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 – Students interface

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Authors	Olivier Heidmann (UTH) Ancuta Gheorghe (ATS)
Reviewers	Hariklia Tsalapatas (UTH)

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Contributors

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

Commented [1]: Olivier, please add your team here. If you find it more relevant, you can add in the Author section above.

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1. Introduction

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.

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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 customise 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 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.

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2. Word of caution

The development of the Let's Mimic platform is an ongoing process. 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 contact the lead developer at the following email address: olivier.heidmann@gmail.com.

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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 and students (public):** This public module contains collections and resources (bite-sized units) accessible to both 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.

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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.

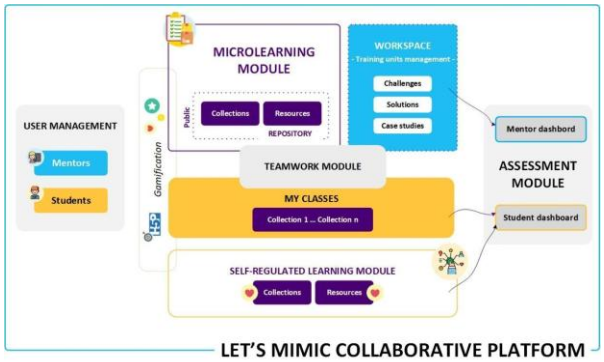

Figure 1. Let's Mimic collaborative platform architecture

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4. Let's Mimic student 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.

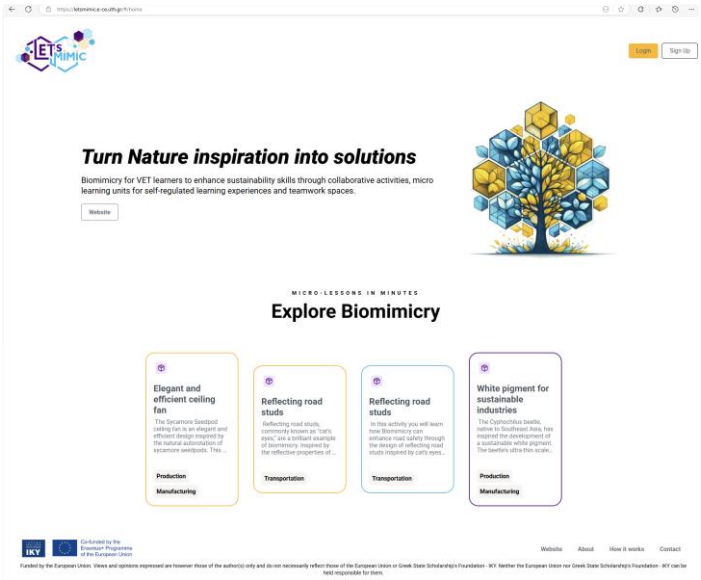

Figure 2. Homepage before login

In the platform, students fulfil a dual role:

- **Assignment completion:** Students are required to 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.

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- **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

Students must first create an account to use the various functionalities offered by the platform. This prerequisite ensures that the platform can provide each user a personalised and secure experience.

The registration form requires typical data to deploy an account:

- **First name and last name**: While using real names is optional, enhancing users' ability to be recognised by peers and educators is recommended, 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 confirm its accuracy, thereby minimising the risk of errors and ensuring account security.
- **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

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Step 1: Check the Student checkbox (Student) and click on Continue button.

Figure 3. Register form. Student role

Step 2: Fill in the specific information fields to establish the account.

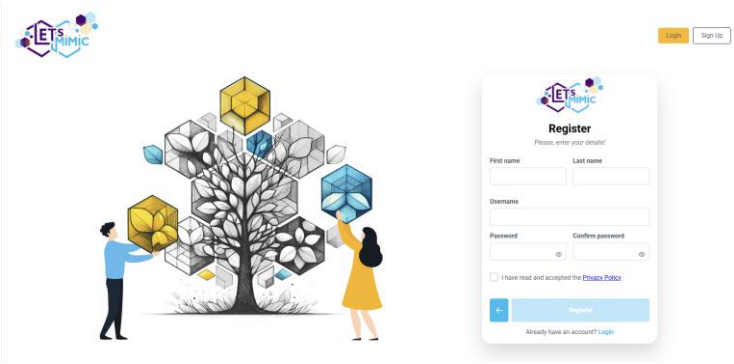

Figure 4. Register form fields (Student)

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

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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 can access the tools and resources appropriate to their role.

Upon subsequent access to the platform, the user will have to authenticate on the platform after a specific period. To proceed, the user must click on the Login button in the home screen's top right corner.

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

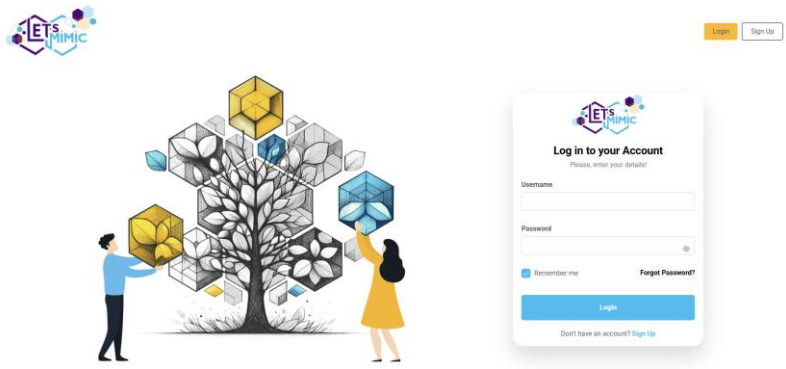

Figure 5. Login form

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.

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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.

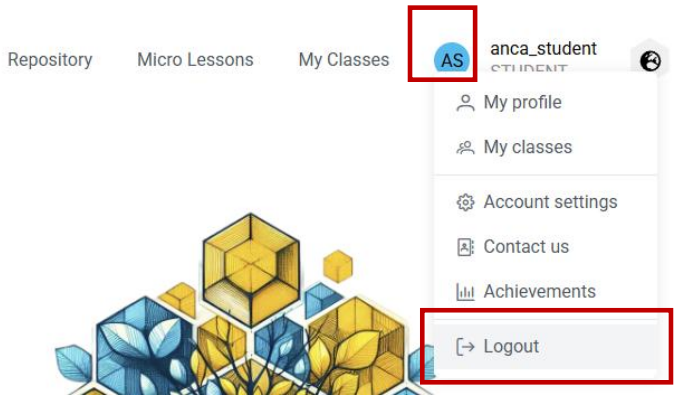

Figure 6. Logout functionality

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.

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5. Let's Mimic platform components for students

5.2. Homepage

The user can view the home screen after successfully logging in with the student account. This Homepage interface serves as the central hub for accessing various features of the platform.

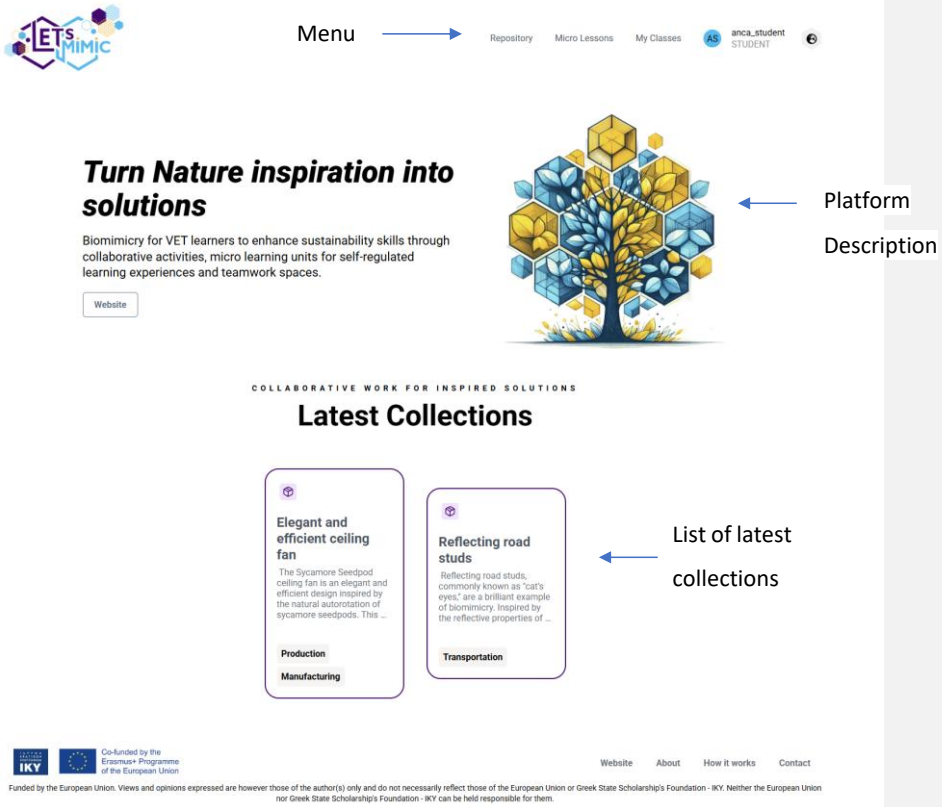

Figure 7. Homepage. Student interface, after login

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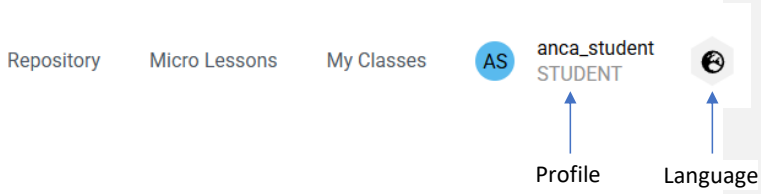
The Homepage is divided in three main sections:

- **The menu:** serves as the primary navigation tool for students. The menu includes the main components of the platform: Repository, Micro Lessons, My Classes, Profile and Language. The menu is designed to provide quick and easy access to the platform's main features, ensuring students can efficiently navigate to their desired destinations.
- **The platform description:** This section provides an overview of the platform, outlining 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 and marked as favourites by the student. It informs users about new and updated content, encouraging them to explore and utilize these resources. The list of latest collections is handy for staying up-to-date with the latest educational materials and ensuring users can access their favourite collections.

The platform menu is specifically tailored to student account privileges.



These options are designed to provide users with the tools and resources relevant to their student role:

- **Repository:** This component contains collections and resources, which are accessible to the public audience.
- **Micro lessons:** This component allows students to curate a personalized list of their favourite collections and educational resources from the Repository. By marking specific items as favourites, students can quickly and conveniently access the learning materials they use most often,

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streamlining their study process and enhancing their overall learning experience.

- **My classes:** This component is built on a hybrid learning model supporting independent and collaborative educational experiences. Students can enrol in individual courses for self-paced learning or join collaborative workspaces by entering a unique code provided by their teacher. A standout feature of this component is its innovative approach to student engagement: it empowers learners to take on leadership roles by monitoring team activities and overseeing the overall learning process. This fosters a sense of responsibility and encourages peer-to-peer support and active participation.
- **Profile:** This component allows students 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.

5.3. Repository

This component is designed to host collections and resources accessible to the public audience, namely students. It serves as a repository of educational materials that can be freely accessed by anyone who has a student account.

The repository serves as a centralized location where students can access educational materials shared by teachers. Students are allowed to explore and choose what educational materials they want to study.

The already deployed collections and resources in the Repository are part of the Self-regulated learning kit and are carefully curated by project partners to ensure

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high quality and relevance. This involves selecting materials that are accurate, up-to-date, and aligned with educational standards.

Overall display of the repository interface

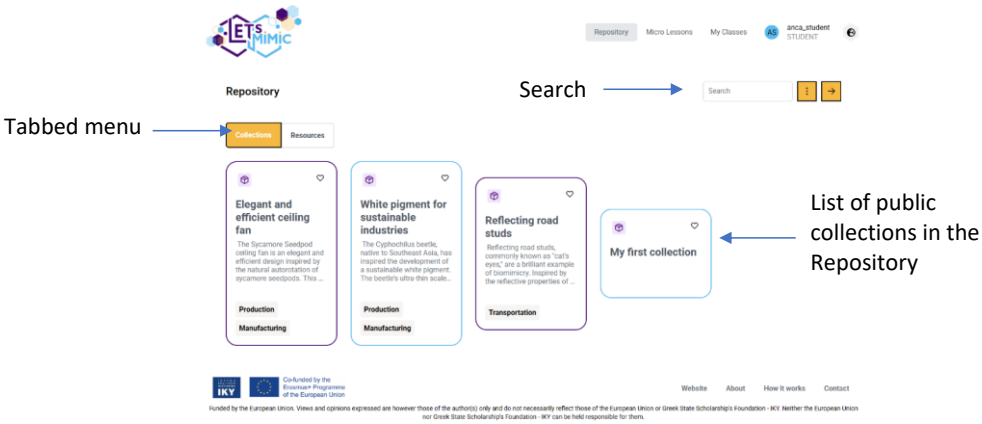

Figure 9. Repository – public collections interface

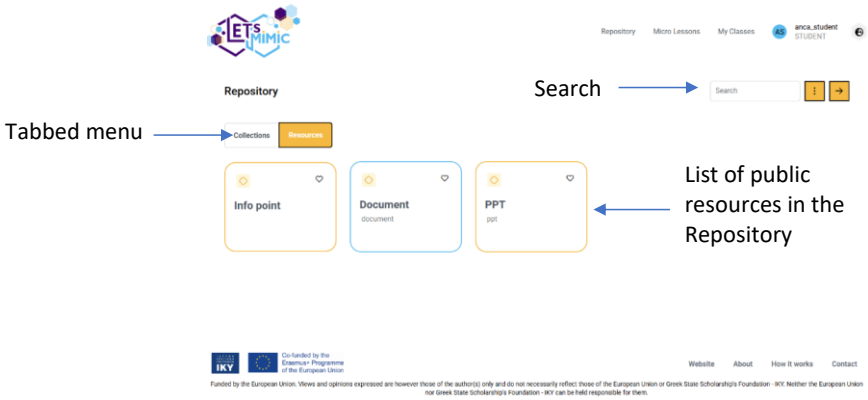

Figure 10. Repository – public resources interface

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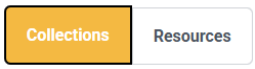
The repository interface is divided in 3 major functionalities:

1. **Tabbed menu** (for Collections or Resources selection): The tabbed menu comprises two buttons: **Collections** and **Resources**. These buttons enable users to switch between the two options, displaying the respective collection lists or 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:** Students 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 students to quickly locate specific materials by their titles, enhancing efficiency and saving time when searching for particular content.

    b. **Search by tag:** To search by tag, students 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 students 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.

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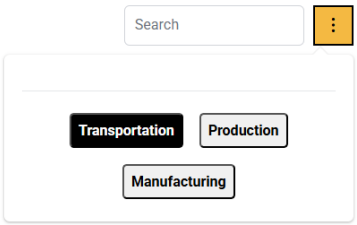
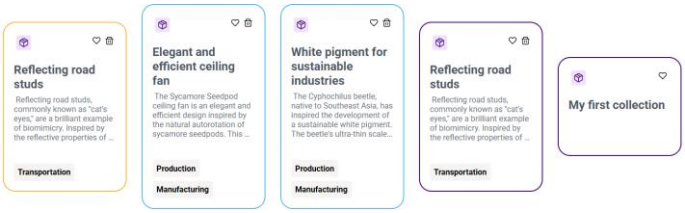


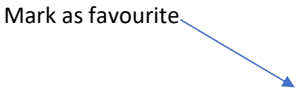
3. **List of collections in the repository (displayed as cards):** Based on the option selected from the tabbed menu, a list of collections or resources, presented as boxes, will be displayed. Students can access, view, mark as a favourite, or delete these items if they are the owners.



5.3.1. Functionalities of collections

Collections refers to the Biomimicry pipeline and contains the 6 steps of the Biomimicry methodology: Define, Biologize, Discover, Abstract, Emulate, Evaluate. Collections provide a structured approach to learning by organizing educational materials according to the six steps, helping users to systematically understand and apply the principles of biomimicry.

Overall display of an owned collection within the Repository



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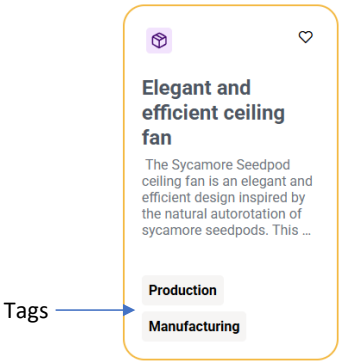

Figure 11. Repository – Collection card

For students, the platform offers two major functionalities for a collection:

- **Access and view:** Students must click on the corresponding box to access and view a collection. This action triggers the display of a pop-up window, where students 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, students can access the defined bite-sized units associated with each step, which may include documents, videos, H5Ps, or collaborative spaces.

- **Mark as favourite**: This feature enables Students to designate a particular collection as their favourite. The selected collection is duplicated into the "Micro Lessons" section, facilitating easier access and

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organization for future learning. The "Mark as favourite" option serves as a tool for Students to streamline their learning at their own pace.

5.3.2. 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 teachers can publish in the Repository, thereby making them accessible to students.

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

Overall display of owned resources within the Repository

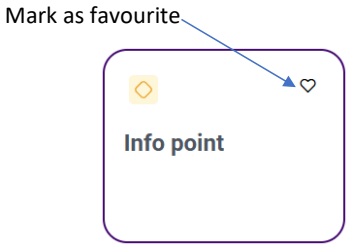

Figure 12. Repository – Resource card

For Students, the platform offers two major options for resources:

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

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

5.4. Micro lessons

The micro lessons component is key to fostering personalised, flexible, and student-centred learning. At its core, it empowers students to take control of their educational journey by allowing them to select and organise learning materials that resonate with their individual goals and interests. Rather than following a rigid, one-size-fits-all curriculum, students can curate a tailored collection of resources from the platform's Repository, creating a learning environment that adapts to their unique needs.

One of the most valuable aspects of this component is its support for self-paced learning. Students can revisit their favourite materials as often as needed, enabling them to study at a rhythm that suits their comprehension and schedule. This flexibility is essential for learners needing more time to grasp complex concepts or who prefer to study during specific times of the day. The Micro Lessons component helps reduce stress and encourages more profound understanding by removing the pressure of keeping up with a fixed pace.

The micro lessons component transforms the learning experience from passive consumption into active, intentional exploration. It supports a more inclusive and adaptable educational model, where students are not just recipients of information but active participants in shaping their learning paths. This approach is particularly effective in modern educational environments that value diversity, personalisation, and student empowerment.

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Overall display of the micro lessons interface

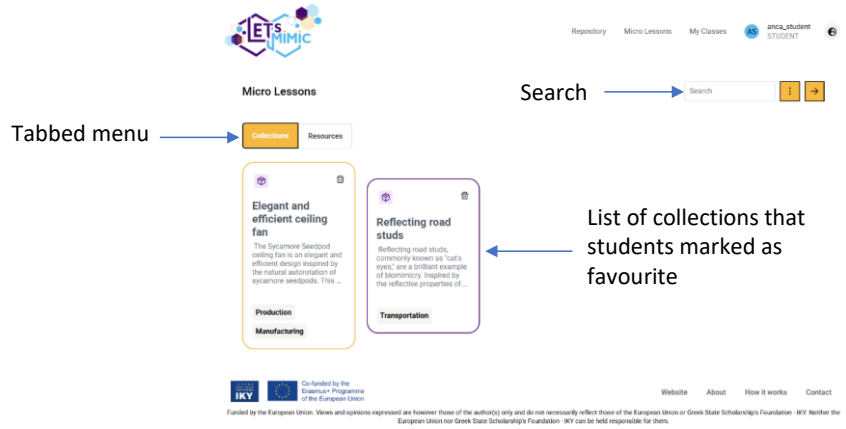

Figure 13. Micro Lessons – Collections marked as favourites

Figure 14. My Workspace – Private resources interface

The Micro Lessons interface is divided in three major functionalities:

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

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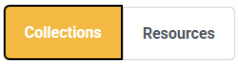
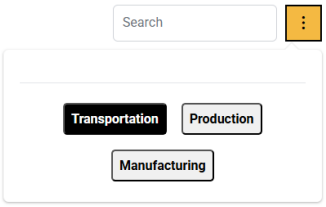
students switch between the two options, displaying the respective lists of favourite collections or resources.



2. **Search:** Search can display specific collections or resources filtered by title. This component offers two primary search options:
    a. **Search by title:** Students 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 students to quickly locate specific materials by their titles, enhancing efficiency and saving time when searching for particular content.

    b. **Search by tag:** To search by tag, students 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 students to find materials categorised 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 specific educational objectives or topics.



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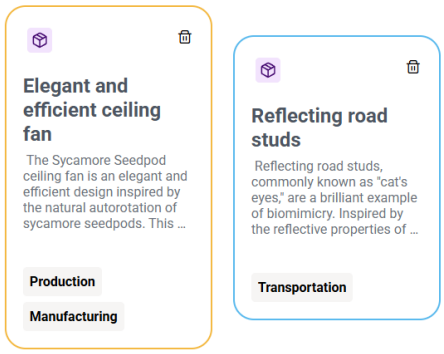
3. **Collection or resource list (displayed as cards):** Based on the option selected from the tabbed menu, a list of collections or resources, presented as boxes, will be displayed. Students can access a collection or resource and also unmark it as a favourite.



5.4.1. Functionalities for favourite collections

Collections marked as favourites 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, Evaluate.

The platform offers two major options for favourite collections:

- General functionalities of collections.
- Pipeline of a favourite collection.

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5.4.1.1. General functionalities of collections

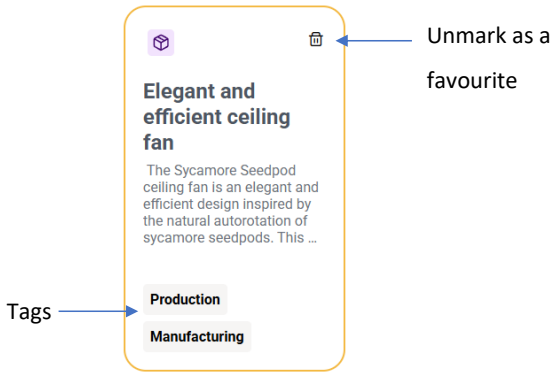

Figure 15. Micro Lessons – Collection card

- **Access and view of a collection:** To access and view a collection, students must click on the corresponding card of the collection. This action triggers a new page, where students can explore the Biomimicry pipeline and work on their favourite collection independently. Students can systematically analyse and apply nature-inspired solutions to real-world problems. This structured approach enhances critical thinking, creativity, and interdisciplinary learning, making complex concepts more accessible and actionable.

  For each step of the Biomimicry methodology, detailed information about the role and significance of that step is provided.

- **Unmark as a favourite:** This feature allows students to unmark a collection as a favourite and thus not display in the Micro Lessons interface.

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5.4.1.2. Pipeline of a favourite collection

Commented [2]: Olivier, can you please take a look from the student's side why the description of the collection is not displayed?

I altered the screenshot to reflect how it should look like.

The **pipeline of a favourite collection** is designed to offer a structured and user-friendly way for students to explore Biomimicry. Its main goal is to provide a comprehensive and well-organised interface that allows students to learn at their own pace. This structured approach ensures that students can effectively understand and apply the principles of biomimicry, making the learning experience more engaging and impactful.

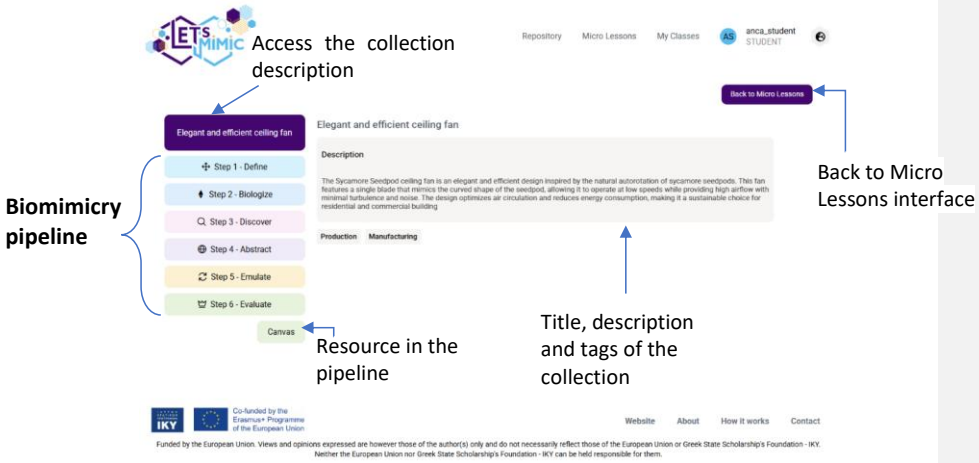

Figure 16. Favourite collection interface

The interface offers the following features for a favourite collection:

- Back to dashboard **Back to micro lessons interface:** This feature allows students to return to the Micro Lessons interface, ensuring easy access to other collections or resources.
- **Access to biomimicry pipeline – Biomimicry steps description:** This feature provides a comprehensive tool for students to understand what Biomimicry is about and have an overview of their learning materials. The pipeline serves as a quick navigation through the six steps of the

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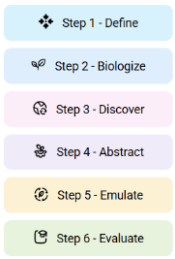
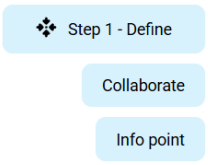
Biomimicry methodology. The interface provides buttons displayed with different colours for each step (Define, Biologise, Discover, Abstract, Emulate, Evaluate). When accessed, detailed information about each step is presented, offering students guidance on how to answer the tasks provided in each step. The steps of the Biomimicry methodology are accompanied by a real-life example to inform students of what they should consider when learning and solving the tasks. (For more information, see point 5.3.3 Purpose of the Biomimicry pipeline).



- **Access to a resource in the pipeline (specific to a Biomimicry step)**: This feature allows students to access resources related to a step of the Biomimicry pipeline. The resources in a collection can be:
    - **Learning resources**, where students can read and discover information about a specific subject addressed in the collection.
    - **Assessment resources**, where students must solve different tasks.

  The resources are coloured in the specific colour of the step.



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5.4.2. Favourite resources

Favourite resources are short, easy-to-understand learning units that were published by their creators in the Repository for public use. These resources are built into the Biomimicry pipeline and organized to match each step of the learning process. From a student's perspective, they are divided into two types: Learning Content, which helps students understand concepts, and Assessment Resources, which check understanding.

These resources aim to make learning more manageable and personalized. By breaking down complex ideas into smaller parts and aligning them with the biomimicry steps, students can learn and focus more on a specific step for deeper understanding.

5.4.3. Biomimicry pipeline

The Biomimicry pipeline feature is designed to provide students with a structured and organized approach to learning about the Biomimicry principles and understanding this concept. This feature ensures that students can easily navigate through the six steps of the Biomimicry methodology, making the learning process more efficient and effective.

Detailed description of the feature

1. **Organised overview and step-by-step navigation**:
    - **Purpose**: To give students a clear and structured view of their learning and assessment materials and allow quick access to each methodology step.
    - **Description**: The interface displays the six steps of the Biomimicry methodology in a visually organised manner, with each step represented by a button in a different colour. This colour-coding helps in quickly identifying and navigating through the steps. This step-by-

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step navigation ensures that students can move through the process systematically and without confusion.

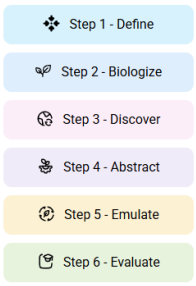

Figure 17. Colour-coded Biomimicry pipeline

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 students to understand what is expected in the specific step and to offer guidance on how to answer the tasks in the Assessment resource.

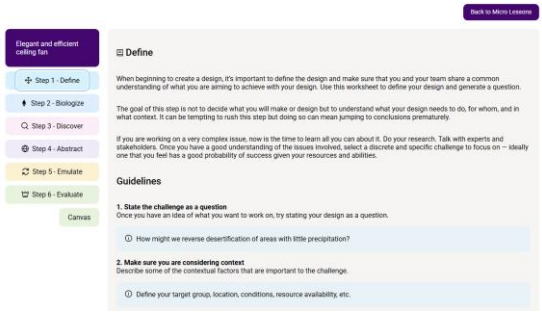

Figure 18. Description of the Define step

3. **Real example:**
   - **Purpose:** To offer practical insights and inspiration.

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- **Description:** A real example accompanies each step to guide students on how to solve the tasks. It is essential to mention that the example serves only as a reference point for students and is not subject to discussion in the specific collection. The platform provides an example that helps students visualise from beginning to end how biomimicry can be used in real-world scenarios.

  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.

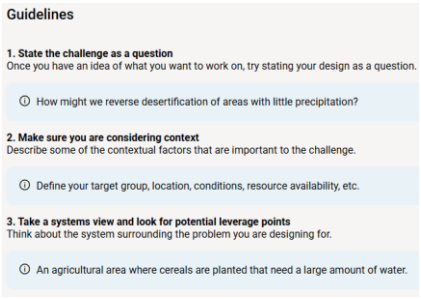

Figure 19. Example provided

5.4.4. Type of resources available

The resources from the student's point of view are divided in two categories:

- **Learning resources**, where students can read and discover information about a specific subject addressed in the collection. These resources can be:
  - Documents.
  - Images.
  - Videos.
  - H5P that are designed as Learning content.

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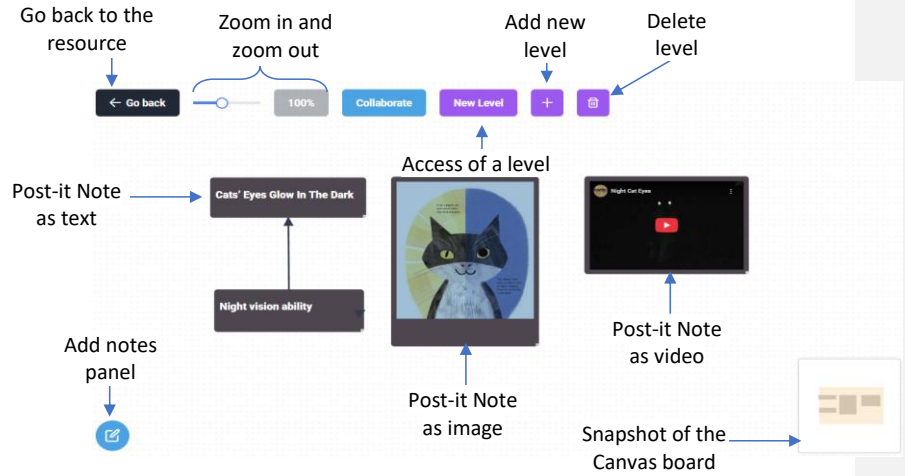
- **Assessment resources**, where students must solve different tasks. These resources can be:
    - Interactive spaces (canvas) are designed as digital spaces where students can add post-it notes to answer to specific tasks. (For more information regarding the canvas interface, see point 5.3.4 H5P Interface)
    - H5Ps that are designed as quizzes or any type that holds an assessment.

5.4.5. 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 offers an organised way to structure the assessment, allowing students to organise their thoughts, share ideas, and visually connect concepts, making the learning process more dynamic and interactive.



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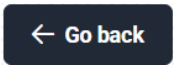
The interface provides the following features:

1. 

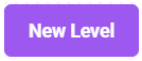
Go back to the resource interface

- **Purpose**: To provide easy navigation back to the primary resource interface.
- **Description**: The feature allows students to return to the resource interface, ensuring seamless movement between different platform parts.

2. 

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 students to zoom in for a closer look at details or zoom out to get an overview of the entire workspace.

3. 

Access levels (tabbed panel)

- **Purpose:** To organise the workspace into different sections or levels for better structure. This is used to have an organised structure of the questions or assignments.
- **Description:** Students 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.

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- **Description:** A feature that allows students 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:** Students can delete levels that are no longer needed, helping to keep the workspace organized and relevant.

6.  **Add notes panel:**

- **Purpose:** To allow students to add various types of content to the workspace.
- **Description:** Students can define notes and add different types of content within each level. (For detailed information regarding note features, see point 5.3.5.1 Post-it notes panel)
- **Available options:**
  -  **Text post-it notes**: For quick text-based notes.
  -  **Image post-it notes**: To visually represent concepts or ideas.
  -  **Video post-it notes**: To provide multimedia explanations or demonstrations.
  -  **Arrow connections**: To create visual links between notes, showing relationships and connections.

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Figure 21. Post-it notes panel

7. **Snapshot of the canvas board:**

- **Purpose:** To provide an overview of the students' current position within the workspace.
- **Description:** A small map in the bottom right corner shows where the students are on the canvas board, helping them navigate the workspace more easily.

8. **Dotted whiteboard:**

- **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 students to view, manage, and arrange their notes as they see fit.

5.4.5.1 Post-it notes panel

The post-it note panel in the Canvas interface is a crucial tool for organising and visualising information. It allows students to create, edit, and connect various

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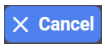
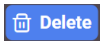
types of notes, making it easier to structure thoughts, share ideas, and collaborate effectively. This feature enhances the learning experience by providing a flexible and interactive workspace that supports different types of content.

The post-it notes panel provides the following features:

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

-  **Add text-based note**: To add a note, students must click on the icon to create a new text-based note. The note appears automatically. To edit it (open the editor), students double-click on the note to start editing. An editor opens where students can type the text.
- **Purpose of the text-based post-it notes:** These notes contain text, allowing students to add written information directly onto the canvas.
- **Functionalities**:
  -  **Save**: A button to save the text entered. The note will display the saved text on the canvas.
  -  **Cancel**: A button discards any changes made during editing and reverts the note to its previous state.
  -  **Delete**: A button to remove the note from the canvas permanently.
  -  **Change colour**: A button to allow students to change the note's background colour, helping to categorise or prioritise information visually.
  - **Modify**: To modify an existing note, students must double-click on the note to open the editing mode.

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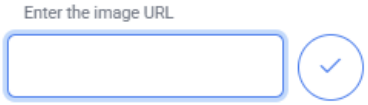
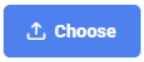
2. **Image-based Post-it notes**

-  **Add image-based post-it notes:** To add an image-based post-it note, students must click on the icon to create a new image-based note. A pop-up box appears where students can either add a link to the image or upload a photo 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 students to add visual content to the canvas.
- **Functionalities**:
    - **Input for URL**: An input to add the link of the image.



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

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, students must click on the icon to create a new note. A pop-up box appears where students can add the video link. Once linked, the video is automatically added to the canvas.
- **Purpose of the video-based post-it notes:** These notes contain videos, allowing students to add multimedia content to the canvas.
- **Functionalities:**

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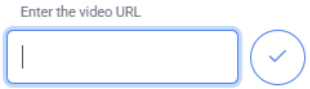
- **Input for URL**: An input to add the video link.



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

Commented [4]: In the pop up, for video appears the image label - Link an image. Please swap the popups.

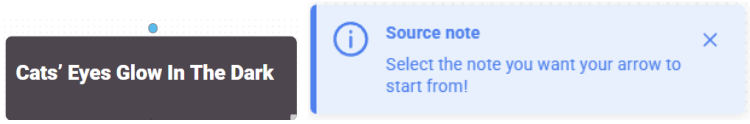
4. Arrow connections

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

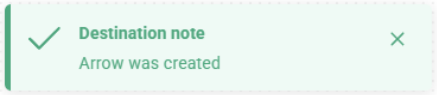
Define the arrow steps:

a)  **Add arrow:** Students must click the icon to create an arrow.

b) **Select source note**: Dots appear around each note. A notification prompts students to select the source note. Students must click on the top dot of the source note to start the connection.



c) **Select target note**: A notification prompts informing students to select the second note to complete the connection. Students must click on the top dot of the target note.



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d) **Customize arrow**: After establishing the connection, to customize the arrow, students 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**

5.4.6. H5P interface

This functionality is still under development.

5.5. My Classes

This component represents the Teamwork module, which is designed to facilitate individual and collaborative work among VET students. This component allows students to join a class, where students can engage in both individual and collaborative tasks:

- **Individual work**: Students work independently on assignments or projects.
- **Collaborative work**: Students can work collaboratively in teams.

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

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- **Flexibility in learning methods:** The hybrid approach allows students to tailor their teaching methods to suit different learning styles and objectives. They can switch seamlessly between individual and collaborative tasks.
- **Structured collaboration:** By using predefined structures like the Biomimicry Design Process, students can work collaboratively on complex projects in a systematic way. This helps maintain 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, which the teacher provides, simplifies the process of joining a class, making it easier for students to join a specific class according to their teacher's instructions.

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Overall display of the My Classes interface

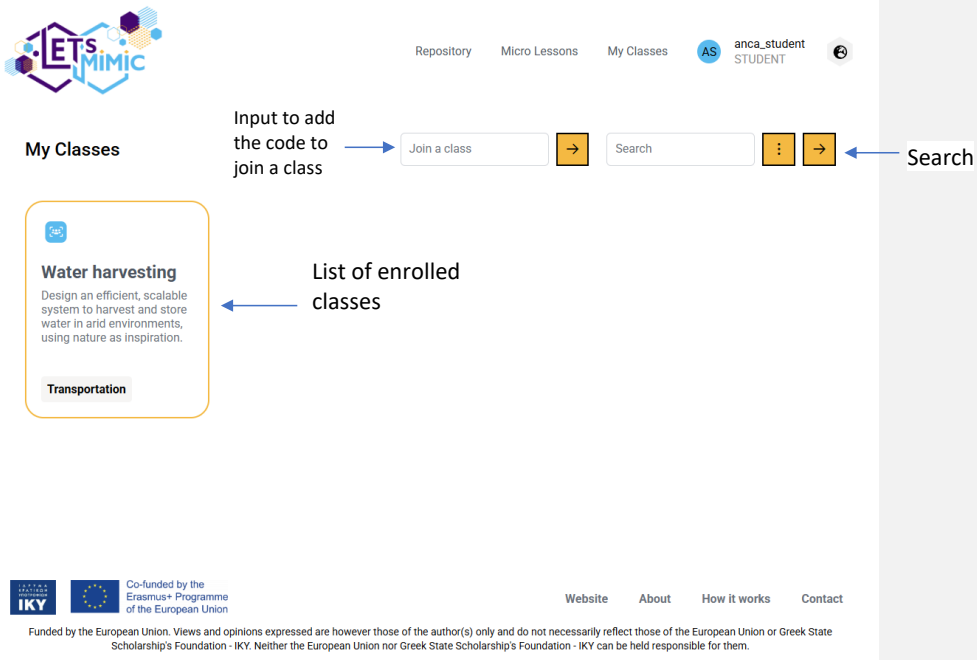


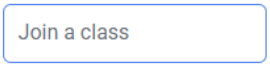
Figure 22. My Classes interface

The My classes interface is divided into three major functionalities:

1. **Join a class:** This feature enables students to join a specific class, as instructed by the teacher. **The teacher must provide the code.**

   Steps to join a class:

   - **Step 1.** Students add the code provided by the teacher in the Join a class input.

   - **Step 2.** Students must click on the right pointing arrow  to join the class.

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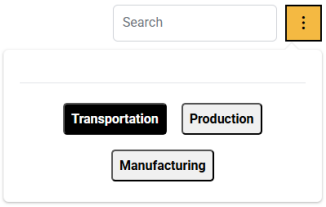
2. **Search:** The search function can be used to display specific classes filtered by title. This component offers two primary search options:
    a. **Search by title:** Students can filter classes by typing the title into the search input field. The system automatically filters and displays the relevant courses based on the entered title. This functionality enables students to quickly locate specific materials by title, enhancing efficiency and saving time when searching for particular content.

    b. **Search by tag:** To search by tag, students 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 search enables students to find materials categorized under specific subjects or from a particular step of the Biomimicry methodology. This method of filtering helps in organising and accessing content that is relevant to specific educational objectives or topics.



3. **List of enrolled classes (displayed as cards):** The classes are presented as boxes, where students can access the classes in which he/she enrolled.

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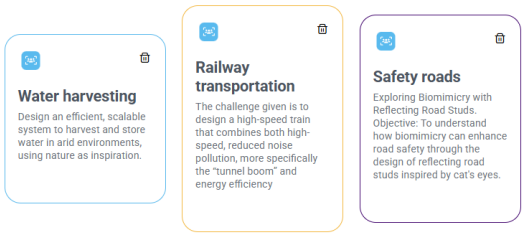
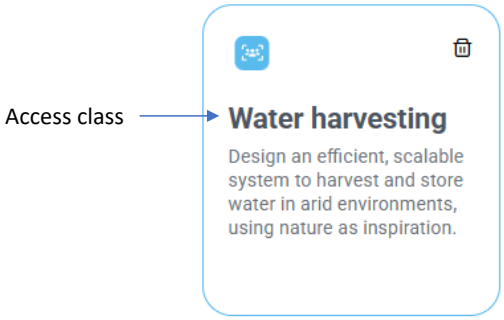


5.5.1. General functionalities for classes



The general functionalities of a class are as follows:

- **Accessing and viewing a class:** To access and view a class, students must click on the corresponding card for that class. This action triggers a new page, where students can explore the Class dashboard and manage the class.

5.5.2. Class dashboard

The Class dashboard is designed to have an organised classroom activity centred around a specific collection. It provides students with a centralised interface and facilitates collaborative learning through structured team creation.

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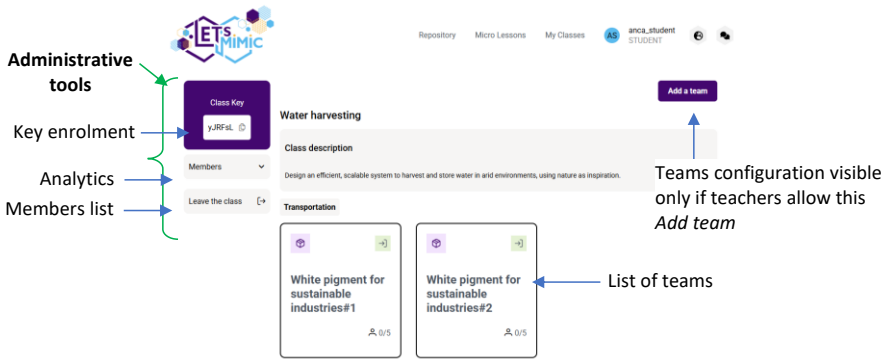

Figure 23. Class dashboard

The Class management interface provides the following functionalities:

- Teams configuration (only if enabled by teachers).
- Administrative tools.
- Class overview.

5.5.2.1. Team configuration (Top panel)

This feature, if **teachers enable it**, allows students to manage the class according to their own preferences. In this case, students decide how many collection cards should be displayed in the class, as teams. In a classroom setting, each team should have a defined number of students. The default setting is 1.

Steps to define a team

- **Step 1.** Click on the Add a team button.

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- **Step 2.** A pop-up window will be displayed. Set the number of members in a team by clicking on the + or – buttons. Students can decide how many participants will be in each team.

- **Step 3.** Set the number of copies by clicking on the + or – buttons. Students can specify the number of teams that the class should include (these represent the learning content and assessment content that a specific collection contains, selected when the class was created).

- **Step 4.** Click on the 

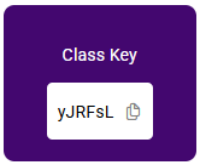
button to save the configuration.

The platform will automatically display the number of teams (collection cards), each with a specific number of participants.

5.5.2.2. Administrative tools (Left panel)

This panel provides information about the class key, used for enrollment, to view the list of enrolled students, and an option to leave the class.

- **Key for enrolment:** The unique code generated automatically when the teacher creates a class.



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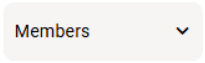
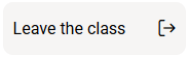
- 

Member list: Displays all enrolled students.
- 

Leave the class: Allows students to leave a class they have previously joined.

Commented [5]: If the class is managed by the student, are they allowed to manage the participants that join a class. Like delete them from the list of members?
If yes, we should explain this.

5.5.2.3. 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.

5.5.3. Team management – Collection interface inside a class

When a student accesses a **team card** within the class, the interface transitions to a dedicated **collection view** that reflects the structure of the Biomimicry methodology. Thus, the student is enrolled automatically in that team. This interface is designed for students through the six-step process in a clear, intuitive, and visually engaging way (For more information, see point 5.3.3 Biomimicry pipeline).

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5.5.3.1. Team card features

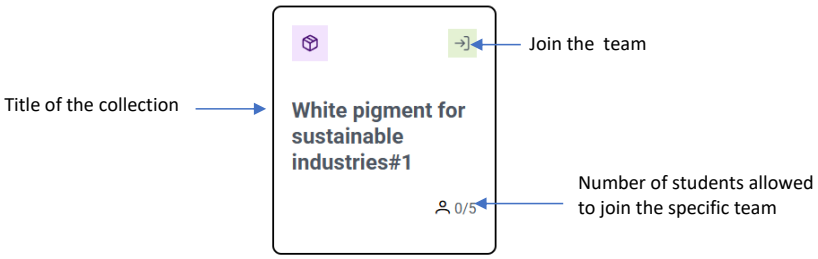

Figure 24. Team card in a class before joining the team

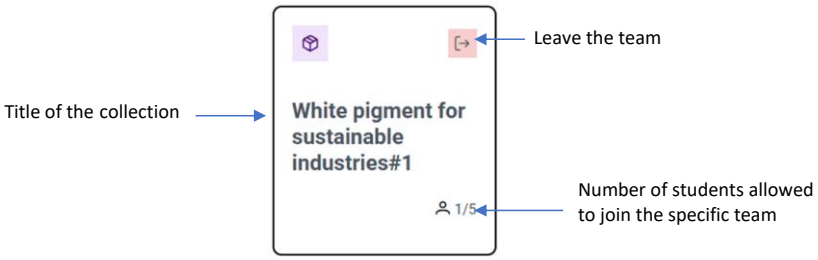

Figure 25. Team card in a class after joining the team

A **team card** represents a student group within that class. It serves as an entry point to access the collection of learning content and assessment content. When selected, it opens a detailed view of the selected collection tailored to the **biomimicry methodology**, allowing students to dive deeper into the team's innovation journey.

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

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- **Collection description:** A brief overview of the project or theme the team will explore.
- **Number of participants allowed to join the specific team:** Indicates how many students can join the team.
-  **Join the team:** A button to allow students to join a specific team within the class. **A student can only join one team.**
-  **Leave the team:** A button to allow students to leave the team.

5.5.3.2. 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 **colour-coded layout** enhances visual clarity and allows students to identify and navigate between steps quickly.
- The **step-by-step navigation** ensures a logical progression through the methodology, reducing confusion and supporting a structured learning experience.

5.6. Dashboard

The Student Dashboard is the central hub for each student's personal experience within the platform. It provides a comprehensive overview of their account,

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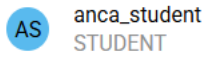
upcoming activities, and planning tools, all designed to support engagement, organization, and progress tracking.

Rather than having to search through different parts of the platform, students are greeted with a curated overview of their classes, progress, and upcoming events. This helps reduce cognitive load, allowing them to focus on what matters most.

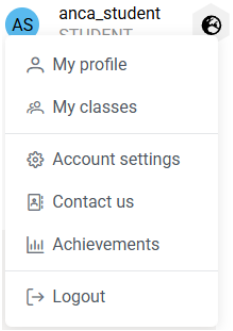
The Student Dashboard features are comprised in a drop-down list which can be activated when students click on the avatar icon. The drop-down list serves as a **personalised control panel**, ensuring that user-specific actions are always just one click away—whether the student wants to check their profile,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

How to access the student dashboard features?

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



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



5.6.1. My profile

The **My profile** feature provides a comprehensive overview of the student account. With the help of this feature, students can view and manage their

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personal information, activity calendar, and upcoming events. This is the central hub for tracking engagement and planning tasks.

The My profile page contains three sections:

1. Account Information section: Allows students to view their personal and account-related details, such as: username, first name, last name and role
2. Calendar for activity planning: Helps students manage their time, plan tasks, and stay on top of deadlines. Students can view the collections and resources planned for a specific day or plan other collections and resources.
3. Upcoming events (next 7 days): To provide a focused, short-term view of what's immediately ahead, helping students prioritize and have a clear overview of the upcoming activities.

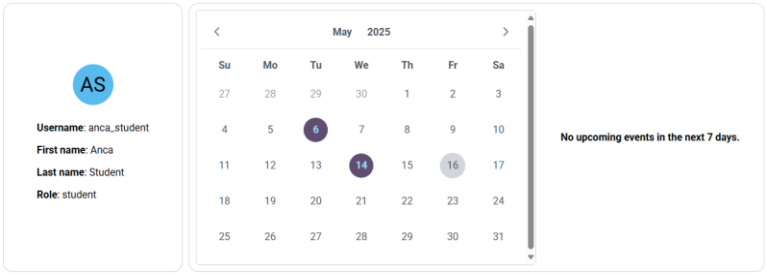

Figure 26. Student dashboard - My profile page

5.6.2. My classes

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

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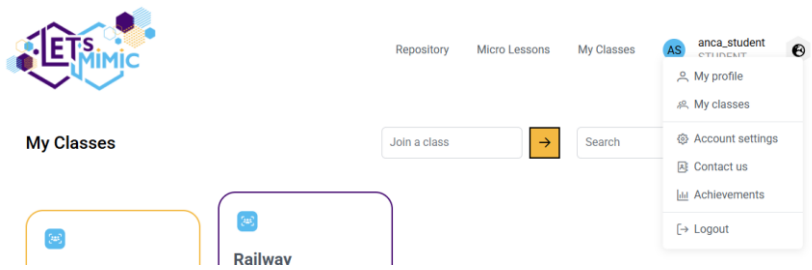

Figure 27. Student dashboard - Link to My classes page

5.6.3. 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 students can keep their profile details up to date and maintain account security with simple, intuitive controls.

5.6.4. Contact us

The **Contact us** feature in the list provides students 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.

5.6.5. Gamification modules - Achievements

The **gamification module** on the Let's Mimic platform serves as a powerful tool for students to foster a more engaging and motivating learning environment. By incorporating elements such as **experience points (XP)**, **progress bars**, and **unlockable rewards**, students can be encouraged to participate consistently.

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The module looks to:

- Motivate and recognize students for their active engagement and contributions on the platform.
- Encourage consistent use of platform features that enhance learning
- 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 the completion of tasks and achieving milestones within the platform activity.

In addition to tracking progress, the module features a rewards system that allows students to unlock various rewards upon reaching specific XP thresholds. These rewards serve as both recognition of effort and motivation to use the platform

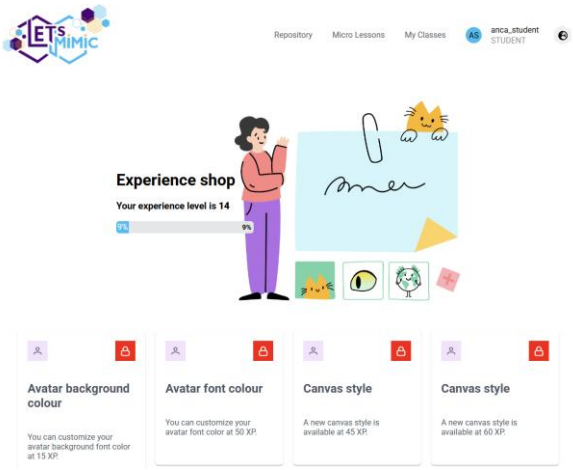

Figure 28. Student dashboard. Gamification module - Achievements page

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6. Conclusions

The Let's Mimic platform is designed to create interactive, engaging, and enjoyable learning experiences. This guide helps students understand how to use the platform confidently, from signing up and logging in to exploring exciting features such as the biomimicry pipeline, self-regulated learning, and gamified learning tools.

Whether students are just getting started or already familiar with the platform, this manual provides in-depth information, step by step, for everything. Students can find information on how to navigate the self-regulated learning content, access class materials, utilise interactive tools such as H5P and Canvas, and participate in team-based activities.

More than just a technical guide, this manual helps students understand how to use the platform to support their learning. It shows how their actions, like marking collections or resources as favourites, accessing tasks, and managing classes, if allowed by teachers, are designed to keep them motivated and involved.

Students can also discover how to personalise their experience through marking favourite features or dashboard settings, and how gamification features can make learning more rewarding. The platform encourages students to explore, experiment, and take charge of their learning journey.

In essence, this manual serves as a vital resource for both new and experienced users, providing clarity, structure, and support. It reflects the platform's mission to foster innovative, self-regulated learning environments where students are equipped with the tools and knowledge to have a personalized learning experience.

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