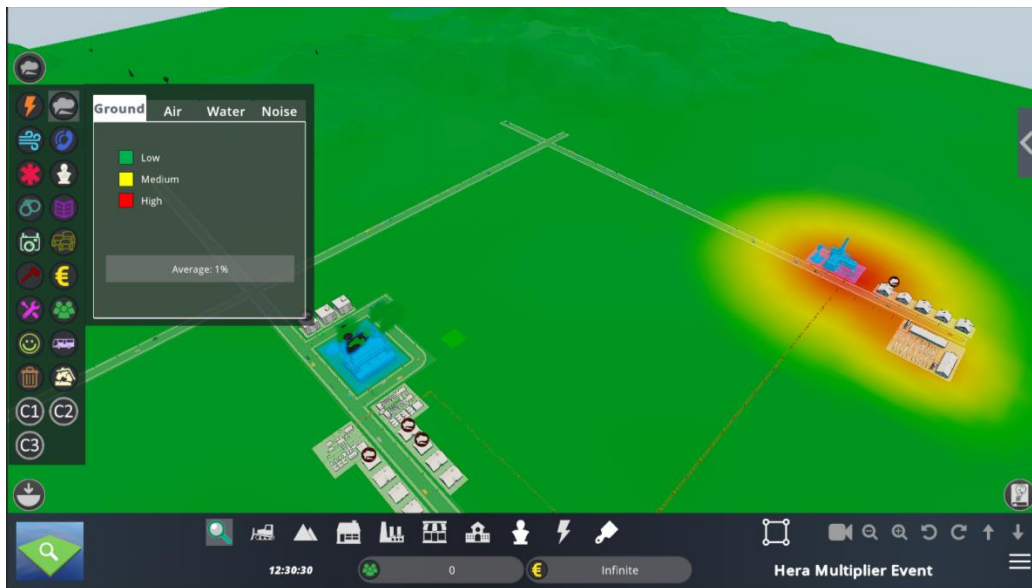



Figure 33: Showing the pollution layer

There are a total of 18 + 3 different layers available to the player by clicking on the  button.

-  displays the revenue levels in the city
-  displays the levels of culture in the city
-  displays the level of tourism in the city
-  displays the wind levels on the map
-  displays the telecommunication services coverage on the map
-  displays the police coverage and crime prevalence on the map
-  displays the different types of pollutions on the map
-  displays the level of education on the map
-  displays maintenance costs on the map
-  displays all information related to energy
-  display the fire fighters coverage on the map
-  displays the happiness levels of the population
-  displays the health level on the map
-  displays the public transportations coverage on the map
-  displays the traffic levels on the map
-  displays the garbage collection information on the map
-  displays the level of integrity of all buildings on the map
-  displays the population information on the map
-  displays the first custom layer information on the map

- C2 displays the second custom layer information on the map
- C3 displays the third custom layer information on the map

Most of the layers include sub-layers related to the theme of the layer. Each sub layer contains a legend explaining the color coding on the map. Figure 34 shows the crime layer, which also contains the police coverage and the resulting public safety level.

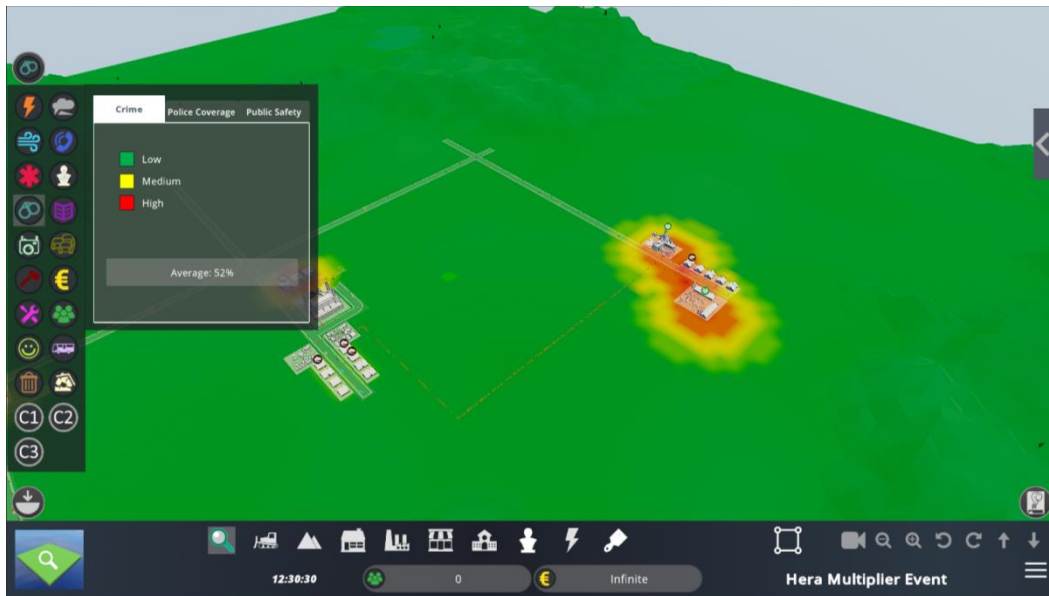


Figure 34: All the layers related to police and crime

When a zone is selected by clicking on its icon and can be de-selected by clicking again on its icon.

UNDERGROUND

Clicking on the button simply displays what is underneath the map, at the underground level.

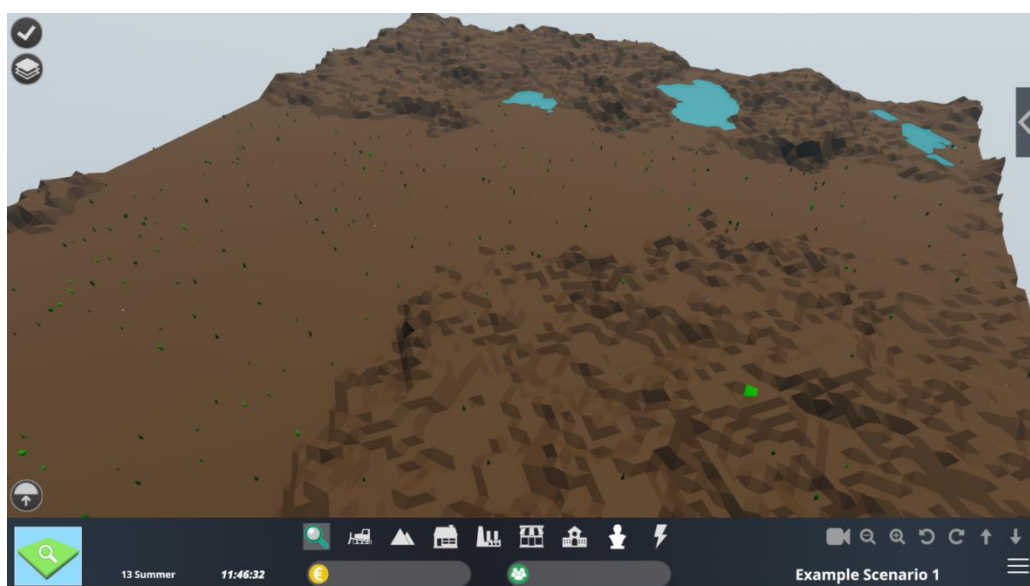



Figure 35: Underground

CUSTOM LAYERS

When preparing their scenario the teacher or content creator can specify a certain amount of customized layers which will have various effects in the game. In order to do so, the teacher needs to click on the  in the toolbar at the bottom of the screen. This prompts the display of the layer editor.

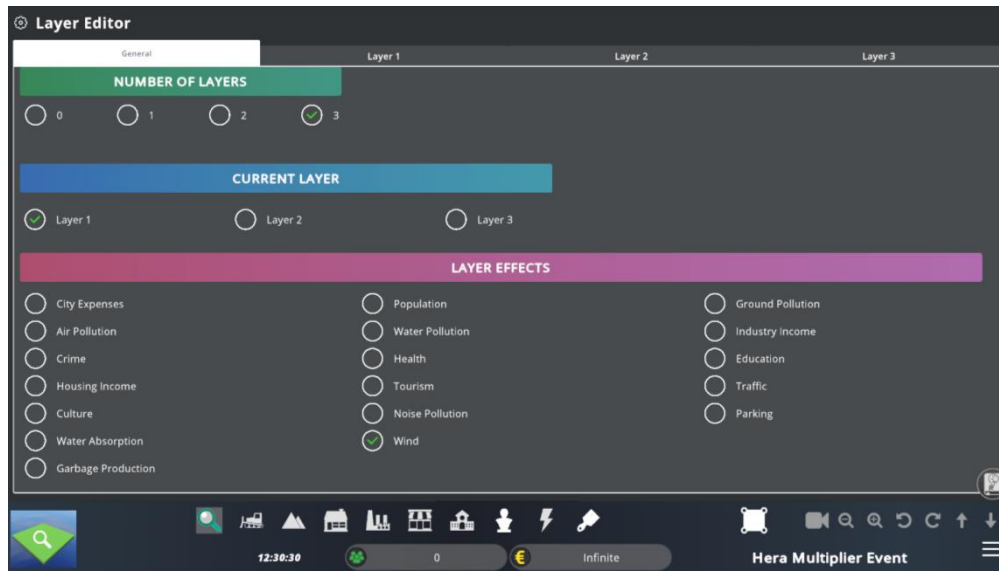


Figure 36: The Layer Editor

Up to 3 custom layers can be defined. Each of the layers is focusing on one only of the following effects:

- City Expenses
- Air Pollution
- Crime
- Housing Income
- Culture
- Water Absorption
- Garbage Production
- Population
- Water Pollution
- Health
- Tourism
- Noise Pollution
- Wind
- Ground Pollution
- Industry Income
- Education
- Traffic
- Parking

Inside a custom layer, up to 6 individual zones can be defined, each affecting the layer effect in a positive or negative way. Each zone can be named independently. Figure 37 shows that two different zones have been defined inside the third custom layer, affecting Commercial income. The first zone, named “Less Commercial revenue” will inflict a net -15 penalty for commercial revenue to each and every building built inside the zone. The second one, named “More Commercial Revenue” adds a bonus of +15 to each of the buildings in that

zone. Each zone can be assigned any of the 6 predefined colors (blue, green, yellow, magenta, red, and turquoise).

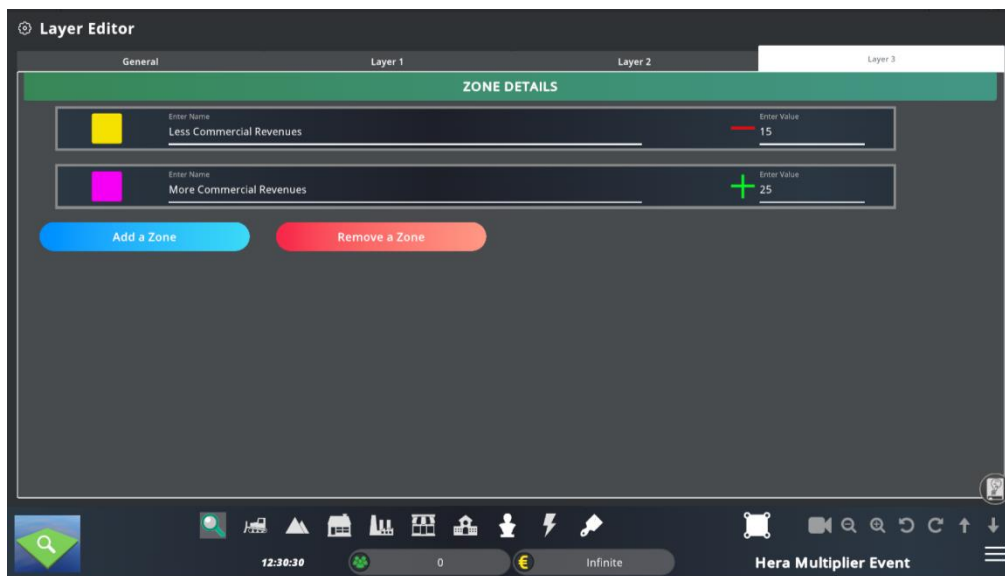


Figure 37: Zones defined inside a custom layer

The custom layer system is an extremely useful tool for content creators and teachers to simulate anything they wish in an easy fashion. For example, in order to simulate a very windy plain, the content creator only needs to define a custom layer affecting wind value, create a zone with a big bonus and then paint in on the map at the right place.

Click again on the Custom Layer's icon to close the Editor.


In order to paint the zones created, the teacher needs to click on the  icon to reveal all the created layers and their zones. Click on one of the zone paint brushes to paint on the map in the right color



Figure 38: Painting custom zones on the map

OBJECTIVES

By clicking on the objectives button, a player can see what objectives are assigned to each of the defined role and how close they are from being complete.

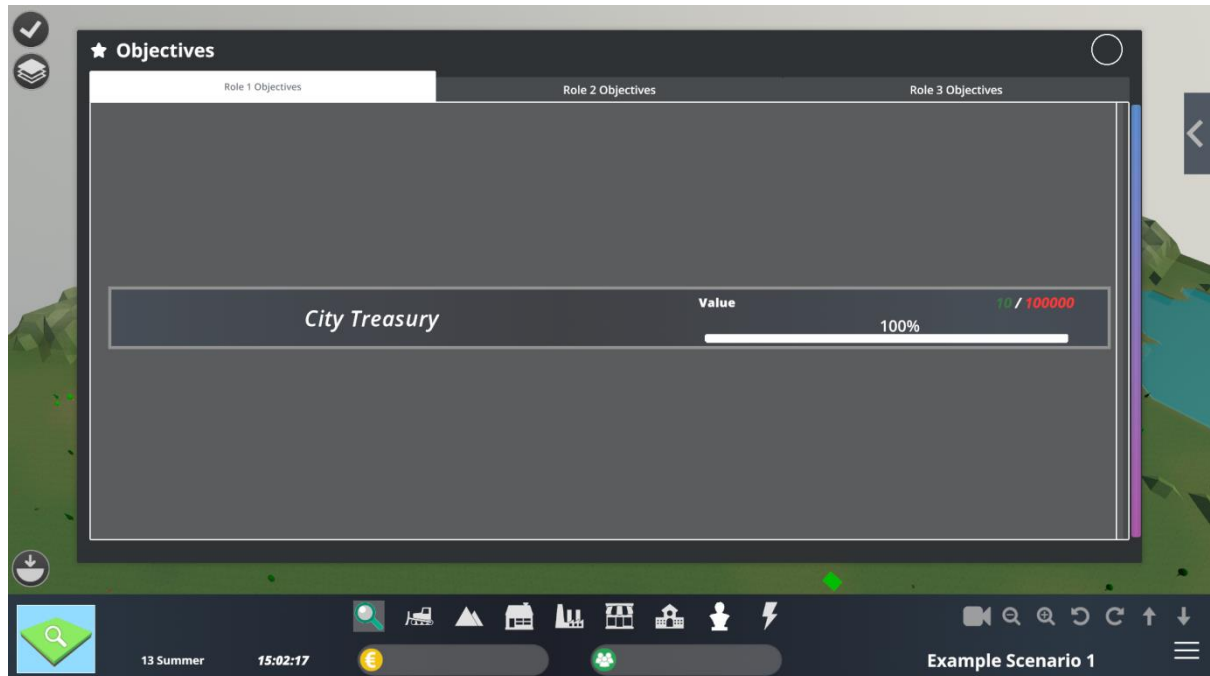
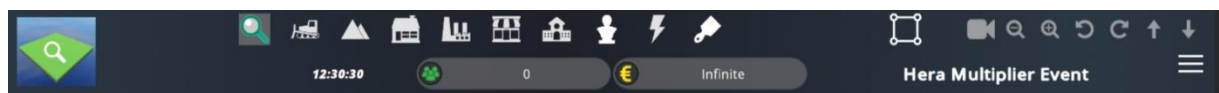


Figure 39: Objective screen

In the example figure 33, the student who is playing role 1 will need to make sure that the city treasury contains 100000 before the end of the scenario, and they have only 10 in bank for the moment.

THE BOTTOM BAR

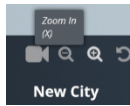
The bottom bar can be divided in several functional parts.



THE CAMERA TOOLS

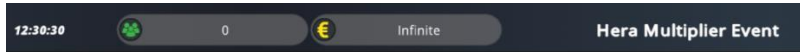


The camera tool bar allows the player to manipulate the in game camera as they see fit. There are buttons to make it go up, down, rotate left, right, zoom in and zoom out.



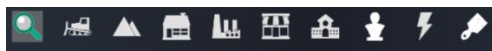
Leaving the mouse hovering over a button shows a tooltip explaining the button function and also showing the keyboard key that can be pressed for the same result. Here we see we can zoom in by pressing the x key.

CITY GENERAL INFORMATION



The lower part of the bottom bar displays the in game date and time, along with the city's treasury and population and the name of the current scenario.

THE CONSTRUCTION TOOL BAR



This toolbar allows the player to build and destroy anything on the map, up to and including its terrain. Some category might not appear for some players, as certain roles will carry limitations in what the players are able to build and destroy on the map.



The magnifying glass allows the user to click on a building on the map and see more information about it. Figure 36 shows the information panel of a paper mill

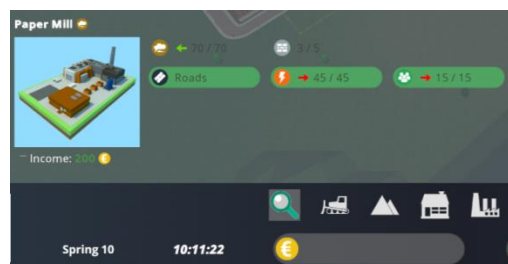


Figure 40: Close up of a paper mill



The Bulldozer tool allows the user to destroy any building they want, within the limits of what is allowed by their role.



Figure 41: Bulldozer tool



The terraforming tools allow the user to modify the terrain. Modify terrain will raise or lower the terrain according to the player clicking with their left or right mouse button and level terrain will set a portion of terrain to the same height.



Figure 42: The terraforming tools



The house tools allow you to build any available dwelling in town. Four different tabs are available, one per size of the house: small, medium, large and skyscrapers.

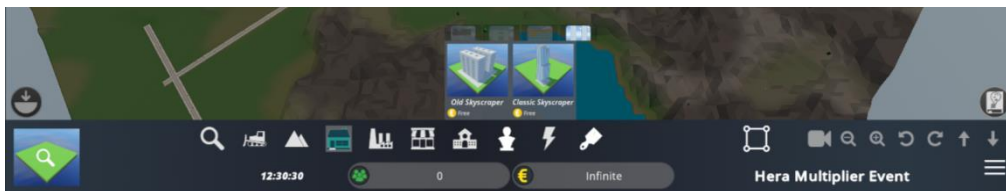
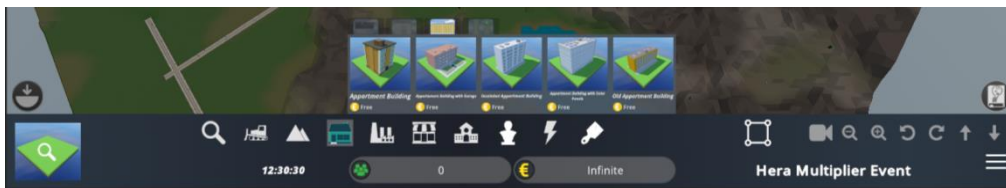


Figure 43: Building houses



The industry tools allow you to build any available industry in town. Three different tabs are available: farms, industries and anti-pollution buildings





Figure 44: Building industries



The commerce tools allow you to build any available commercial building in town. Three different tabs are available: big markets, small shops and office buildings.



Figure 45: Building commercial



The public services tools allow you to build any of the available public services in town. Four different tabs are available: public services, public transports, parks and garbage disposal.

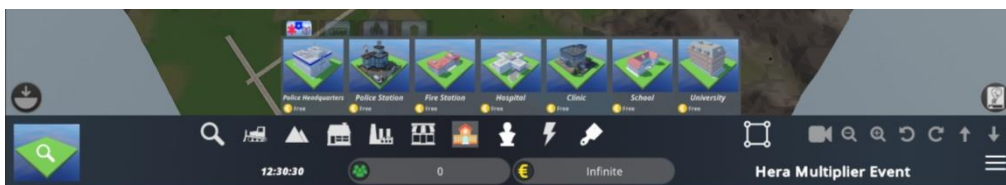




Figure 46: Building public services



The culture tools allow you to build any cultural building in town.

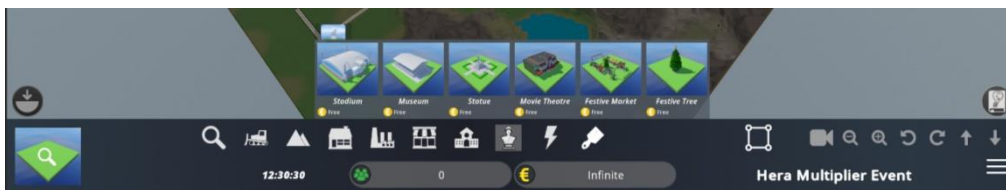


Figure 47: Building culture structures



The infrastructure tools allow you to build all the electrical and energy-related infrastructures, but also everything pertaining to Internet and phones. Four different tabs are available: roads, energy, internet and phone.

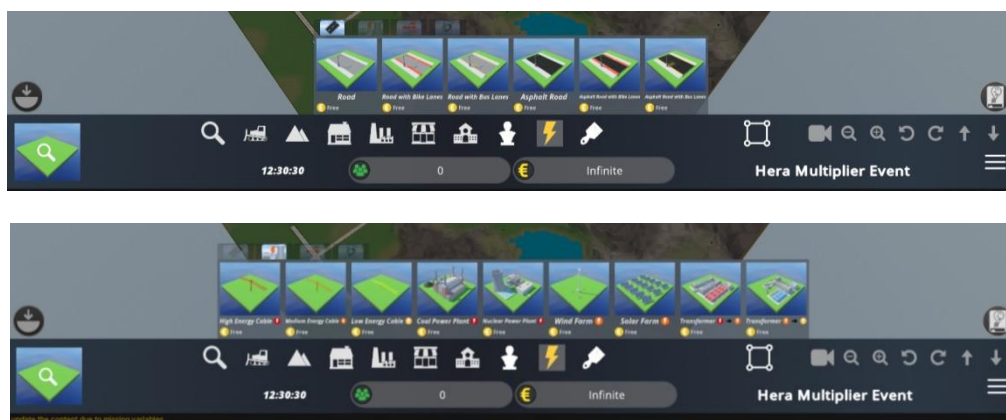


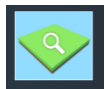


Figure 48: Building infrastructures



The paintbrush icon is related to custom layers, appears only for the teachers and content creator in editor mode and has been explained in details above.

THE CONTEXTUAL INFO BOX



The contextual info box allows you to always know what building is selected while you are using building tools. Figure 49 shows that the currently selected building is a Classic Medium House and of them will be built if the players click on the map.

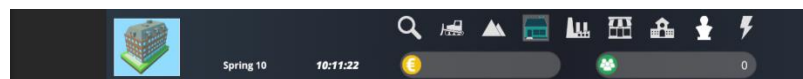


Figure 49: Contextual info box

THE HERA INTEGRATED TOOLS

THE AGILE TOOL

The Agile tool allows the students to coordinate by drawing up fully fledged action plans, complete with custom annotations and legends.

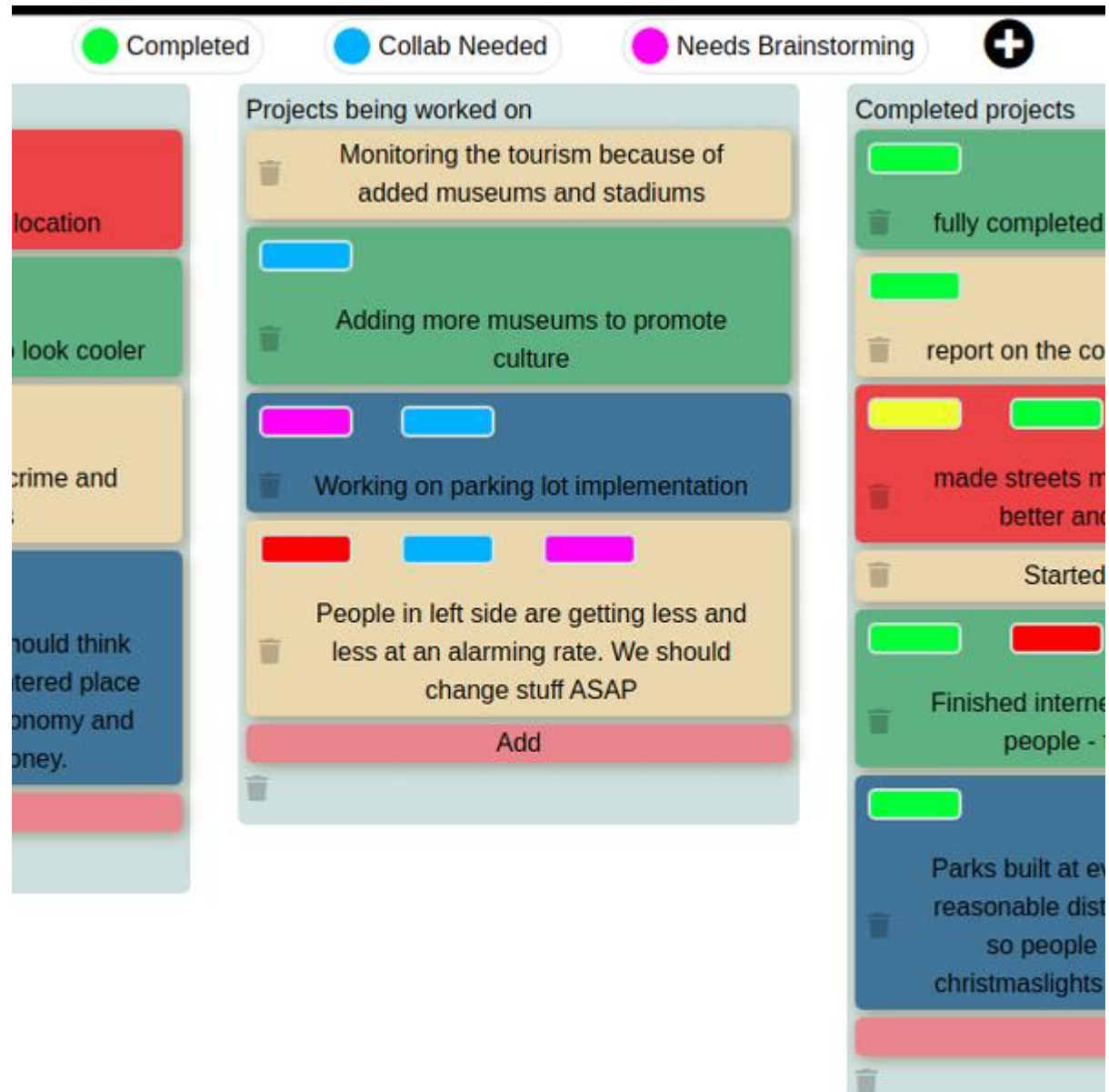
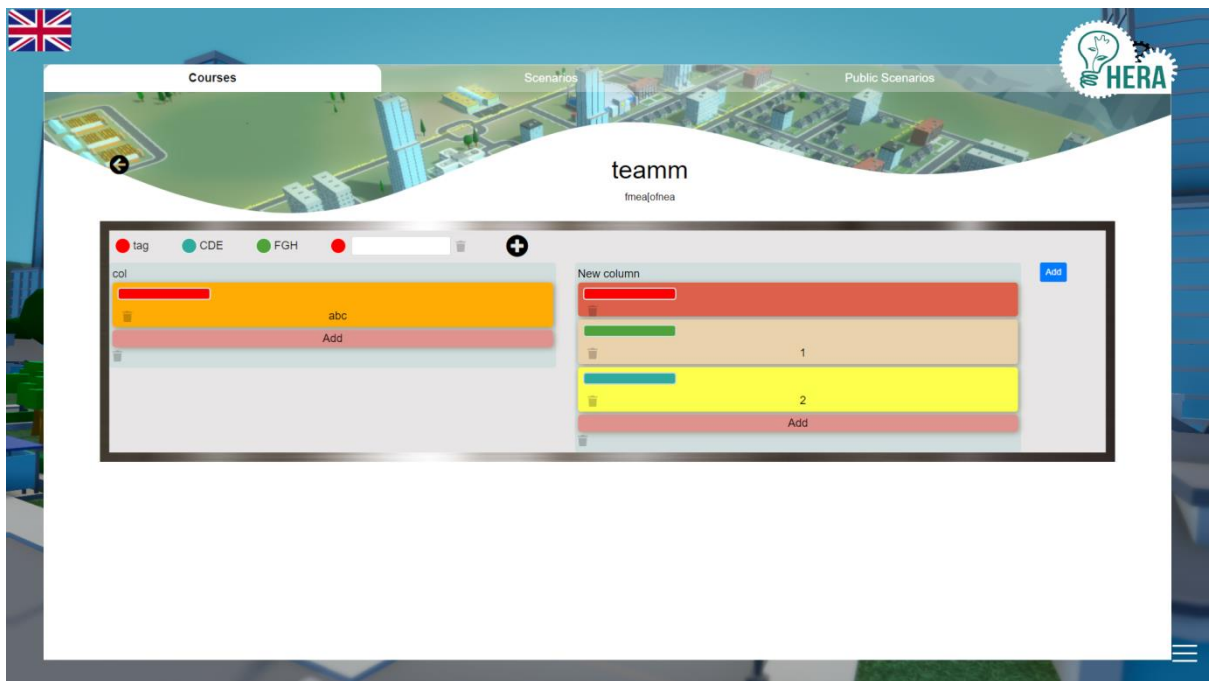
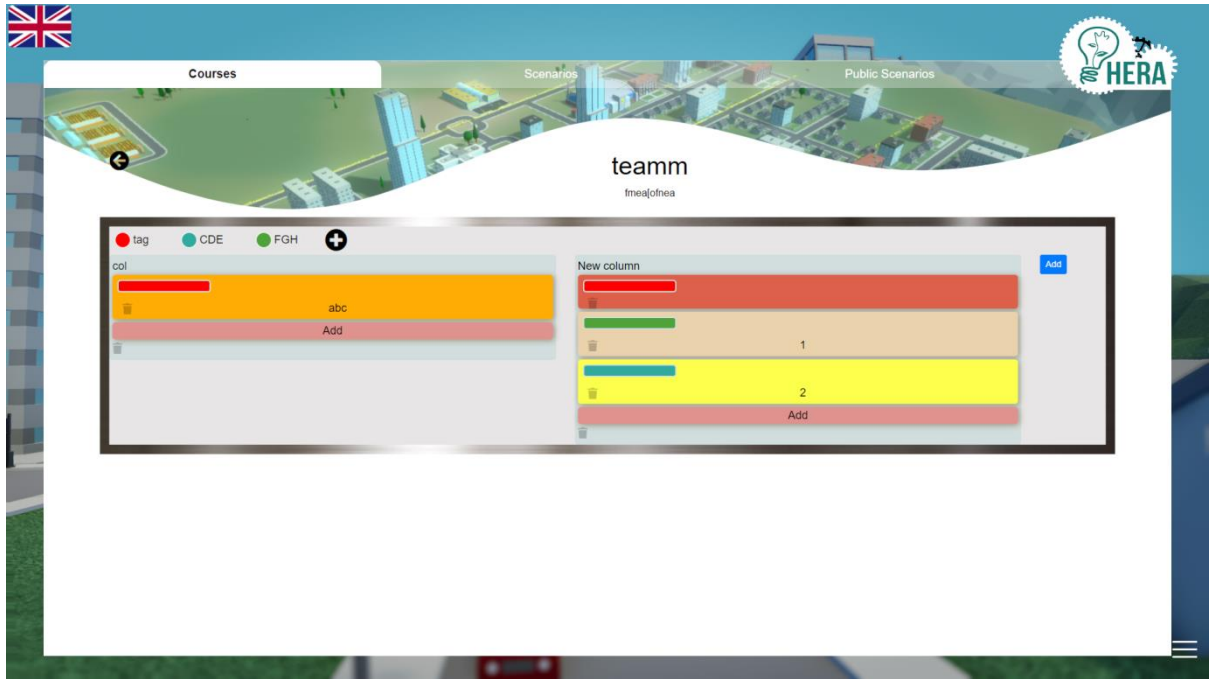
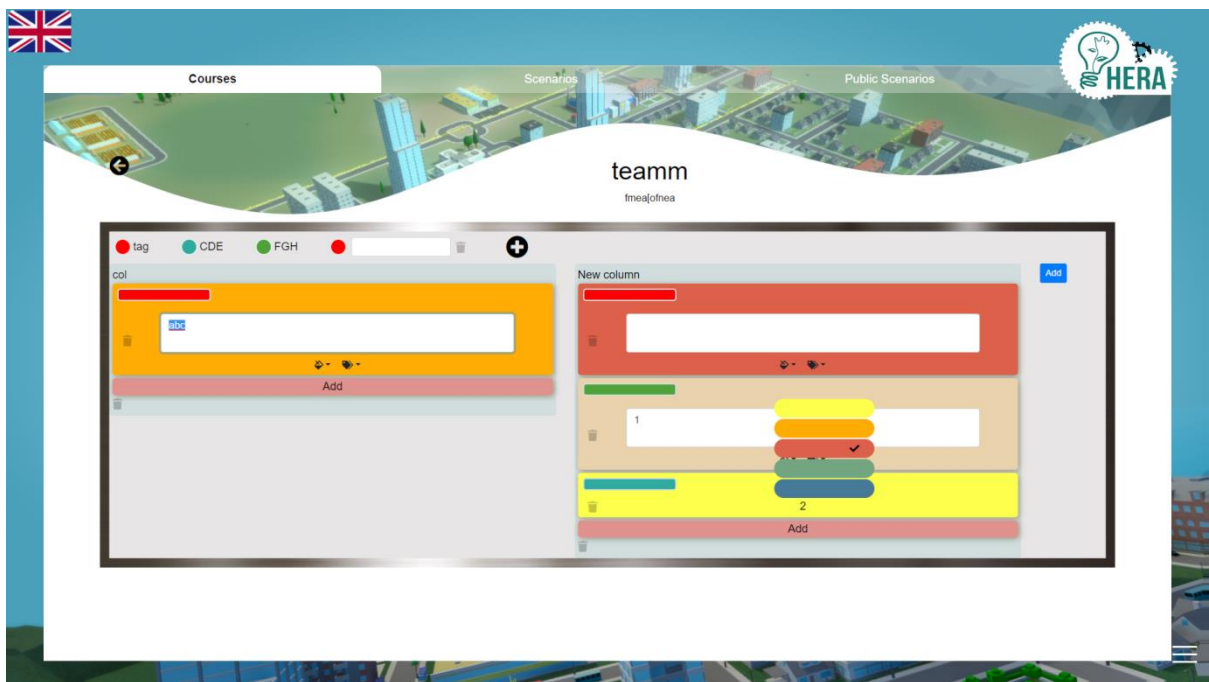
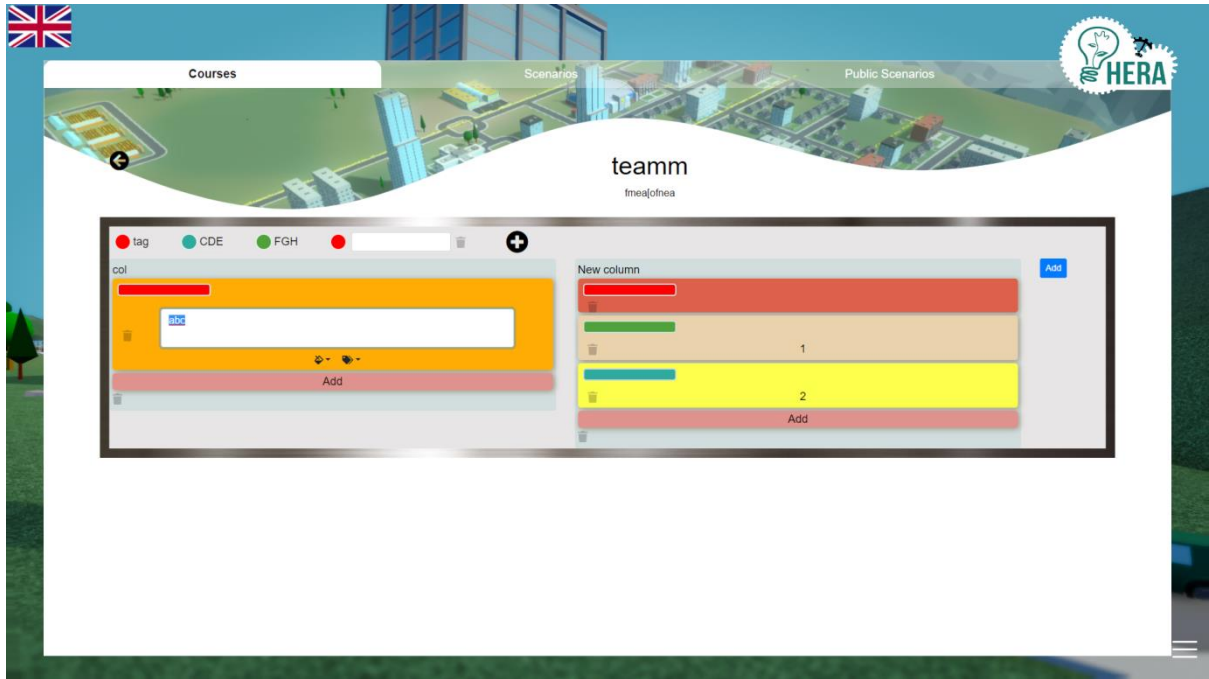
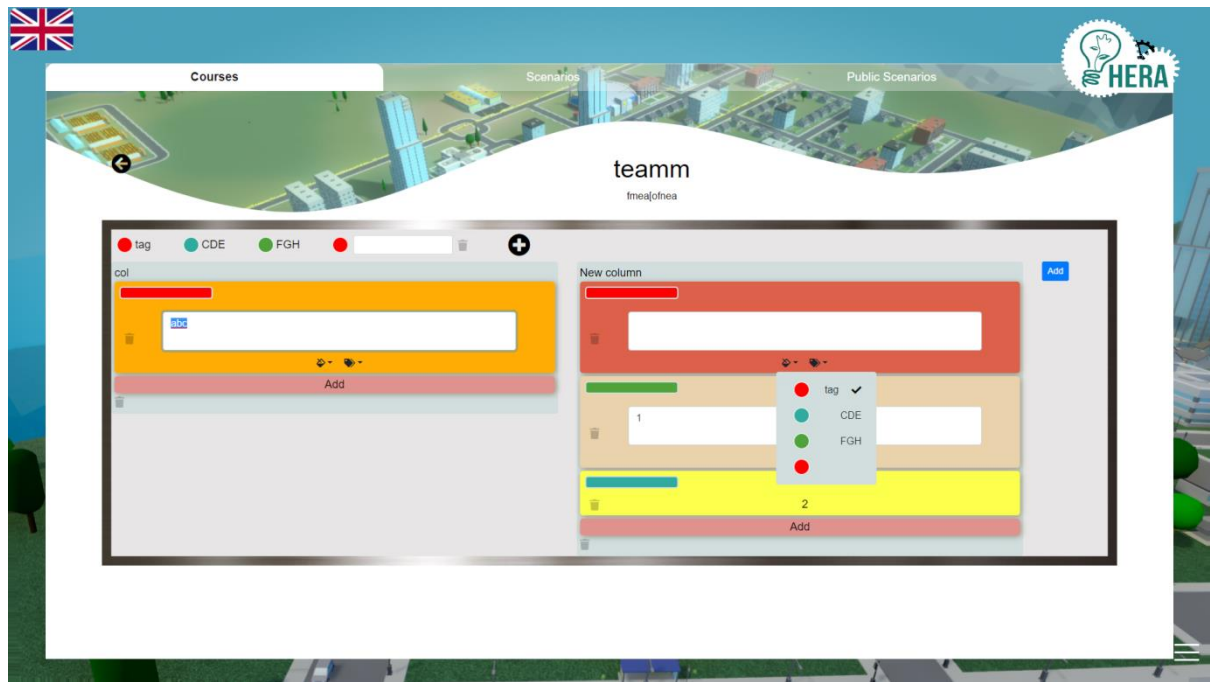


Figure 50: The Agile tool in use







POST-IT WHITEBOARD

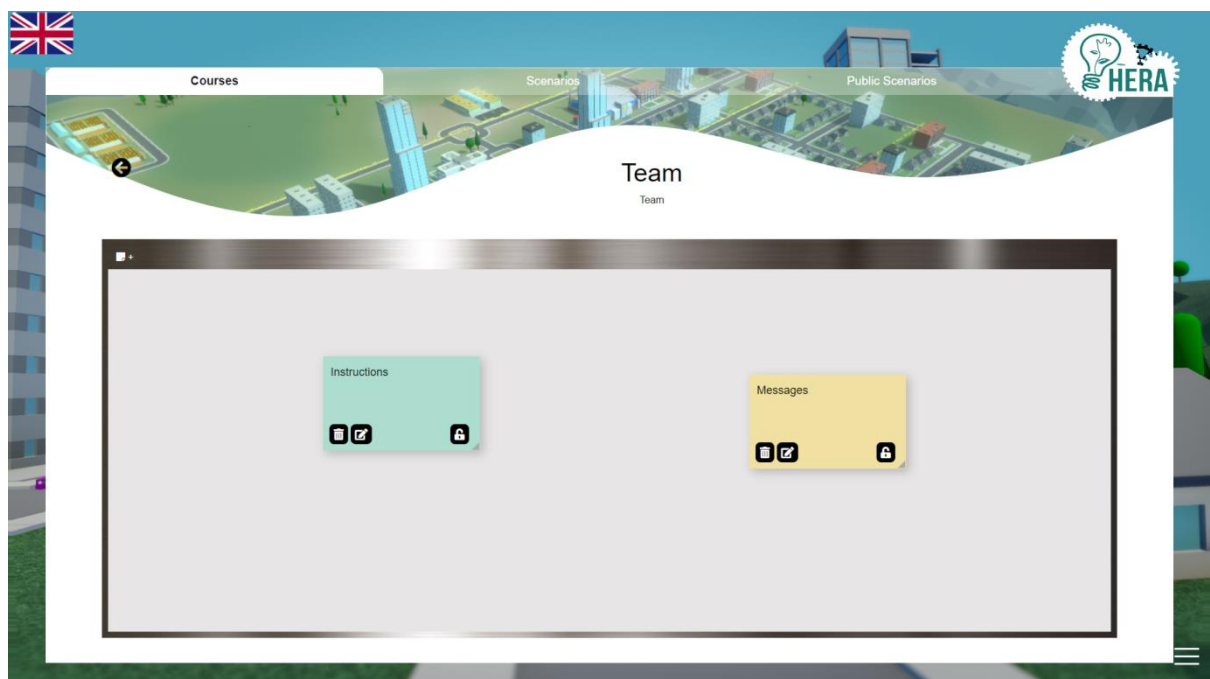


Figure 51: The Post it whiteboard

By default the default post-it note is only text, with the message “Edit me Double Click me” displayed. “Edit me” is in italic and “Double click me” is in bold, showcasing from the get-go the formatting capacities of the post-it text engine.

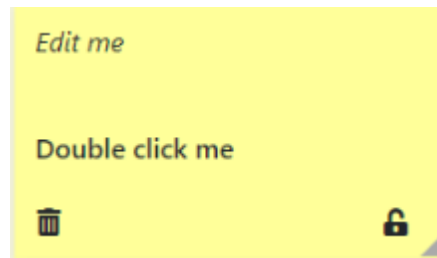


Figure 52: The default post-it

In order to avoid issues with users concurrently working on the same canvas, when a user adds a new note, the note won't appear directly on the canvas but it will open a pop-up instead. There, the post-it can be modified as it was directly on canvas and by clicking save it will show up to all the other users too.

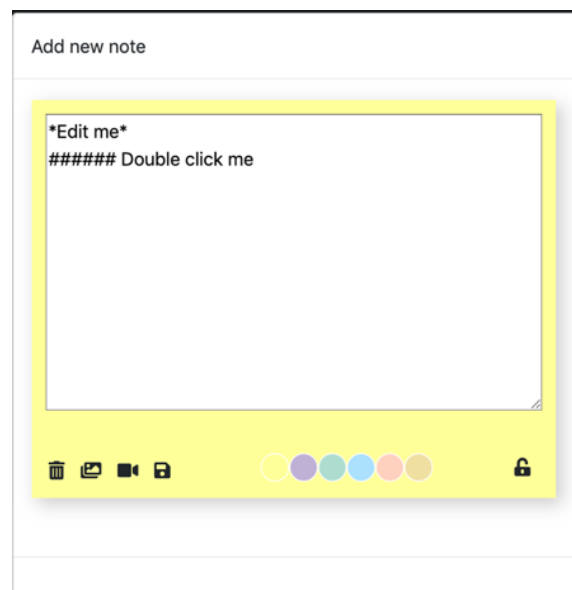



Figure 53: Add new note pop-up

To change this text the user has to double click on the post-it (double tap on mobile) on the pen icon on the bottom left and to destroy the post-it the user has to click on the trashcan icon  on the bottom right. In order to confirm deletion, the button has to stay pressed for a certain amount of time before the note is deleted. Once the blue bar on top of the screen is full, the post-it is deleted. This mechanism has been introduced to avoid any possible accidental deletion.

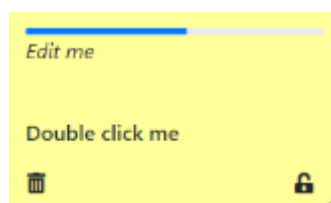


Figure 54: Post-it getting deleted




When clicking on the text editing button, new icons appear on the bottom of the text, one  for adding a photo and one  for adding a video. By clicking on the floppy disk icon  the user will change any modifications that been done. Clicking on the color disk at the bottom will change accordingly the post-it color.



Figure 55: Editing the text

All the changes done to a post-it are immediately shown to all the other members of the team if they are consulting the brainstorm canvas at the same time.

When the user wants to add a photo, they are prompted with a button asking them to select a file from their hard drive. The said file will be automatically and transparently be displayed on the screen, being uploaded to our servers for them to handle it.



Figure 56: Inserting a photo

The icon at the right of the camera icon is a text icon , in case the user wants to go back to a text only post.



Figure 57: a photo embedded in a post-it



If the user wants to insert a video, they are prompted with a message asking them to copy here the URL of the video. Youtube, Vimeo and Dailymotion are supported at the moment.




Figure 58: Inserting a video



Figure 59: A video embedded in a post-it

At the bottom right of the post-it we can see a padlock icon. It is open  when the post-it is editable or locked  when the post-it cannot be edited. Only teachers have the possibility of locking and unlocking post-its, students can only know if a post is locked or not without being able to act on it.

Grabbing the little triangle symbol at the bottom left of a post-it  allows to resize the post it to the desired size. This is especially useful if the post-it contains a huge photo or a long text, as otherwise the content will just overflow the post-it.

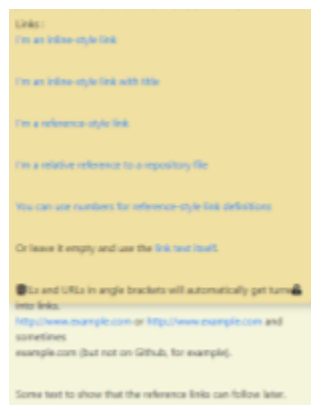


Figure 60: Example of content overflowing

To avoid such overflow, please re-dimension your post-it accordingly.

POST-ITS ENRICHED TEXT RULES

The complete reference for the enrich text rule is available at this URL: <https://github.com/adam-p/markdown-here/wiki/Markdown-Cheatsheet>.

Headers can be defined by using # symbols (the more # there are, the smaller the header's text) or alternatively by underlining the text with the = symbol.



Figure 61: Post-it containing various headers

Emphasis (italic, bold, bold and italics or strike through) can be obtained by placing the text between * and _. If we write **italics** or *italics* the post-it will display *italics*, ***strong*** or **strong** are displayed as **strong**, and ****italics strong**** are displayed as ***italics strong***. Finally ~~strike~~ is displayed as ~~strike~~.



Figure 62: Post-it containing emphasis

The system also supports bullet point lists, numbered lists and hypertext links (see the linked URL above for more details).

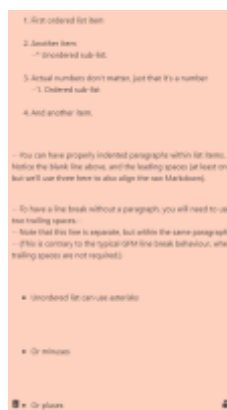


Figure 63: A post-it containing lists

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