Biomimicry Design for Sustainability Skills in VET

KA220-VET-00620D4B

KA220-VET - Cooperation Partnerships in Vocational Education and Training

WP4 Biomimicry Platform Development

D4.1. Platform Technical Guide – Teacher interface

1

Document Info	
Project reference	2023-1-EL01-KA220-VET-000158477
Deliverable	D.4.1 Platform Technical Guide
Dissemination level	Public
Date	22.04.2025
Document version	1
Status	Draft
Sharing	CC-BY-NC-ND
Authors	Olivier Heidmann (UTH) Ancuta Gheorghe (ATS)
Reviewers	Hariklia Tsalapatas (UTH)

Contributors

University of Thessaly	Konstantinos Katsimentes
	Sotiris Evangelou
	Apostolos Fotopoulos
	Christina Taka
	Nadia Vlachoutsou
Advanced Technology Systems	Ioana Andreea Stefan
	Antoniu Stefan

Contents

4

Table of figures

1. Introduction

The Let's Mimic project aims to introduce a hybrid learning approach through its two dimensions: self-regulated learning and collaborative learning. This approach supports virtual presence in addition to physical presence in hybrid, flexible learning delivery models.

The Let's Mimic project is dedicated to cultivating skills that empower future generations to design sustainable solutions inspired by nature's efficient resource use. The project aims to foster a greener future by reducing waste and minimising environmental impact. The Let's Mimic platform leverages the biomimicry design process. It enables Vocational Education and Training (VET) learners to enhance their sustainability skills through engaging microlearning units, collaborative activities, and self-directed learning experiences.

On a detailed level, the platform implements the biomimicry process design methodology, guiding VET learners through the six steps of the Biomimicry Design Process: Define, Biologise, Discover, Abstract, Emulate, and Evaluate. The platform provides self-regulated learning experiences and a collaborative space for experimenting with problem-based learning methods. Additionally, the Platform includes microlearning resources and offers stand-alone units that can be configured as SRL-P to support active, personalised learning processes, better accommodating the diverse learning needs of VET students. By integrating gamification mechanics, the platform aims to boost engagement and motivation while providing mechanisms to evaluate achievements and monitor progress.

8

Importance of the Let's Mimic platform

- **Promotes sustainable design:** The biomimicry design process encourages innovative thinking and the development of new solutions inspired by nature.
- **Enhances learning experiences:** Gamified microlearning units and collaborative activities make learning more engaging and effective, fostering a deeper understanding of sustainability concepts among VET learners.
- **Self-directed learning experiences:** The Self-Regulated Learning Paths (SRL-P) allow learners to customize their learning experiences according to their needs, promoting active and self-directed learning.
- **Encourages collaboration:** The collaborative platform allows learners to experiment with problem-based learning methods, enhancing their problem-solving skills and promoting social learning.
- **Boosts engagement and motivation:** Integrating gamification mechanics helps to keep learners motivated and engaged, making the learning process more enjoyable and effective.
- **Monitors progress and achievements:** The platform includes mechanisms to evaluate learners' achievements and monitor their progress, ensuring they meet their learning goals and continuously improve their skills.

Overall, the Let's Mimic Project is crucial for developing the skills needed to create sustainable designs, fostering a greener future, and enhancing the learning experiences of VET students.

2. Word of caution

The development of the Let's Mimic platform is ongoing. Consequently, the online version of the platform is subject to frequent updates aimed at incorporating new features and rectifying bugs identified during the alpha and beta testing phases.

This manual is also subject to updates until the platform reaches its final version. Users may encounter discrepancies between the descriptions provided in this manual and the functionalities of the online platform, such as undocumented or modified features. These discrepancies indicate that a new version of the manual is forthcoming.

For any inquiries, please get in touch with the lead developer at the following email address: olivier.heidmann@gmail.com.

3. Let's Mimic platform architecture

The Let's Mimic Platform implements the Biomimicry Process Design methodology and integrates the following components:

a) Microlearning module: This module manages bite-sized units of content designed to develop the sustainability skills of Vocational Education and Training (VET) students. Each unit has specific learning outcomes. The module oversees the creation and distribution of these training units through the following sub-components:

- ***My Workspace – Teachers (private):*** Dedicated to managing training units where teachers can create private collections based on the six steps of the Biomimicry Design Process. This pipeline controls digital assets and includes private resources.
- ***Repository – Teachers & Students (public):*** This public module contains collections and resources (bite-sized units) accessible to Teachers and students.

b) Self-Regulated learning module: This module empowers students to choose the learning units they wish to study, allowing them to control their learning journey. VET students can take responsibility for their education and complete their training at their own pace and preferred location. Content is delivered as Self-Regulated Learning Paths (SRL-P), which are constructed based on individual goals, self-evaluation, and gamified challenges. The module oversees the engagement of students with their favourite units through the following sub-component:

- **Microlessons – Students:** This component enables students to list collections and resources from the Repository that they mark as favourites, facilitating easy access to preferred learning materials.

11

c) Teamwork module: This module manages collaborative spaces where teachers can create digital environments for VET students to engage in collaborative work. These spaces can be structured based on the collection pipeline, the six stages of the Biomimicry Design Process, or other micro-units available in the Repository. The module oversees the collaborative work through the following sub-component:

- **My Classes – Teachers and students:** This component is designed based on a hybrid approach for individual and collaborative work. Students can enrol in these classes for personal work or in collaborative spaces, using a code provided by the teacher. An innovative approach of this component is the option to allow students to monitor the teams and the entire learning process.

d) Gamification module: This module includes features such as a point system, which enhances the overall platform experience.

e) Assessment module: This module manages dashboards for teachers and students, providing feedback on student progress and performance. It is used to monitor and improve student outcomes.
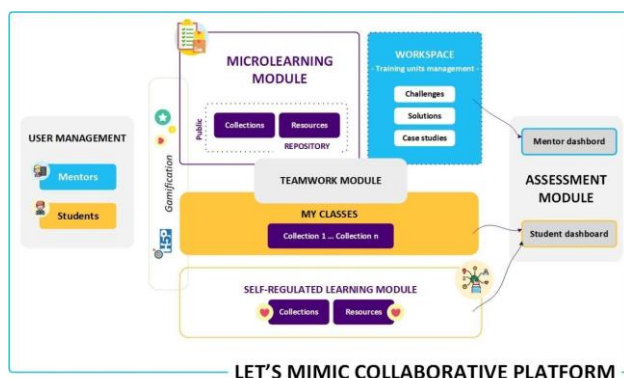
Figure 1. Let's Mimic collaborative platform architecture

12

4. Let's Mimic teacher roles and responsibilities

The Let's Mimic platform is available at the following URL: https://letsmimic.e-ce.uth.gr

Upon accessing the provided URL, users who are not authenticated will be redirected to the platform's home page.
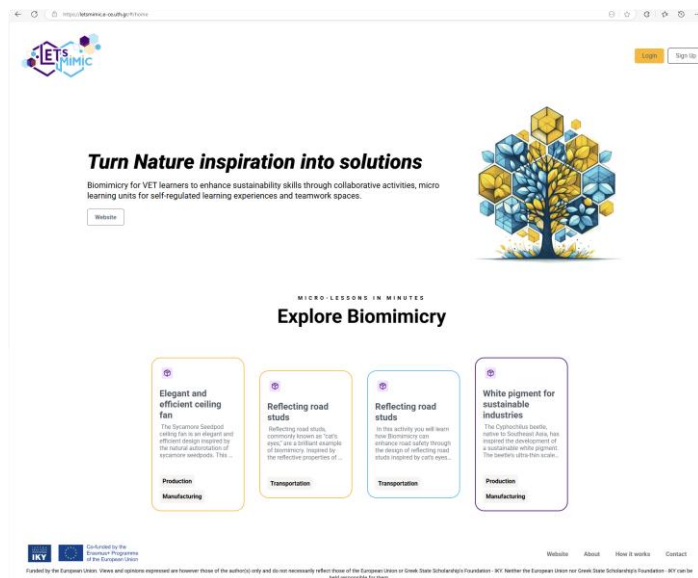
Figure 2. Homepage before login

The platform distinguishes between two categories of users: **Teachers** and **Students**.

Teachers fulfil a dual role:

- **Collection and resource management:** Teachers are tasked with creating, managing, and publishing educational collections or resources.

13

This involves curating relevant and beneficial content for the students' learning experience.

- **Class management:** Teachers also create and manage classes, which can be structured for self-directed learning or collaborative activities among students. This dual responsibility ensures that teachers facilitate both individual and group learning experiences.

Students also have a dual role:

- **Assignment completion:** Students must access and complete assignments provided by their teachers. These assignments can be designed for self-work, where students work independently, or for collaborative work, where students engage with peers.
- **Self-regulated learning:** Students are also encouraged to take charge of their own learning by accessing the collections or resources available in the self-regulated learning kit. This empowers students to manage their educational journey and develop autonomy in their studies.

4.1. Registration
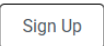
Users must first create an account to use the various functionalities offered by the platform. This prerequisite ensures that the platform can provide a personalized and secure experience for each user.

The registration form requires typical data to deploy an account:

- **First name and last name**: While using real names is optional, it is recommended as it enhances users' ability to be recognised by peers and educators, fostering a sense of community and collaboration.
- **Username:** The platform requires a unique username for each user to ensure distinct identification. This prevents duplication and maintains the integrity of user profiles.

- **Password and confirm password:** Users must generate a password to secure their account. The process includes re-entering the password to verify its accuracy, thereby minimising the risk of errors and ensuring account security.
- **Teacher's code:** Teachers must enter a special code during registration. This code is essential for granting them access to teacher-specific functionalities and privileges, distinguishing their role from that of students.
- **User policy agreement:** Users must agree to the Let's Mimic user policy by selecting the corresponding checkbox. This step ensures users acknowledge and adhere to the platform's terms and conditions.

Registration process

Step 1: To create an account, click on the [Sign Up] *button, displayed in the top right corner of the screen.*

Step 2: Check the Teacher checkbox (☑ Teacher) and click on [Continue →] *button.*
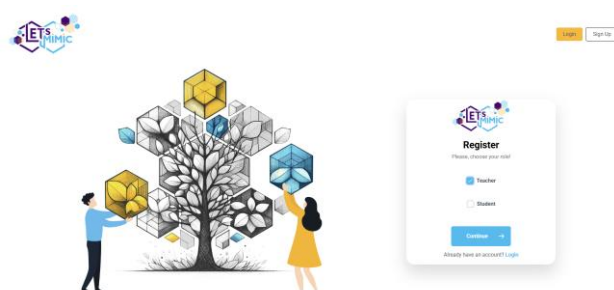
Figure 3. Register form. Teachers' role

Step 3: Add the teacher code in the designated input field. The teacher's code is available upon request.
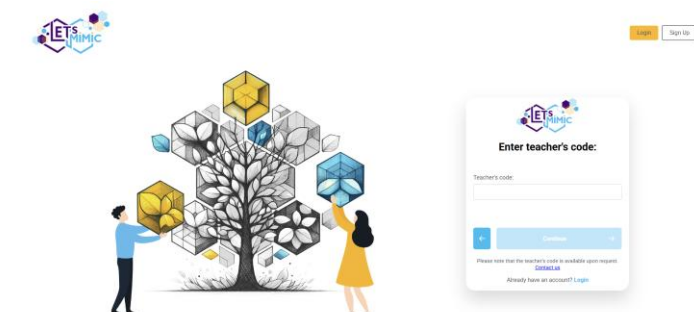
15

Figure 4. Register form. Teacher code

Step 4: Fill in the specific fields of information to establish the account.

Figure 5. Register form fields

The registration data is crucial for creating a secure user profile, enabling personalized access to the platform's features.

16

4.2. Login

Once the account is created, users can automatically explore and use the platform's features based on their account privileges. This ensures that users have access to the tools and resources appropriate to their role.

Upon subsequent access to the platform, after a certain period of time, the user will have to authenticate on the platform. To proceed, the user must click on the **Login** button located in the top right corner of the home screen.

At the Login screen, the user is required to enter their username and password. By clicking the **Login** button, the user can access the platform using their account credentials.
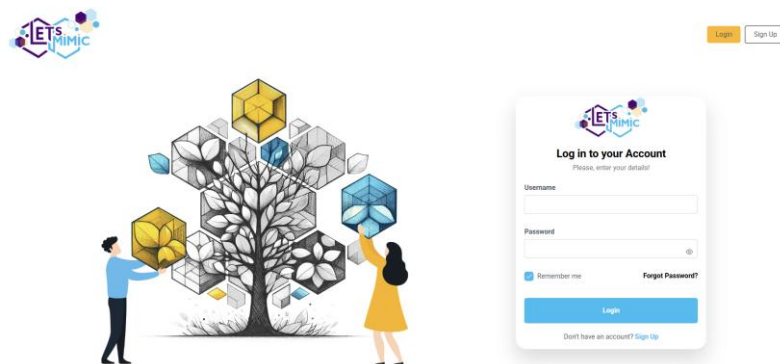

Figure 6. Login form

Additionally, there is the ☑ **Remember me** option to enable the system to remember the username for future logins. This feature pre-fills the username field, streamlining the login process for subsequent sessions.

4.3. Logout

To log out of the platform, users must click on their profile icon and select the logout option from the drop-down menu.
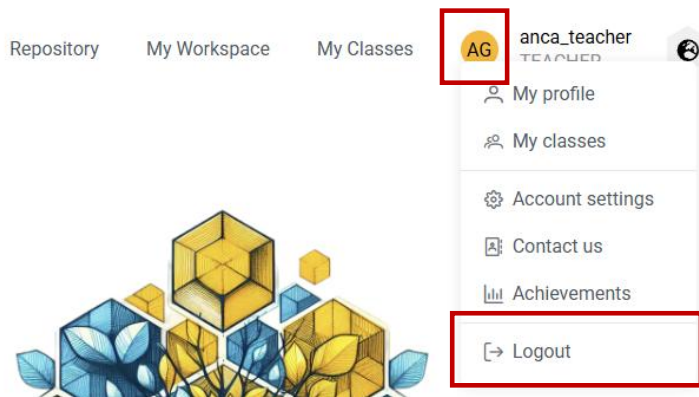

Figure 7. Logout functionality

Selecting the logout option from the drop-down menu initiates the process of logging out. This action ensures that the user is securely signed out of their account, preventing unauthorized access and maintaining user data integrity.

5. Let's Mimic platform components for teachers

5.1. Homepage

After successfully logging in with the teacher account, the user can view the home screen. This Homepage interface serves as the central hub for accessing various platform features.

Menu

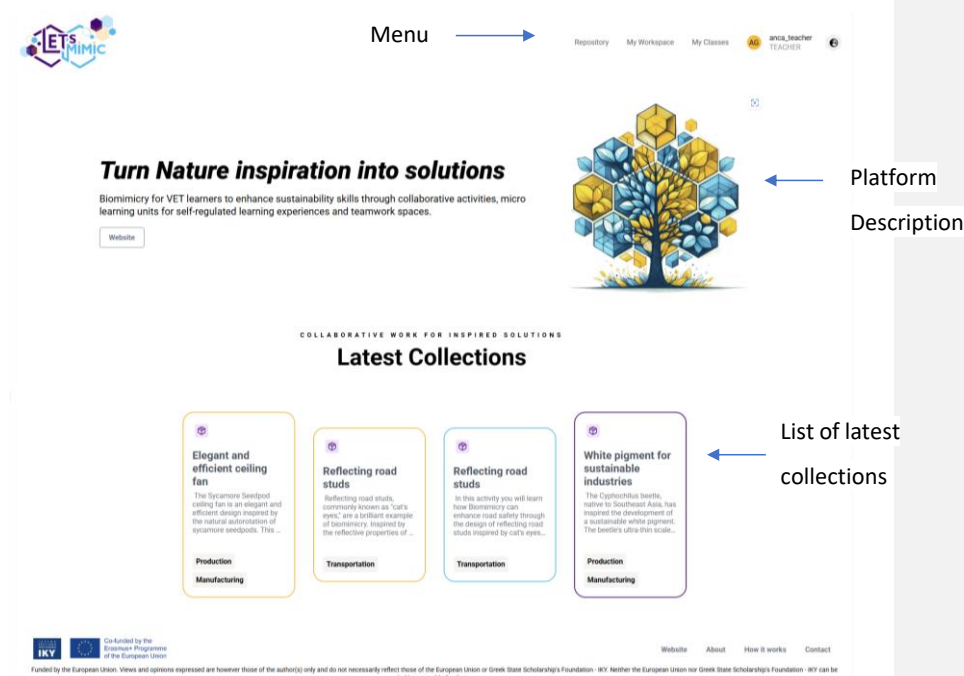Platform Description

List of latest collections

*Figure 8. Homepage. Teacher interface, after login*

The Homepage is divided into three main sections:

- **The menu:** It serves as the primary navigation tool for teachers. The menu includes the main components of the platform: Repository, My Workspace, My Classes, Profile, and Language. It is designed to provide quick and

easy access to the platform's main features, ensuring teachers can efficiently navigate to their desired destinations.

- **The platform description:** This section outlines its purpose, key features, and benefits.
- **List of latest collections:** This section displays the most recent collections of resources or materials added to the platform. It informs users about new and updated content, encouraging them to explore and use these resources. The list of latest collections is handy for staying up-to-date with the latest educational materials and ensuring users can access the most current information.

The platform menu is specifically tailored to teacher account privileges.
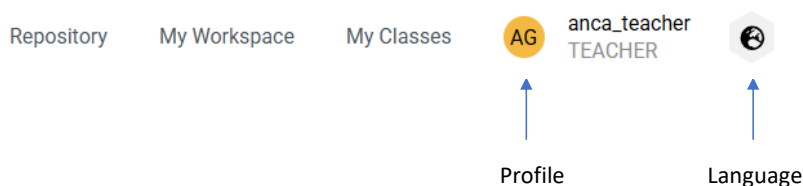
These options are designed to provide users with the tools and resources relevant to their teacher role:

- **Repository:** This component contains collections and resources, which are accessible to the public audience.
- **My workspace:** This component is dedicated to managing training units. It allows teachers to create private collections based on the six steps of the Biomimicry Design Process and manage the resources. This pipeline facilitates the control of digital assets and includes private resources.
- **My classes:** This component enables teachers to create courses that accommodate individual and collaborative work. Once a class is established, teachers can design spaces for students to engage in

personal study or collaborative activities, utilising the available collections or resources.

- **Profile:** This component allows teachers to view their profile data, schedule collections or resources using the calendar, track upcoming assignments, manage their personal information and account settings, access the Gamification module, and log out.
- **Language:** This component enables users to select their preferred language for the platform. The languages available are: English (default), Greek, Romanian, Turkish, French, Spanish and Portuguese.

5.2. Repository

This component is designed to host collections and resources that are accessible to the public audience. It is a repository of educational materials that anyone, including teachers and students, can freely access.

The repository is a central location where teachers can share educational materials with a broader audience. Teachers can disseminate valuable resources that other educators and students can use by contributing to public collections. This promotes a culture of collaboration and knowledge sharing within the educational community.

The repository's already deployed collections and resources are part of the self-regulated learning kit and carefully curated by project partners to ensure high quality and relevance. This involves selecting materials that are accurate, up-to-date, and aligned with educational standards.

21

Co-funded by
the European Union

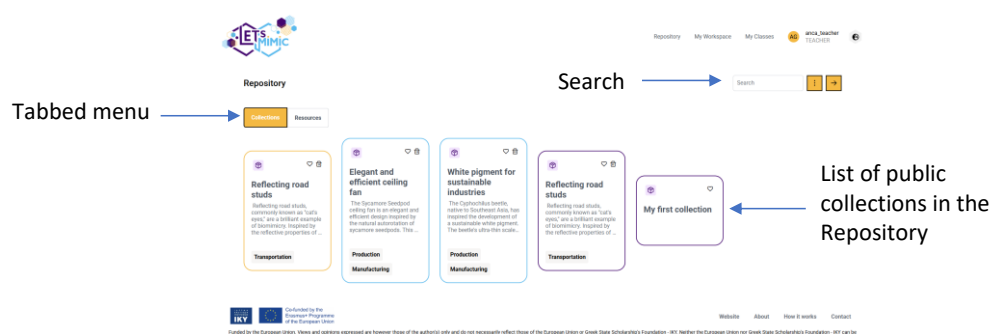**Overall display of the repository interface**

Figure 10. Repository – public collections interface

Figure 11. Repository – public resources interface

The repository interface is divided into three major functionalities:

1. **Tabbed menu** (for collections or resources selection): The tabbed menu comprises two buttons: **Collections** and **Resources**. These buttons let users switch between the options, displaying the respective collection lists or resources.
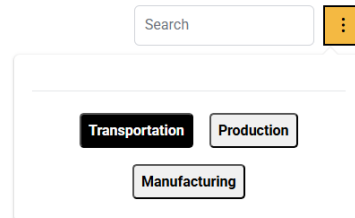
   [Collections] [Resources]
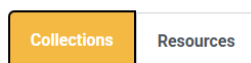
2. **Search:** The search can display specific collections or resources filtered by title. This component offers two primary search options:

   a. **Search by title:** Teachers can filter collections or resources by typing the title into the search input field. The system automatically filters and displays the relevant collection or resource based on the entered title. This functionality allows teachers to locate specific materials by their titles quickly, enhancing efficiency and saving time when searching for particular content.

   [Search] [⋮] [→]

   b. **Search by tag:** To search by tag, teachers must click on the [⋮] button and select a tag from the tag list. The system then filters and displays collections or resources associated with the selected tag. Tag-based search enables teachers to find materials categorized under specific subjects or from a particular step of the Biomimicry methodology. This method of filtering helps in organizing and accessing content that is relevant to particular educational objectives or topics.

3. **List of collections in the repository** (displayed as cards): Based on the option selected from the tabbed menu, a list of collections or resources, presented as boxes, will be displayed. Teachers can access, view, mark as favourite, or delete these items if they are the owners.
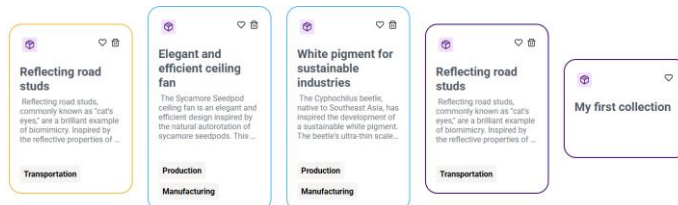
5.2.1. Functionalities of collections

Collections refers to the biomimicry pipeline and contains the six steps of the methodology: Define, Biologize, Discover, Abstract, Emulate, Evaluate. Collections provide a structured approach to learning by organising educational materials according to the six steps, helping users understand and apply biomimicry principles systematically.

Overall display of an owned collection within the repository

Mark as favourite
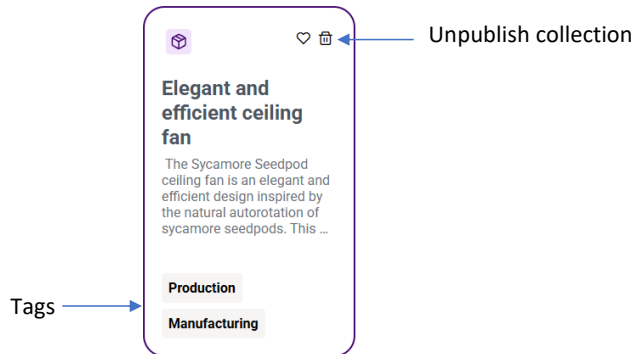
24

Unpublish collection

Tags
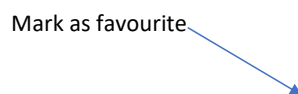
Figure 12. Repository – Collection card

The platform offers three major functionalities for a Collection:

- **Access and view:** Teachers must click on the corresponding box to access and view a collection. This action triggers the display of a pop-up window, where teachers can explore the Biomimicry pipeline. For each step of the Biomimicry methodology, detailed information about the role and significance of that step is provided. Additionally, teachers can access the defined bite-sized units associated with each step, including documents, videos, H5Ps, or collaborative spaces.
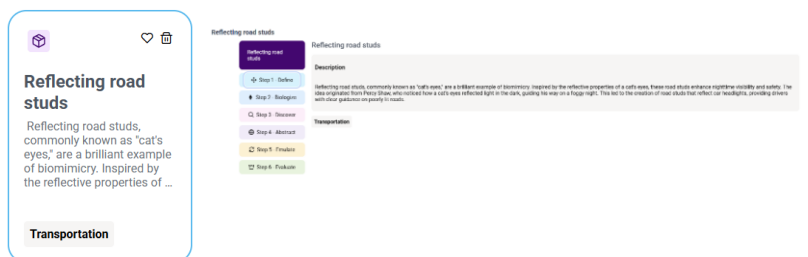
- ♡ **Mark as favourite**: Teachers can designate a particular collection as favourite. This functionality duplicates the selected collection into the "My Workspace" section, facilitating easier access and organisation for future reference. The "Mark as favourite" option serves as a tool for teachers to streamline their workflow. When a collection is marked as favourite, it is

not merely highlighted but actively copied into the "My Workspace" component. This duplication ensures that the collection is readily available for the teacher, allowing for efficient retrieval, customization and use in various educational activities.

- 🗑 **Unpublish owned collections:** This feature allows Teachers to retract a previously published collection from the Repository. By using this option, teachers can remove their own collection from public view, ensuring it is no longer accessible to others. **This feature is visible exclusively for collections owned by the teacher.**

5.2.2. Functionalities of resources

Resources refer to bite-sized units integrated within the Biomimicry pipeline, pertinent to each step of the Biomimicry methodology. Each collection may encompass numerous resources, which can be published in the Repository by the collection's creator, thereby making them accessible to all users, facilitating the sharing of knowledge and promoting collaborative learning.

These resources are designed to support and enhance the application of biomimicry principles at each step.

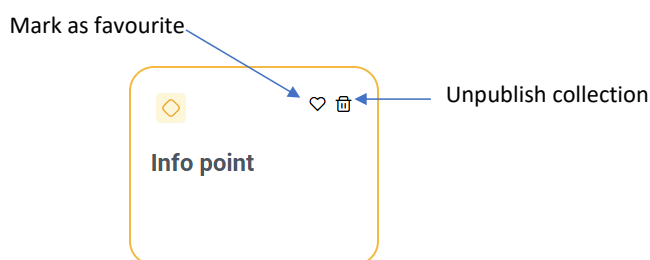**Overall display of owned resources within the repository**

Figure 13. Repository – Resource card

The platform offers three major options for resources:

26

- **Access and view**: Teachers must click on the corresponding box to access and view resources. This action triggers the display of a pop-up window, where the resource can be viewed.

- ♡ **Mark as favourite**: Teachers can mark resources as favourites. When this feature is used, the marked resource is duplicated into the "My Workspace" component, facilitating easier access and organisation for future reference.

- 🗑 **Unpublish owned resources**: Teachers can retract resources from public view using the "Unpublish" feature. This option allows teachers to remove their resources from the Repository, ensuring they are no longer accessible to others. This feature is accessible exclusively for teacher-owned resources**.**

5.3. My workspace

The My workspace component allows teachers to manage the Biomimicry pipeline and various resources, such as documents, videos, interactive content, and collaborative tools. The possibility of creating private collections ensures that teachers have complete control over their materials, allowing them to customise and refine their resources without public access until they are ready to be shared in the repository.
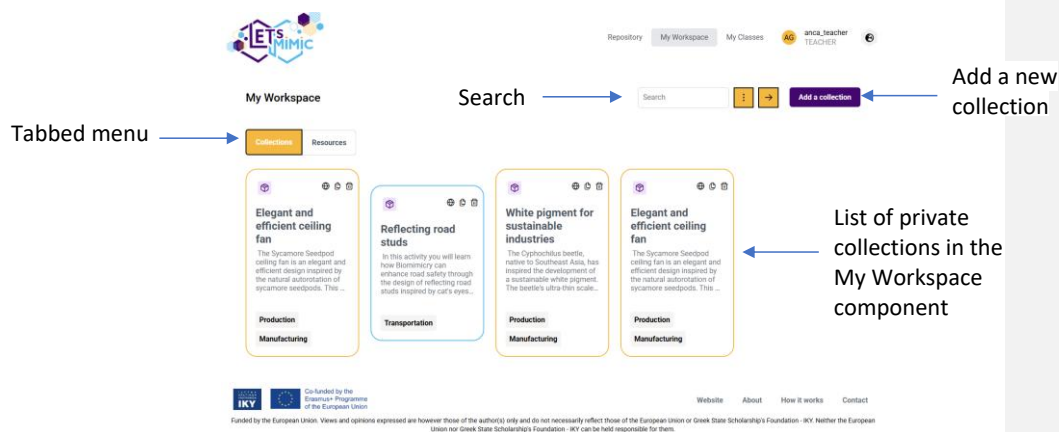
Overall display of the My Workspace interface

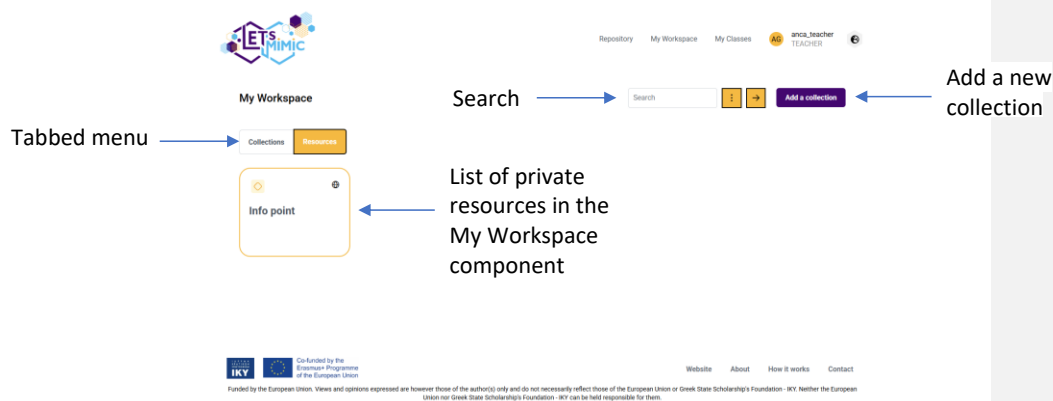*Figure 14. My Workspace – Private collections interface*

Figure 15. My Workspace – Private resources interface

The My Workspace interface is divided in four major functionalities:

1. **Tabbed menu** (for Collections or Resources selection): The tabbed menu comprises two buttons: **Collections** and **Resources**. These buttons

28

enable users to switch between the options, displaying the respective lists of owned collections or resources.
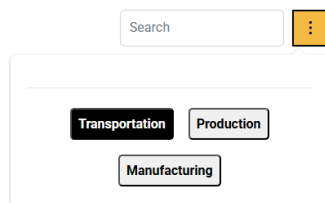

2. **Search:** Search can display specific collections or resources filtered by title. This component offers two primary search options:

a. **Search by title:** Teachers can filter collections or resources by typing the title into the search input field. The system automatically filters and displays the relevant owned collection or resource based on the entered title. This functionality allows teachers to locate specific materials by their titles quickly, enhancing efficiency and saving time when searching for particular content.

b. **Search by tag:** To search by tag, teachers must click on the button and select a tag from the tag list. The system then filters and displays collections or resources associated with the selected tag. Tag-based search enables teachers to find materials categorized under specific subjects or from a specific step of the Biomimicry methodology. This method of filtering helps in organizing and accessing content that is relevant to particular educational objectives or topics.

29

3. **Collection definition:** This functionality allows teachers to create a new private collection. The process involves adding a title, description, and defining tags to effectively organise and categorise the collection.

a) **Add a collection** : This button creates a new collection and is available in the Private collection interface.

b) **Collection form:** This form allows teachers to define a new private collection by adding the title, description, and tags.

New collection ×

Title

Description

New tag

c) **Tags definition inside the collection form:** This option allows teachers to define multiple tags, relevant for the specific collection.

Examples of tags: **Renewable energy** **Buildings** New tag

- **To add a tag**, teachers must type the name of the tag in the New tag input New tag and then press ENTER. Multiple tags can be defined.
- **To delete a tag** teacher must click on the specific tag from the list.

d) ✓ Save **Save the collection:** This button within the collection form is used to save the collection.

30

4. **Collection or resource list** (displayed as cards): Based on the option selected from the tabbed menu, a list of collections or resources, presented as boxes, will be displayed. Teachers can access, publish, make a copy and delete a private collection and access and publish a resource.
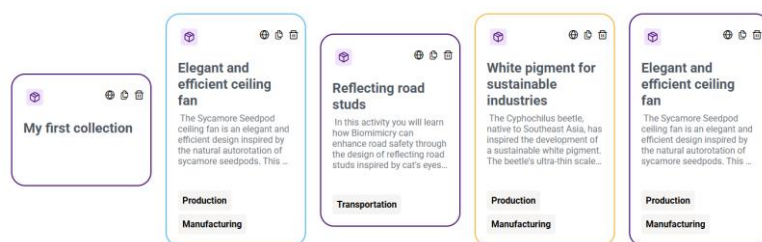
5.3.1. Functionalities for private collections

Private collections are also designed based on the Biomimicry pipeline to facilitate a structured approach to learning and applying the principles of biomimicry. These collections are organized according to the six steps of the Biomimicry methodology: Define, Biologize, Discover, Abstract, Emulate, and Evaluate. These collections are not accessible to other teachers, so the materials and resources remain exclusive to the owner.

The platform offers three major options for private collections:

- General functionalities of collections.
- Collection management.
- Resource management within a collection.

5.3.1.1. General functionalities of collections

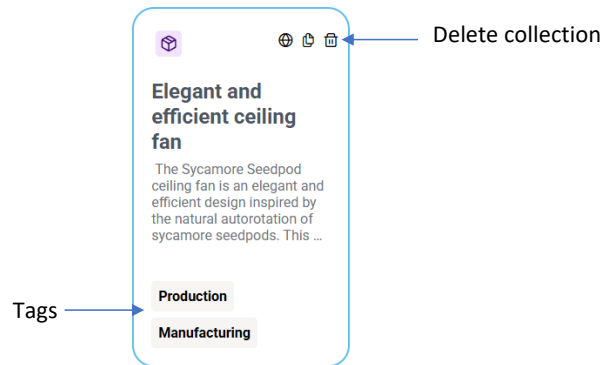Publish to repository   Create a copy

31

Figure 16. My workspace – Collection card

- **Access and view of a collection:** To access and view a collection, teachers must click on the corresponding card of the collection. This action triggers a new page, where teachers can explore the Biomimicry pipeline and manage each step (specific resources are available for each step of the biomimicry methodology).
  We provide detailed information about the role and significance of each step of the biomimicry methodology.

- ⊕ **Publish to repository:** This feature allows teachers to make a collection public and accessible to all teachers (shared in the repository).

- ⎙ **Create a copy:** This feature allows teachers to duplicate a collection, modifying or using it as a template without altering the original.

- 🗑 **Delete:** This feature allows teachers to remove a collection from the platform permanently.

5.3.1.2.   Collection management

The **Collection management interface** of a private collection is designed to facilitate a structured and user-friendly approach to managing and implementing biomimicry-based educational resources. The primary purpose of this interface is

to provide teachers with a comprehensive and organized platform to manage a collection based on the biomimicry pipeline. This structured approach ensures that teachers can effectively guide students through the principles of biomimicry, enhancing the learning experience.
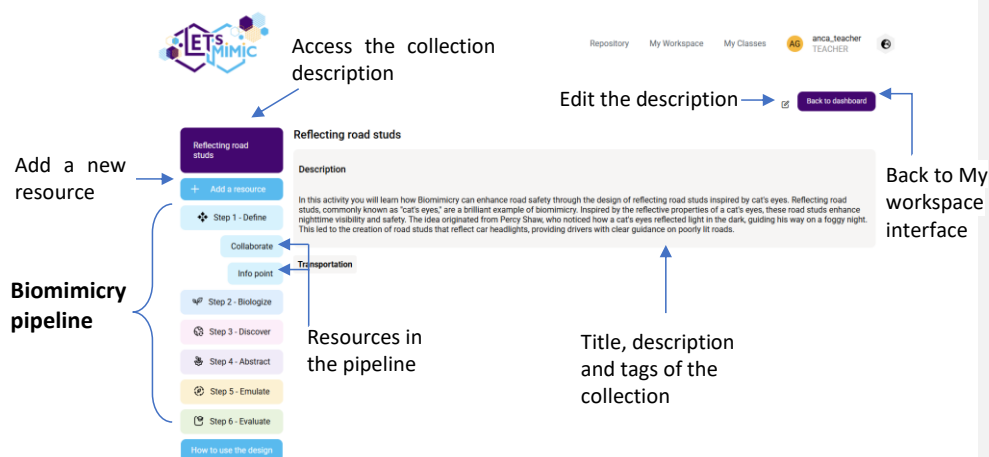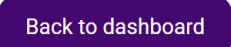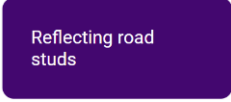

Figure 17. Collection management interface

The interface offers the following features for managing the collection:

- **Edit description:** This feature allows teachers to modify the description of the collection.

- **Back to My Workspace interface:** This feature allows teachers to go back to the My Workspace interface, ensuring easy access to other collections or resources.

- **Access the Collection description:** This feature holds the title of the collection and allows teachers to view the collection's

33

description from any point within the pipeline. Teachers can click to return to the main description of the collection, ensuring they have context and understanding of the collection's purpose and content.

- **+ Add a resource** **Add a resource:** This feature enables teachers to enhance their collections by incorporating various educational resources. This enriches the learning experience and provides diverse materials supporting teaching methodologies and student needs. This feature allows teachers to add documents, videos, interactive space for individual or collaborative work, H5Ps, or public or private resources. (For more information, see point 5.3.4 Types of resources.)

- **Access to biomimicry pipeline – Biomimicry steps description:** This feature provides a comprehensive tool for teachers to have an organised overview of their instructional materials and facilitates a quick and straightforward navigation through the six steps of the Biomimicry methodology. The interface provides buttons displayed with different colours for each step (Define, Biologize, Discover, Abstract, Emulate, Evaluate) and when accessed, detailed information of each step is presented, offering participants guidance on how to structure their work. A real-life example accompanies each step to inform participants of what they should consider when structuring their materials. (For more information, see point 5.3.3 Purpose of the Biomimicry pipeline).

Step 1 - Define

Step 2 - Biologize

Step 3 - Discover

Step 4 - Abstract

Step 5 - Emulate

Step 6 - Evaluate

34

- **Access of a resource in the pipeline (specific to a Biomimicry step)**: This feature allows teachers to view and access a particular resource related to a step of the Biomimicry pipeline. This feature can access the Resource management interface of that specific resource. The resources are coloured in the particular colour of the step.

 ❖ Step 1 - Define

  Collaborate

  Info point

- How to use the design **Instructions:** This feature provides teachers with guidelines on implementing an activity based on the Biomimicry methodology in the classroom.

5.3.1.3. Resource management interface within a collection

The **Resources management interface** within a collection is designed to help teachers efficiently manage their private educational resources. This function is activated when accessing a resource and allows teachers to organise, modify, and control the access of their resources within a collection. This ensures that the resources are up-to-date, relevant, and appropriately shared.

The interface offers the following features for managing the resources:

- ✏️ **Edit:** This option allows teachers to update the resource's information, such as its title, description, content if applied or tags. It ensures that the resource remains accurate and relevant to the collection's objectives.

- 🗑️ **Delete:** This option enables teachers to permanently delete a resource that is no longer needed or relevant for the step. It helps in keeping the collection clean and focused.

35

- ⊕ **Publish:** This option allows teachers to publish a resource, making it available to other teachers or students. A copy of the resource will be created in both the Repository—Resource interface and the My Workspace—Resource **interface**. This option facilitates sharing valuable materials.

- ◉ or ◌ **Visibility:** This option allows teachers to set a resource's visibility, determining whether it can be visible for them in their own private Resource list in the **My Workspace component**. This helps maintain a clean and organized private Resource list, as Collections often consist of multiple Resources, and showing each individually could result in unnecessary clutter.

5.3.2. Functionalities for private resources

Private resources are bite-sized units integrated within the Biomimicry pipeline, specifically curated and managed by individual teachers. These resources are pertinent to each step of the Biomimicry methodology and are kept exclusive to the teacher's private collection, not shared with other users.

5.3.3. Biomimicry pipeline

The biomimicry pipeline feature provides teachers with a structured and organised approach to incorporating Biomimicry principles into their instructional materials. This feature ensures that teachers can easily navigate through the six steps of the Biomimicry methodology, making the process of teaching and learning more efficient and effective.

Another critical role of the pipeline structure is to facilitate the efficient management of digital assets specific to each step, ensuring that all the content and resources are organized and easily accessible.

Detailed description of the feature

1. **Organised overview and step-by-step navigation**:
   - **Purpose**: To give teachers a clear and structured view of their instructional materials and allow quick access to each methodology step.
   - **Description**: The interface displays the six steps of the Biomimicry methodology in a visually organized manner, with each step represented by a button in a different colour. This colour-coding helps quickly identify and navigate through the steps. This step-by-step navigation ensures that they can move through the process systematically and without confusion.

Figure 18. Colour-coded Biomimicry pipeline

2. **Detailed Information and guidance:**
   - **Purpose:** To provide comprehensive guidance on how to structure instructional materials.
   - **Description:** Each step, when accessed, opens up detailed information that explains the meaning of the step. A clear definition of the step of the Biomimicry methodology is provided to allow teachers to understand what is expected in the specific step.
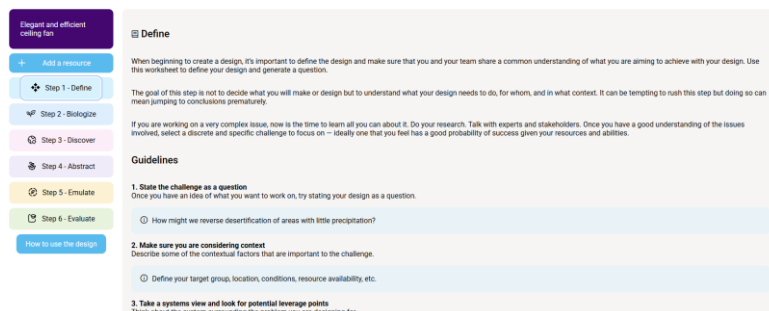
Figure 19. Description of the Define step

3. **Real example:**
   - **Purpose:** To offer practical insights and inspiration.
   - **Description:** Each step is accompanied by a real example illustrating what each step should contain. It is essential to mention that the example serves only as a reference point for teachers and students and is not subject to discussion in the specific collection. The platform provides the example only to help teachers and students visualize from beginning to end how Biomimicry can be used for a real-world scenario.

   The example tackles the challenge of **reverse desertification of areas with little precipitation** and explains how **the biological strategy of mangroves can help people identify solutions to this** challenge.

38

Figure 20. Example provided

5.3.4. Type of resources available

The Add a resource feature allows teachers to add various types of educational resources and is designed to enrich a collection and enhance the learning experience. By providing multiple options, teachers can cater to different teaching methodologies and student needs, ensuring a more dynamic and engaging educational environment.

When accessed this feature teachers have the possibility to define a resource for a certain step or add an existing resource from the Repository.

Figure 21. Resource definition panel

The interface provides the following features:

- **Document resource:** To add textual materials such as PDFs, Word documents, or other text-based files. Teachers can link documents that provide detailed information, instructions, or supplementary content related to the collection.

39

When defining a text-based resource, teachers are requested to add the title of the resource, a short description, the URL and pick from the tabbed menu the step that the resource should be included and click on the [✓ Save] button to save the resource.
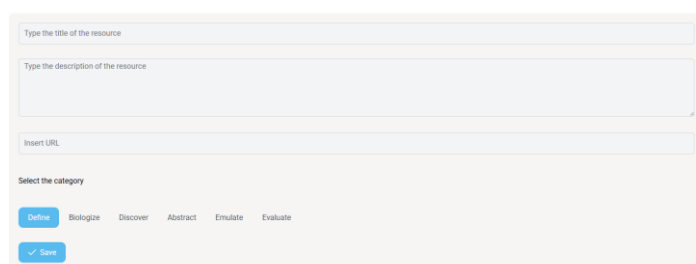

Figure 22. Interface for defining a document resource

- [▶] **Video resource:** To include visual and auditory materials. Teachers can link videos that explain concepts, demonstrate processes, or provide visual aids to enhance understanding.

When defining a video resource, teachers are requested to add the title of the resource, a short description, the URL and pick from the tabbed menu the step that the resource should be included and click on the [✓ Save] button to save the resource.
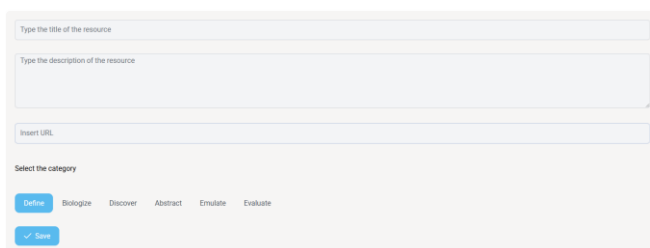

Figure 23. Interface for defining a video resource

40

- **Interactive space resource - canvas**: To facilitate interactive individual or collaborative work. This feature allows teachers to create an interactive space where students can work at the individual level or collaboratively.

When defining an interactive space resource, teachers are requested to add the resource title and a short description, pick from the tabbed menu the step that the resource should be included in, and click on the button to save the resource. ([For more information regarding the canvas interface see point 5.3.5 Canvas interface](#))
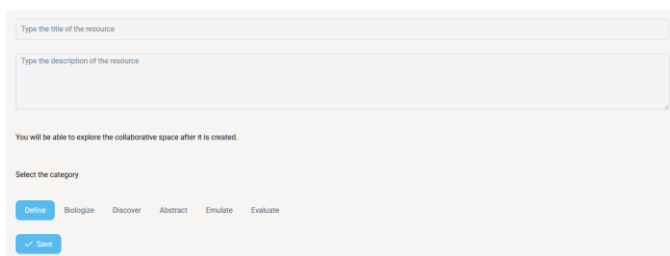

Figure 24. Interface for defining an interactive space resource

- **H5P resource:** To integrate interactive content. H5P resources enable teachers to add interactive elements such as quizzes, presentations, and videos, making the learning experience more engaging. When defining an H5P resource, teachers are requested to add the resource title, a short description, the H5P embed link, pick from the tabbed menu the step that the resource should be included in, and click on the button to save the resource. ([For more information regarding H5P interface see point 5.3.4 H5P Interface](#))

41

Figure 25. Interface for defining an H5P resource

- **Add resource from repository:** To integrate into the pipeline, an existing public resource. Teachers can select resources from the Repository and structure the collection based on the. This can simplify the creation process because this feature ensures that the resource is pre-vetted. When selecting a resource from the Repository, a pop-up box with a list of available resources will be displayed. Teachers only have to click on the specific resource, which will automatically be included in the pipeline.
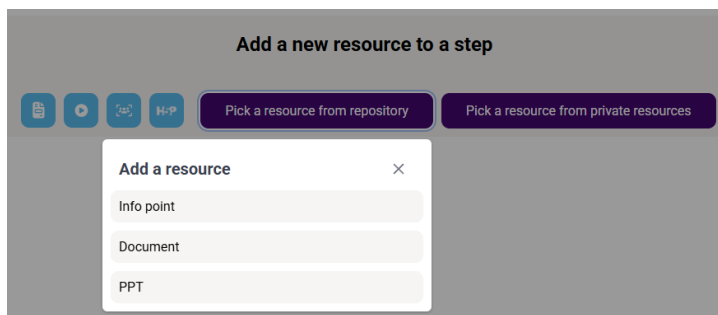

Figure 26. Pop-up box with list of available resources in the Repository

The resource will be automatically added to the step where it was previously defined, but teachers can drag and drop it to another step. The drag and drop should be done at the Step button level.

42

If teachers move the resource to another step, they must be aware that the resource's specificity applies to the new step (whether it is relevant to the new step or not).
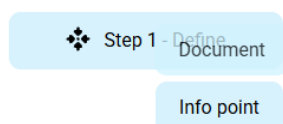
- **Add resource from private resources.** To use personal resources made available in the Resource interface of My workspace. This feature allows teachers to choose from their private collection of resources, ensuring that the materials remain exclusive and tailored to their specific needs. This functionality encourages the reuse of existing resources. When selecting a resource from the private resources, a pop-up box will be displayed with a list of available owned resources. Teachers only have to click on the specific resource and it will be automatically included in the pipeline.
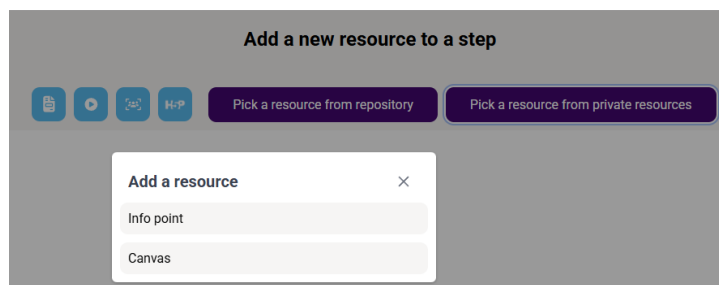

Figure 27. Pop-up box with list of available resources in the private resources interface

43

The resource will be automatically added to the step where it was previously defined, but teachers can drag and drop it to another step. The drag and drop should be done at the Step button level.

Attention!

If teachers move the resource to another step, then they have to be aware that the specificity of that resource applies to the new step (if it is relevant or not for the new step).
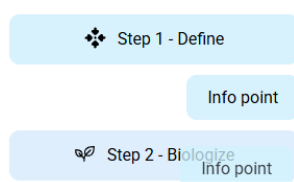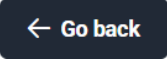
5.3.5. Canvas interface

The canvas interface within the Biomimicry pipeline is an interactive workspace for individual and collaborative work. It facilitates student engagement by allowing them to answer questions specific to each step of the Biomimicry methodology and post their responses in various formats. This workspace helps teachers organise questions or assignments given to students in a more structured way (using the define level feature), allowing students to organise their thoughts, share ideas, and visually connect concepts, making the learning process more dynamic and interactive.
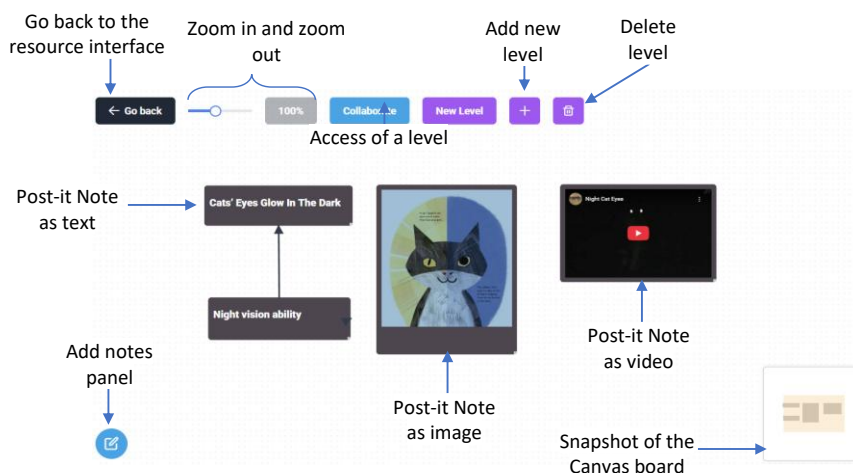
The interface provides the following features:

1. **Go back** ← Go back **to the resource interface**
- **Purpose**: To provide easy navigation back to the main resource interface.
- **Description**: The feature allows users to return to the resource interface, ensuring seamless movement between different parts of the platform.

2. 100% **Zoom in and out in the workspace area (whiteboard)**
- **Purpose:** To adjust the view of the workspace for better visibility and management.
- **Description:** Controls that enable users to zoom in for a closer look at details or zoom out to get an overview of the entire workspace.

45

3. **New Level**   **Access levels (tabbed panel)**

- **Purpose:** To organise the workspace into different sections or levels for better structure. This is used to organise the questions or assignments.
- **Description:** Users can navigate through different levels within the workspace, each representing a different section or stage of their project.

4.   **Add new levels:**

- **Purpose:** To expand the workspace by creating new sections or levels.
- **Description:** A feature that allows users to add new levels to the workspace, providing more space for organising their notes and resources.

5.   **Delete levels:**

- **Purpose:** To remove unnecessary or outdated sections from the workspace.
- **Description:** Users can delete levels that are no longer needed, helping to keep the workspace organized and relevant.

6.   **Add notes panel:**

- **Purpose:** To allow users to add various types of content to the workspace.
- **Description:** Users can define notes and add different types of content within each level. (For detailed information regarding notefeatures, see point 5.3.5.1 Post-it notes panel)
- **Available options:**

  - *Text post-it notes:* For quick text-based notes.

46

o **Image post-it notes**: To visually represent concepts or ideas.

o **Video post-it notes**: To provide multimedia explanations or demonstrations.

o **Arrow connections**: To create visual links between notes, showing relationships and connections.

Figure 29. Post-it notes panel

7. **Snapshot of the canvas board:**
● **Purpose:** To provide an overview of the user's current position within the workspace.
● **Description:** A small map in the bottom right corner shows where the user is on the canvas board, helping them navigate the workspace more easily.

8. **Dotted whiteboard:**

47

- **Purpose:** To provide a clear and organized space for managing notes.
- **Description:** The canvas board is displayed with a dotted white background, offering a clean and structured area for users to view, manage, and arrange their notes as they see fit.

5.3.5.1 Post-it notes panel

The post-it note panel in the Canvas interface is a crucial tool for organising and visualizing information. It allows teachers to create, edit, and connect various types of notes, making it easier to structure thoughts, share ideas, and collaborate effectively. This feature enhances the learning experience by providing a flexible and interactive workspace that supports different types of content.
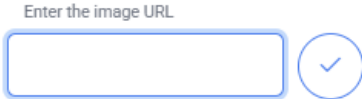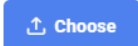
The post-it notes panel provides the following features:

1. **Text-based post-it notes:**

- **Add text-based note**: To add a note, the teachers must click on the icon to create a new text-based note. The note appears automatically. To edit it (open the editor) teachers have to double-click on the note to start editing. An editor opens where teachers can type the text.
- **Purpose of the text-based post-it notes:** These notes contain text, allowing users to add written information directly onto the canvas.
- **Functionalities**:
  o **Save**: A button to save the text entered. The note will display the saved text on the canvas.
  o **Cancel**: A button discards any changes made during editing and reverts the note to its previous state.
  o **Delete**: A button to remove the note from the canvas permanently.

48

- o **■ Change colour**: A button to allow teachers to change the background colour of the note, helping to categorize or prioritize information visually.
- o **Modify**: To modify an existing note, teachers must double click on the note to open the editing mode.

2. Image-based post-it notes

- **Add image-based post-it notes:** To add an image-based post-it note, teachers must click on the icon to create a new image-based note. A pop-up box appears where teachers can either add a link to the image or upload an image from their computer. The image is automatically added to the canvas once uploaded or linked.
- **Purpose of the image-based post-it notes:** These notes contain images, allowing users to add visual content to the canvas.
- **Functionalities**:
  - o **Input for URL**: An input to add the link of the image.

    Enter the image URL

  - o **⬆ Choose Choose button:** A button to upload the image from the computer.
  - o **Modify:** To update the image, teachers must double-click on the note and change the initial URL with the new one. When editing mode is activated, teachers can update, cancel or delete the note.

Commented [3]: In the popup, for images it is mentioned - Link to video. This has to be changed.

3. **Video-based post-it notes**

- **Add video-based note:** To add a video-based post-it note, teachers must click on the icon to create a new video-based note. A pop-up box appears where teachers can add the link to the video. The video is automatically added to the canvas once linked.
- **Purpose of the video-based post-it notes:** These notes contain videos, allowing users to add multimedia content to the canvas.
- **Functionalities:**
    - o **Input for URL**: An input to add the link of the video.

    Enter the video URL

    - o **Modify:** To update the video, teachers must double click on the note and change the initial URL with the new one. When editing mode is activated, teachers can update, cancel or delete the note.

4. **Arrow connections**

Purpose of the video-based post-it notes: Arrows are used to visually connect different notes, showing relationships and the flow of information.

Define the arrow steps:

a) **Add arrow:** Teachers must click on the icon to create an arrow.
b) **Select source note**: Dots appear around each note. A notification prompts teachers to select the source note. Teachers must click on the top dot of the source note to start the connection.
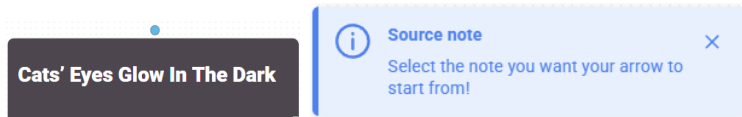
c) Select target note: A notification prompts informing teachers to select the second note to complete the connection. Teachers must click on the top dot of the target note.
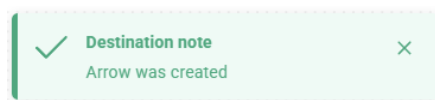
d) Customize arrow: After establishing the connection, to customize the arrow, teachers can click on the arrow to open a panel where they can:

- **Change weight**: Adjust the thickness of the arrow.

- **Change colour**: Modify the colour of the arrow for better visual distinction.

- **Change type**: Select the style of the arrow (e.g., solid, dashed).

- **Delete arrow**: Remove the arrow connection.

5. Placement and arrangement on the whiteboard canvas

5.3.6. H5P interface

This activity is under implementation.

51

5.4. My classes

This component represents the **teamwork module** designed to facilitate individual and collaborative work among VET students. This component allows teachers to create and manage digital environments where students can engage in both individual and collaborative tasks:

- **Individual work:** Teachers can set up classes where students work independently on assignments or projects.
- **Collaborative work:** Teachers can also create collaborative spaces where students work in teams.

This component provides several key advantages that highlight the relevance and value of hybrid teaching for teachers:

- **Flexibility in teaching methods:** The hybrid approach allows teachers to tailor their teaching methods to suit different learning styles and objectives. They can seamlessly switch between individual and collaborative tasks.
- **Structured collaboration:** By using predefined structures like the Biomimicry Design Process, teachers can guide students through complex projects in a systematic way. This helps in maintaining clarity and focus throughout the project.
- **Enhanced student engagement:** Allowing students to take on monitoring roles increases their engagement and accountability. It also fosters a sense of ownership and responsibility towards their learning.
- **Efficient management:** The enrolment code system simplifies the process of managing who can access the classes, making it easier for teachers to keep track of student participation and progress.

Overall display of the My Classes interface
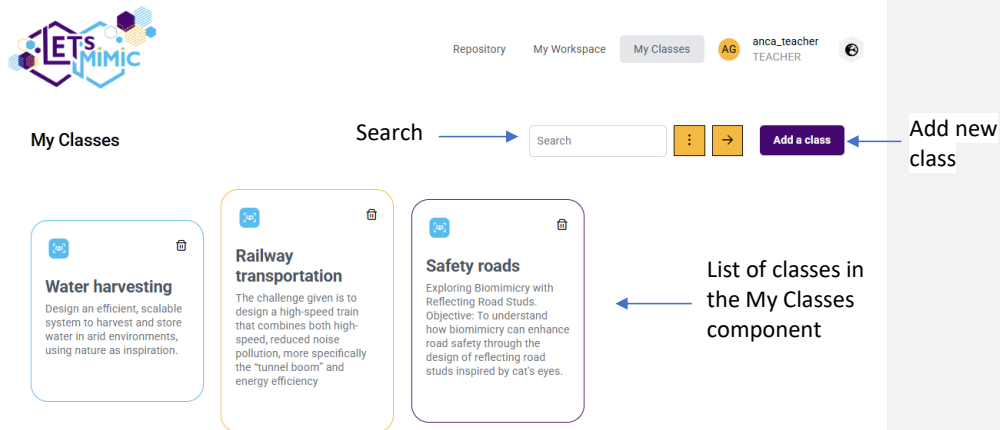
Figure 30. My Classes interface

The My Classes interface is divided into three major functionalities:

1. **Search:** Search can display specific classes filtered by title. This component offers two primary search options:

    a. **Search by title:** Teachers can filter classes by typing the title into the search input field. The system automatically filters and displays the relevant courses based on the entered title. This functionality allows teachers to locate specific materials by their titles quickly, enhancing efficiency and saving time when searching for particular content.

    b. **Search by tag:** To search by tag, teachers must click on the button and select a tag from the tag list. The system then filters and displays classes associated with the selected tag. Tag-based

53

search enables teachers to find materials categorized under specific subjects or from a specific step of the Biomimicry methodology. This method of filtering helps in organizing and accessing content that is relevant to particular educational objectives or topics.
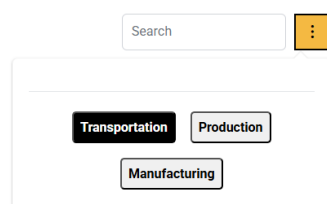
2. **Class definition:** This functionality allows teachers to create a new class. The process involves adding a title and description, defining tags, and selecting the collection relevant to the class.

a) **:** This button is used to create a new collection and is available in the Private collection interface.

b) **Class form:** This form allows teachers to define a new class by adding the title, description, and tags.

54

c) **Tags definition inside the collection form:** This option allows teachers to define multiple tags, relevant for the specific collection.

Examples of tags: Renewable energy Buildings New tag

- **To add a tag**, teachers must type the tag'and then press ENTER. Multiple tags can be defined.
- **To delete a tag**, the teacher must click on the specific tag from the list.

Select a collection ∨

e) **Select a collection:** This option allows teachers to select a collection specific to the subject of the class.

✓ Save

f) **Save the class:** This button within the collection form is used to save the collection.

3. **Class list (displayed as cards):** The classes are presented as boxes, where teachers can access and delete a class.

Water harvesting
Design an efficient, scalable system to harvest and store water in arid environments, using nature as inspiration.

Railway transportation
The challenge given is to design a high-speed train that combines both high-speed, reduced noise pollution, more specifically the "tunnel boom" and energy efficiency

Safety roads
Exploring Biomimicry with Reflecting Road Studs. Objective: To understand how biomimicry can enhance road safety through the design of reflecting road studs inspired by cat's eyes.

5.4.1. General functionalities for classes
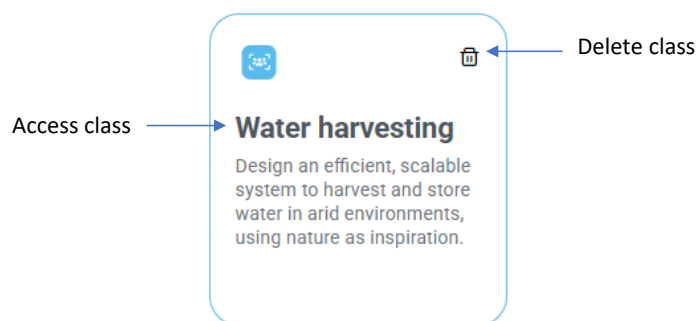
The general functionalities of a Class are as follows:

- **Access and view of a class:** To access and view a class, teachers must click on the corresponding class card. This action triggers a new page, where teachers can explore the Class dashboard and manage the class.

- 🗑 **Delete:** This feature allows teachers to remove a collection permanently from the platform.

5.4.2. Class dashboard

The Class Management component is designed to streamline the organization and oversight of classroom activities cantered around team-based collections on specific subjects. It provides educators with a centralized interface to manage class enrolment, monitor student engagement, and facilitate collaborative learning through structured team creation.
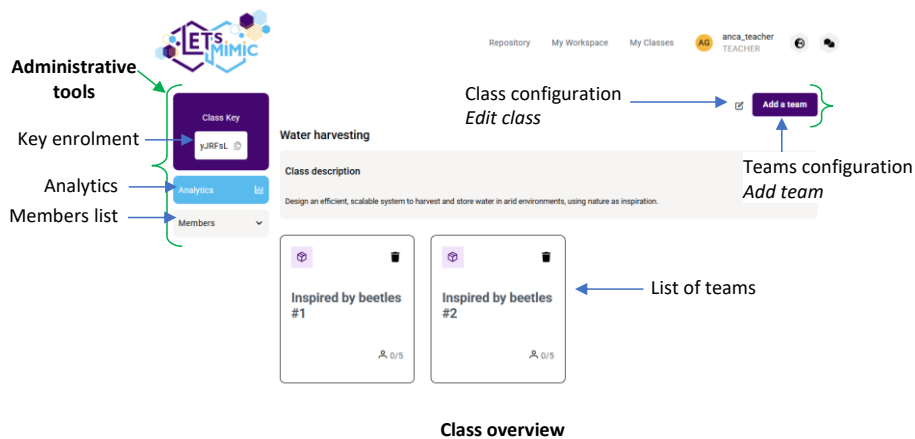
Class overview

Figure 31. Class dashboard

The Class management interface provides the following functionalities:

- Class configuration.
- Teams configuration.
- Administrative tools.
- Class overview.

5.4.2.1. Class configuration (Top panel)
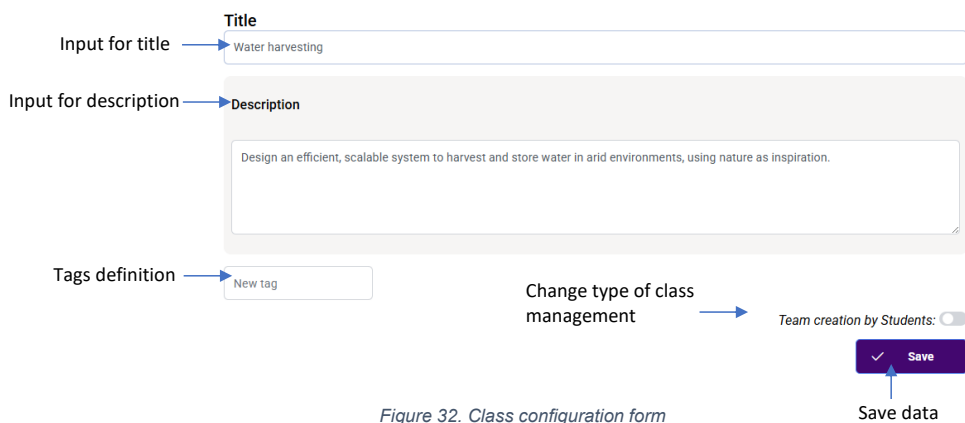
Figure 32. Class configuration form

This panel offers features for customizing the class setup, including editing the class description and defining student teams based on a specific collection.

- ☑ **Edit button:** This button enables teachers to update the class title and description to reflect changes in focus or objectives and the type of management of the class.

  The edit form offers the following functionalities:

  o **Input for title**

  Title

  Water harvesting

  o **Input for description:**

  Description

  Design an efficient, scalable system to harvest and store water in arid environments, using nature as inspiration.

  o **Tag definition:**

  Transportation   New tag

  o **Toggle to change the type of management:** This feature offers the possibility to assign students the role of monitoring teams and the learning process. This not only empowers students but also helps in developing their leadership and organizational skills.

    ▪ Team managed by teacher -

    Team creation by Students: ◯

58
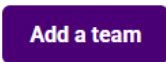
- ▪ Team managed by students -

  Team creation by Students: 🔵

  o ✓ **Save** *Button to save the data*

5.4.2.2. Team configuration (Top panel)

This panel offers features for creating new teams, including adjusting the number of teams to be created, and the maximum number of students per team.

- **Add a team** **Add a team button:** Enables the teachers to create new teams for the class.

  The add a team panel offers the following functionalities:

  o **Adjusting the maximum members per team:**

  Team Members: ➖ 3 ➕

  o **Adjusting the number of teams to be created:**

  Copies: ➖ 2 ➕

  o ✓ **Save** *Button to create the teams.*

5.4.2.3. Administrative tools (Left panel)

This panel offers features that support class administration, such as generating enrolment keys, viewing class analytics, and managing the list of enrolled students.

59

- **Key for enrolment:** A unique code that allows students to self-enrol in the class, simplifying the onboarding process.
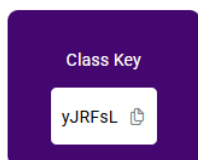
- **Class analytics:** Provides insights into student participation, team activity, and overall class engagement.

- **Member list:** Displays all enrolled students, allowing teachers to monitor attendance and team distribution.

5.4.2.4. Class overview (Middle panel)

This panel display the class title, description, and active teams, offering a clear snapshot of the class structure and ongoing collaborative work.

- **Class title and description:** Presents the subject and objectives of the class, helping students stay aligned with the learning goals.
- **List of teams (displayed as cards):** Shows all currently active teams, each associated with the specific collection selected when creating the class, giving a snapshot of ongoing collaborative work.

60

Water harvesting

Class description

Design an efficient, scalable system to harvest and store water in arid environments, using nature as inspiration.

Inspired by beetles

👤 0/1
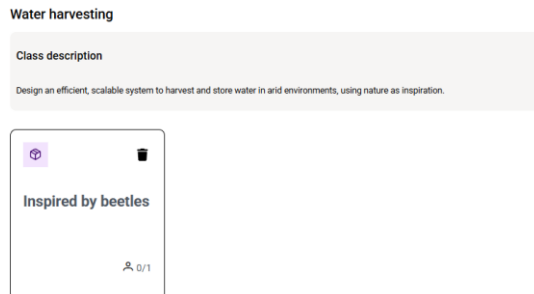
5.4.3. Team management – Collection interface inside a class

When a teacher selects a **team card** within the class, the interface transitions to a dedicated **collection view** that reflects the structure of the Biomimicry methodology. This interface is designed to guide both teachers and students through the six-step process in a clear, intuitive, and visually engaging way ([For more information see point 5.3.3 Biomimicry pipeline](#))

5.4.3.1. Team card features

Delete team card

Title of the challenge

Inspired by beetles

Number of students allowed to join the specific team

👤 0/1
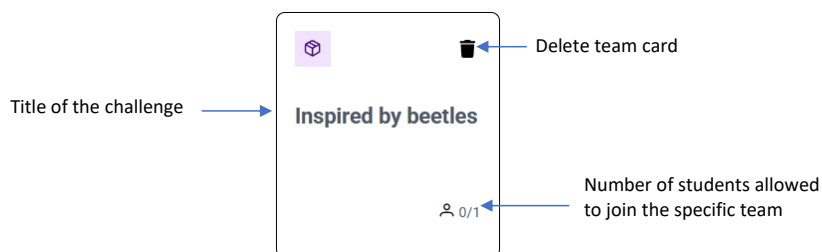
Figure 33. Team card in a class

A **Team card** represents a student group within a class. It is an entry point for exploring the team's progress and work. When selected, it opens a detailed view of the chosen collection tailored to the biomimicry methodology, allowing teachers and students to dive deeper into the team's innovation journey.

Before entering the collection interface, each **team card** provides essential information at a glance:

61

- **Collection description:** A brief overview of the project or theme the team will explore.
- **The number of students allowed to join the specific team:** This number indicates how many students can join the team, helping manage group sizes effectively.
- **Delete button:** Allows teachers to remove the team if needed, maintaining control over class organisation.

5.4.3.2. Collection view

The **Collection view** within a Team card is a structured, step-by-step interface that mirrors the six stages of the biomimicry process. Designed to be intuitive and visually engaging, it helps guide teams through each phase—from identifying a challenge to developing nature-inspired solutions—making the learning experience both educational and inspiring.

- The interface prominently features the **six steps of the Biomimicry** methodology, each represented by a distinctively coloured button.
- This **color-coded layout** enhances visual clarity and allows users to quickly identify and navigate between steps.
- The **step-by-step navigation** ensures a logical progression through the methodology, reducing confusion and supporting a structured learning experience.
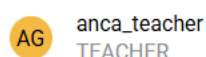
5.5. Dashboard

The User Dashboard is the central hub for each teacher's personal experience within the platform. It provides a comprehensive overview of their account, upcoming activities, and planning tools, all designed to support engagement, organization, and progress tracking.
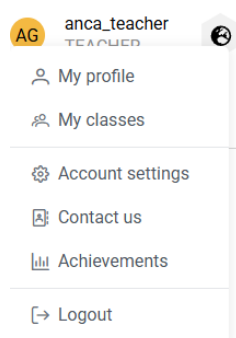
Rather than searching through different parts of the platform, teachers are greeted with a curated overview of their classes, progress, and upcoming events. This helps reduce cognitive load and allows them to focus on what matters most.

The User Dashboard features are in a drop-down list that can be activated when teachers click on the avatar icon. The drop-down list serves as a **personalised control panel**, ensuring that user-specific actions are always just one click away—whether the teacher wants to check their profile, adjust settings, or log out securely.

How to access the User Dashboard features?

Step 1. Click on the avatar icon from the top right menu.

AG anca_teacher
TEACHER

Step 2. Select from the drop down list the available features.

AG anca_teacher
TEACHER
- 👤 My profile
- 👥 My classes
- ⚙️ Account settings
- 🖼️ Contact us
- 📊 Achievements
- [→ Logout

5.5.1. My profile

The My Profile feature provides a comprehensive overview of the teacher account. Teachers can view and manage their personal information, activity calendar, and upcoming events. This is the central hub for tracking engagement and planning tasks.

63

The My profile page contains three sections:

1. **Account Information section:** Allows teachers to view their personal and account-related details, such as: username, first name, last name and role

2. **Calendar for activity planning:** This tool helps teachers manage their time, plan tasks, and stay on top of deadlines. Teachers can view the classes planned for a specific day or plan other classes.

3. **Upcoming events (next 7 days):** To provide a focused, short-term view of what's immediately ahead, helping teachers prioritize and have a clear overview of the upcoming activities.
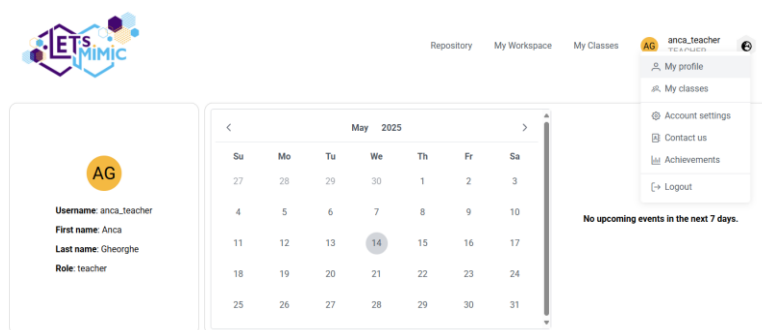

Figure 34. Teacher dashboard - My profile page

5.5.2. My classes

It is a dedicated link that leads directly to their private classes. This feature is designed for teachers, providing quick and streamlined access to manage and oversee their private courses.

Figure 35. Teacher dashboard - Link to My classes page

5.5.3. Account settings

The Account Settings page allows users to easily update their personal information, including first name, last name, and password. This feature ensures that teachers can keep their profile details current and maintain account security with simple, intuitive controls.

5.5.4. Contact us

The Contact us feature in the list provides teachers with quick access to a dedicated page containing all the necessary contact details. Whether for support, inquiries, or feedback, this feature ensures users can easily reach out and connect with the appropriate team.

5.5.5. Gamification modules - Achievements

The **Gamification module** on the Let's Mimic platform is a powerful tool for teachers to foster a more engaging and motivating learning environment. Teachers can encourage consistent participation by incorporating elements such as experience points (XP), progress bars, and unlockable rewards.

The module looks to:

65

- Motivate and recognize teachers' active engagement and contributions on the platform.
- Encourage consistent use of platform features that enhance teaching
- To foster a sense of achievement and professional growth through visible progress and rewards.

The module is designed to enhance engagement and motivation by integrating game-like elements into the learning experience. At its core, the module features a progress bar that visually tracks the accumulation of experience points (XP) based on completing tasks and achieving milestones within the platform's activity.

In addition to tracking progress, the module includes a rewards system where teachers can unlock various rewards upon reaching specific XP thresholds. These rewards serve as both recognition of effort and motivation to use the platform
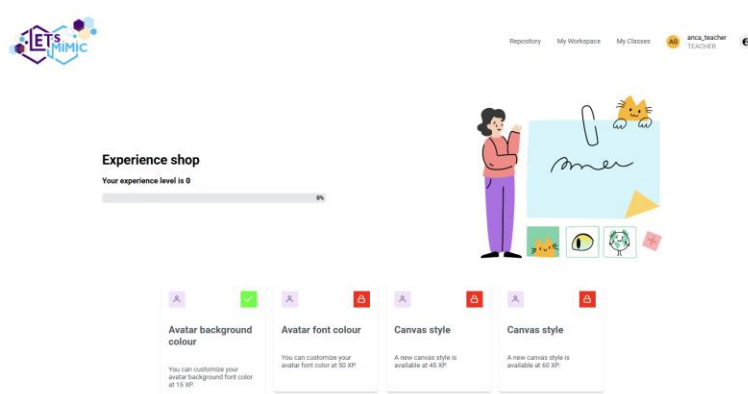

Figure 36. Teacher dashboard. Gamification module - Achievements page

6. Conclusions

The Let's Mimic platform manual serves as a comprehensive guide designed to support teachers in navigating and utilising the platform's features confidently and efficiently. From initial registration and login procedures to advanced tools like the biomimicry pipeline and gamification modules, the manual provides step-by-step instructions and contextual explanations that empower teachers to make the most of their digital teaching environment.

This manual is not only a technical reference but also a pedagogical companion. It outlines teachers' roles and responsibilities, helping them understand how their actions contribute to student engagement and learning outcomes. The manual ensures that teachers can seamlessly integrate digital resources into their instructional practices by detailing the functionalities of key components such as the repository, workspace, class management tools, and interactive interfaces like H5P and Canvas.

Moreover, including the dashboard, account settings, and gamification modules highlights the platform's commitment to personalisation, motivation, and continuous professional development. Teachers are encouraged to explore and experiment within a structured framework, supported by clear documentation that reduces the learning curve and enhances usability.

This manual is a vital resource for new and experienced users, offering clarity, structure, and support. It reflects the platform's mission to foster innovative, self-regulated learning environments where teachers have the tools and knowledge to inspire and guide their students effectively.