D4.1

Strategic Leadership in Green Business

ERASMUS-EDU-2024-CBHE-STRAND-2

LMS Platform

P. Code: **101179307**

Co-funded by the European Union

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Technical References

Project Information

SLGB was specifically designed to address regional needs, leveraging the opportunity to create a significant and sustainable impact in the region. The project involves collaboration and participation from multiple Latin American countries (Ecuador, Colombia, and Argentina) alongside three European countries (Spain, Sweden, and Finland) to develop a Strategic Leadership for Green Business program. The participating Latin American countries share similarities in terms of socio-economic and cultural contexts. The SLGB project aims to enhance specific knowledge and, consequently, the capacity of Latin American students to become effective leaders and entrepreneurs, tackling the challenging issues of sustainable prosperity in Latin America and the transition of productive sectors toward decarbonization, as part of the European Green Deal.

Project Code	101179307
Project Acronym	SLGB
Full Project Title	Strategic Leadership in Green Business
Call Identifier	ERASMUS-EDU-2024-CBHE
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Type of Action	ERASMUS-LS
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Deliverable Details

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Version History

Version	Date	Author	Partners	Description
1.0	28/02/2026	UNAD Colombia	UNAD Colombia	Platform LMS

Delivery Summary

This document details the development and implementation of the learning platform (LMS) for the SLGB project (Grant Agreement 101179307), corresponding to Work Package 4 (WP4), led by the UNAD. The platform constitutes the operational core for the deployment of the project's educational resources and the strengthening of the SLGB community. Designed under a blended learning approach and integrating gamification elements, this tool guarantees a robust, scalable learning environment aligned with European pedagogical standards for technical and professional education.

Keywords

E-learning platform, LMS, UNAD, SLGB, IT learning tools, gamification, blended learning, techno-pedagogical design, Virtual Private Server (VPS), Cloud, AWS, seed course, technical validation, educational interoperability, teacher training, open educational resources.

Disclamer and Legal Notice

1. General Description

The development of the SLGB e-learning platform, which operates at the following link: https://platform.greenleaderslatam.com/, was conceived as a structured technical and pedagogical process to ensure maximum effectiveness in content delivery. Under the direction of UNAD, and with the technical and pedagogical support of the project partners, an eight-phase roadmap was executed for its implementation:

1. **Comparative Analysis:** An exhaustive study of existing learning management systems (LMS) was conducted to identify the most viable options according to the project's needs.
2. **Technology Selection:** Two platform options were chosen: one structured and custom-made for the project, and a support and backup one under the well-known LMS Moodle. These are considered optimal alternatives for hosting the courses that are part of the SLGB project diploma. The first option was selected as it is necessary to have an option that adjusts to the project's own needs with a blended approach. The second option (Moodle) was chosen due to its flexibility and the tracking tools it provides; although it can be somewhat complex, it has been taken as a backup option for handling course information and activities.
3. **Server Infrastructure:** Two servers have been contracted to support the platform. One is a Virtual Private Server (VPS), where the backup version for the project has been hosted. The other is a general-type server with support to handle 180 potential simultaneous students on Amazon Web Services (AWS), which guarantees stability in the course offering and simultaneous access for users and teachers.
4. **System Configuration:** A Linux operating system, in its Ubuntu distribution, was installed on the VPS server to ensure a secure and fluid execution environment.
5. **Integration and Design:** The installation and configuration of the subdomain and visual interface were carried out, ensuring a graphic identity consistent with the project's main website**.**
6. **Techno-pedagogical Design:** Courses were structured in close alignment with the frameworks defined in the corresponding WPs, starting from the creation of a "seed course" that serves as the basis for the entire training offer.
7. **Piloting Phase:** This is an ongoing process in which fine-tuning is being carried out through a series of tests. The goal is to build upon the implementation of the course led by UNAD with CUC, which relates to the Design Thinking methodology (week 4) before the official launch.
8. **Preparation for SLGB Diploma Module Launch:** Once progress is made in the pilot tests, the different institutions will be supported in the implementation and design of the courses they are responsible for. The process will culminate with the offering of each course on the platform within the indicated timeframes.

9. **Evaluation and final reports:** Each module has one or several evaluative activities. Therefore, the development of the platform has planned for guidance in obtaining final grades per module and the generation of a report on student performance and their interaction with teachers and mentors.

2. Access Link to the SLGB Educational Platform

https://platform.greenleaderslatam.com/

Image 1. SLGB Course Platform Home Screen

3. Description of the SLGB Educational Platform

3.1. The VPS Server

The server for the Platform for the SLGB diploma, in its backup and performance testing version, was configured on a VPS (Virtual Private Server), which was contracted to support the storage of the diploma courses, as well as the domains and subdomains of the project's main website; the domain https://greenleaderslatam.com is hosted in this space. This server has the following characteristics:

- Operating System: Linux Ubuntu 24.04 LTS
- Real IP Direction: 167.88.46.224
- Hosted Domains: https://greenleaderslatam.com y https://platform.greenleaderslatam.com

- Server Location: United States – Boston
- Host Name: platform.slgb
- Number of Cores (CPU): 8
- Memory: 32GB
- Disk Space: 400GB

In image 2, the current performance of the server can be observed.

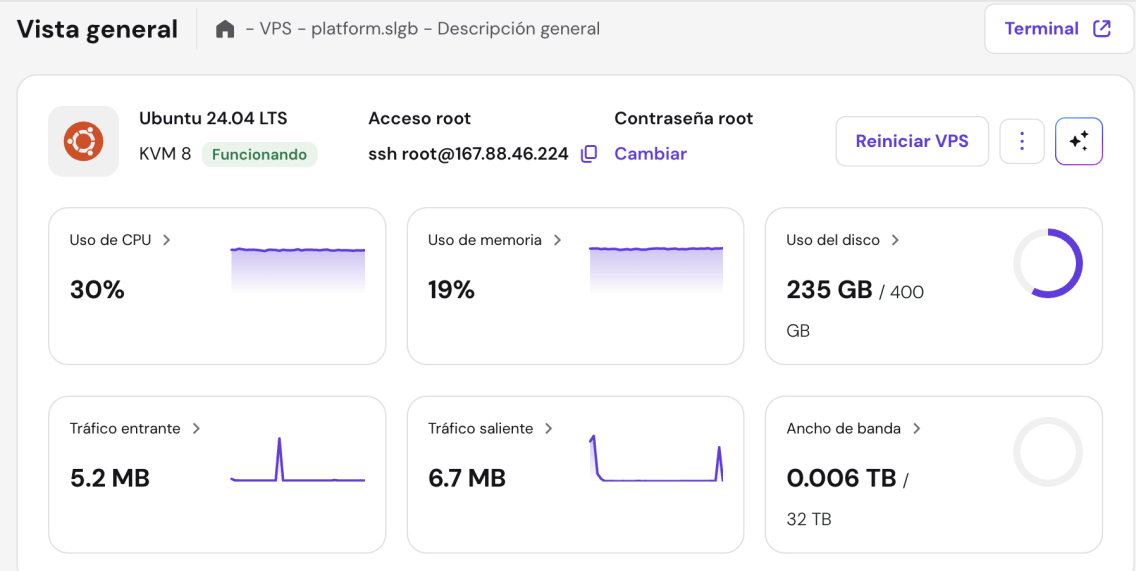

Image 2. Performance of the SLGB VPS Server

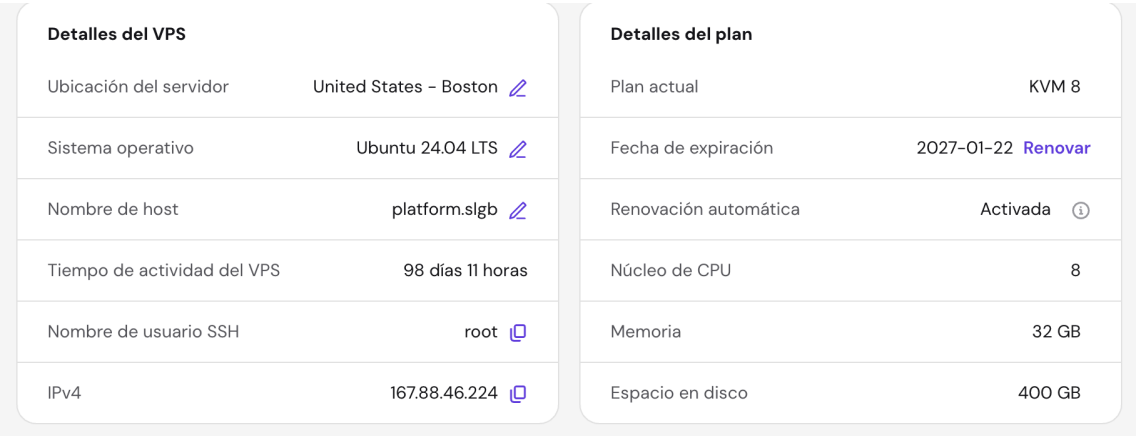

Image 3. VPS Server Characteristics - Platform

In image 4, the server's operation over the last few days can be observed, showing that there has been activity, mainly related to the testing and implementation of the courses.

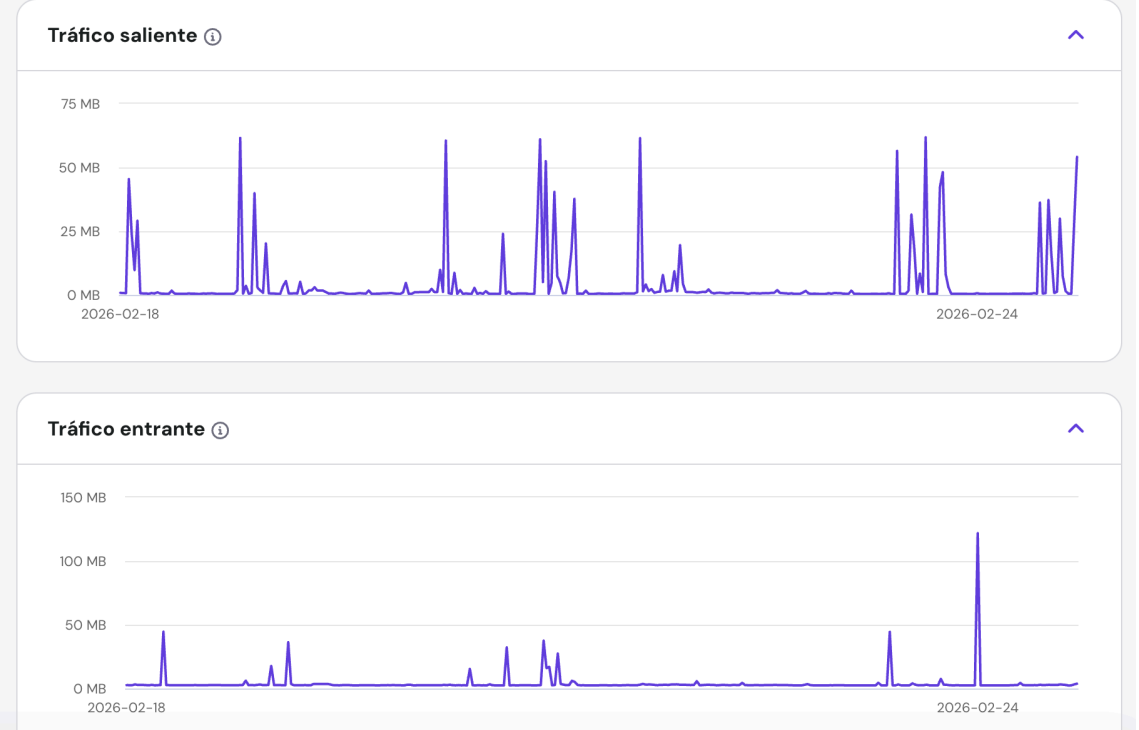

Image 4. Server behavior during the last week of February 2026

3.2. Moodle Installation

The first platform to be installed was the Moodle LMS, using version 4.2.4 (Build: 20231211), which was selected for the following advantages:

1. Instead of an endless list of files scrolling down, in this version students can see an organized grid.
2. An icon or image can be assigned to each module, which improves visual memory.
3. Each tile displays a percentage circle that fills up as students complete tasks.
4. Upon clicking, the module content unfolds smoothly without reloading the entire page, keeping the students' focus.
5. It is 100% responsive; on mobile phones, it appears as a very intuitive list of touch cards.

Image 5 shows the official Moodle logo and its help screen regarding version 4.2.

Image 5. Moodle 4.2 help screen

Regarding the installation of this platform on the server, the logical steps followed are listed below:

1. **Plugin Download:** This process was carried out from the official Moodle repository, located at: https://download.moodle.org/releases/latest, where the .zip file corresponding to version 4.2 was downloaded. (See image 6).

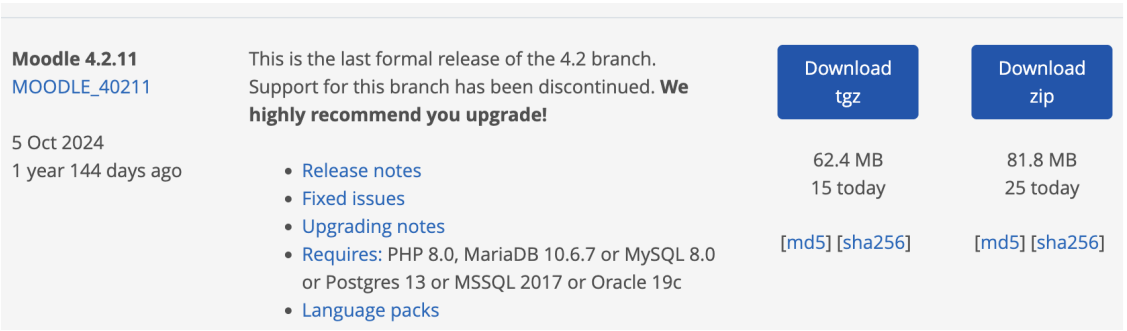

Image 6. Moodle download version screen

2. **Installation on the Server:** Before carrying out this step, it was necessary to verify compliance with the following characteristics or requirements:

- Having a Web Server (viable options: Apache, Nginx, Litespeed, or IIS); for the SLGB project's VPS, Nginx is being used.
- Having a Database Server engine (accepted options: PostgreSQL, MySQL, MariaDB, Aurora MySQL, or Microsoft SQL Server); for the VPS server, MariaDB was installed as the database engine during the Linux installation.
- Having the PHP language installed.

With the aforementioned requirements met, the configuration and fine-tuning were carried out to enable logging in as an administrator.

3. **Installation of Plugins required for the project:** After the Moodle version was installed on the server, it was accessed as an administrator and the following plugins were installed:

- **BigBlueButton:** For managing synchronous connections.
- **Book (Libro):** For content management.
- **H5P:** For the use of external applications for the development of Objects.
- **Workshop (Taller):** For managing workshop-type activities.
- **Edwiser:** For managing courses as cards.
- **Adaptable:** Appearance plugin.
- Others included by default in Moodle.

4. **Login appearance design and user creation:** After the plugins were installed, the next step was to configure the initial design of the site. This involved creating banners for the main page, inserting European Union logos, mentioning project partners, and providing a general description of the platform. One of the created images is shown below in Image 7:

Image 7. Example image for the platform's home screen

5. **Activation of common course features:** The next step was to configure the general parameters of the courses to be designed on the platform, which include, among other aspects, the following:

- **Course format:** Tiles and cards
- **Tile colors:** Green colors were selected
- **Show progress:** Yes, which will show the progress percentage per course
- **Courses by Topics**
- **Size of files to be uploaded**
- **Permitted roles:** Teacher, Student, and Designer

6. **Fine-tuning (Immersive Design):** Once the general configuration was completed, the personalized design of a "seed" or base course for all courses in the SLGB project diploma was initiated. This consisted of each of the proposed techno-pedagogical elements. This is explained in detail further on.

3.3. Platform Operation with Moodle:

The following is a step-by-step explanation of how to access the SLGB diploma platform:

1. Enter the site https://platform.greenleaderslatam.com/; the following screen will appear (see image 8).

Image 8. SLGB Platform login screen

2. On this first visit, if you scroll down, you will be able to see the courses contained in the platform that are currently published. For now, there are several versions of Design Thinking, which is the module managed by CUC and UNAD, as well as a test of Module 1. The site has not yet been officially launched, so this information is not yet public; see image 9.

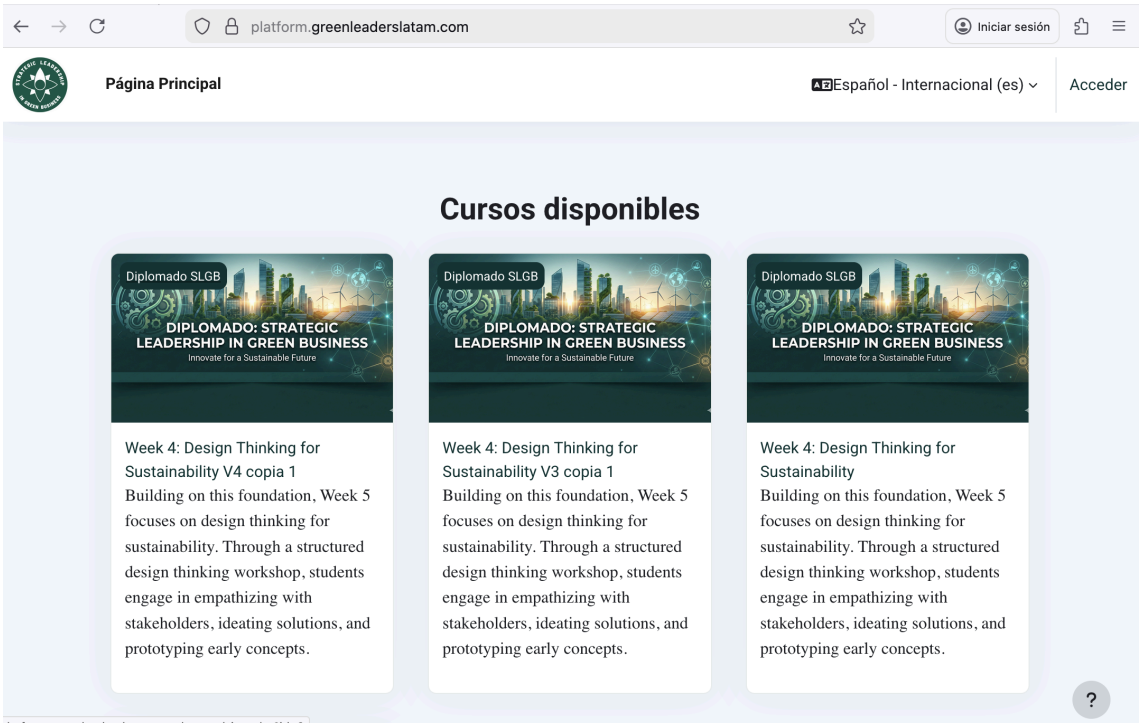

Image 9. SLGB Platform login screen – Available Courses

3. To access the courses area, you must go to the top right and select the "Login" (Acceder) option. In this same space, there is an option to change the platform language; the default is Spanish-International – (Es). See images 10 and 11.

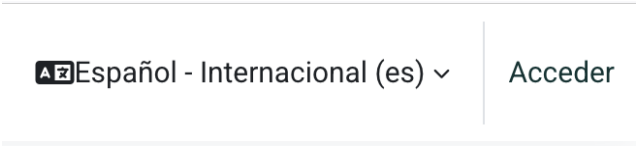

Image 10. Platform courses area access menu

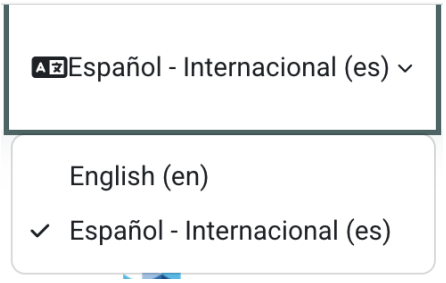

Image 11. Platform language change menu

4. Accessing the courses area: After clicking on "Login" (Acceder), image 12 appears, where you must enter your assigned username and password.

4.

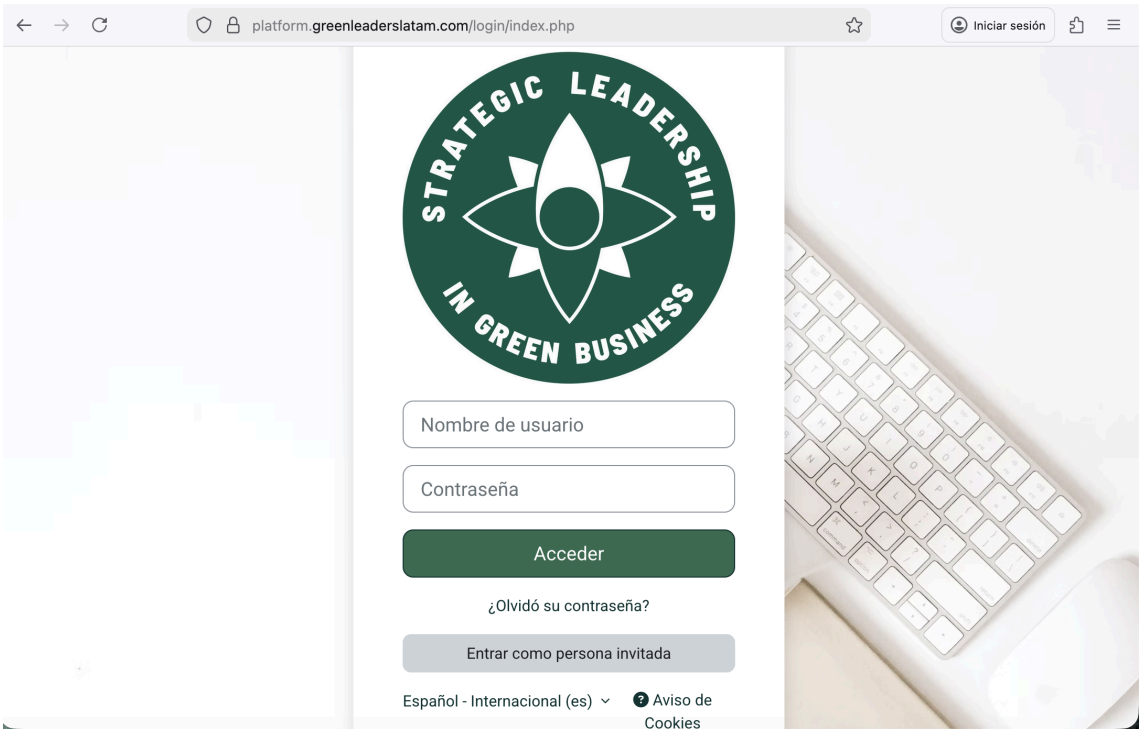

Image 12. Courses area login screen

5. Administrator area: When logging in as an administrator, image 13 appears, where you can work on the editing and design of courses.

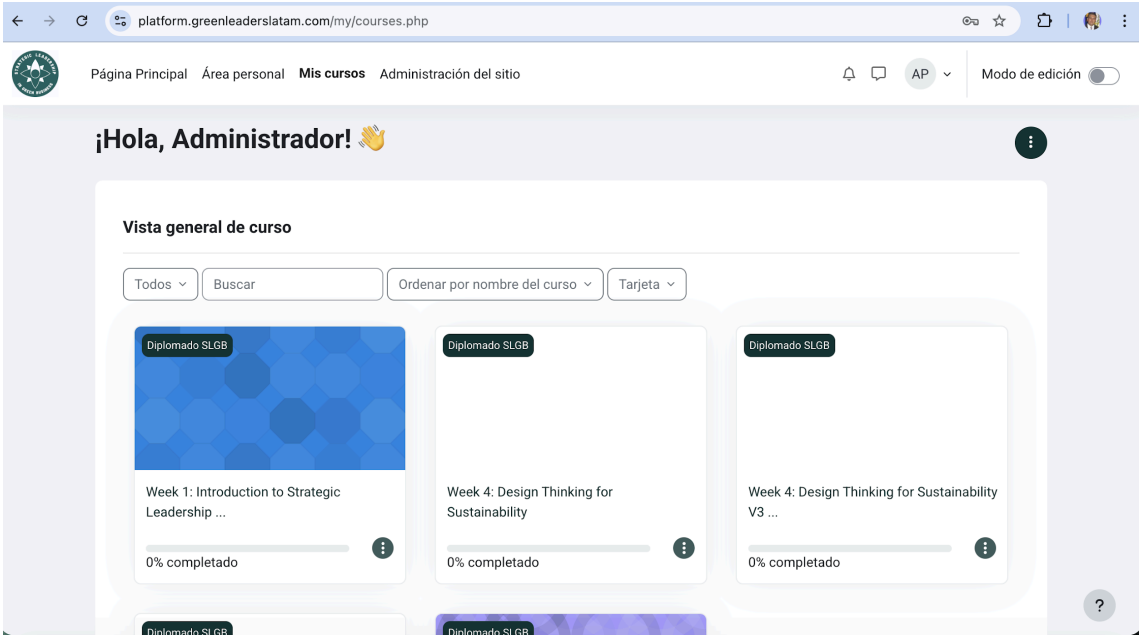

Image 13. Platform administrator area screen

In this area, the administrator can configure all aspects of the platform and the courses; in image 14, the available general menu can be observed.

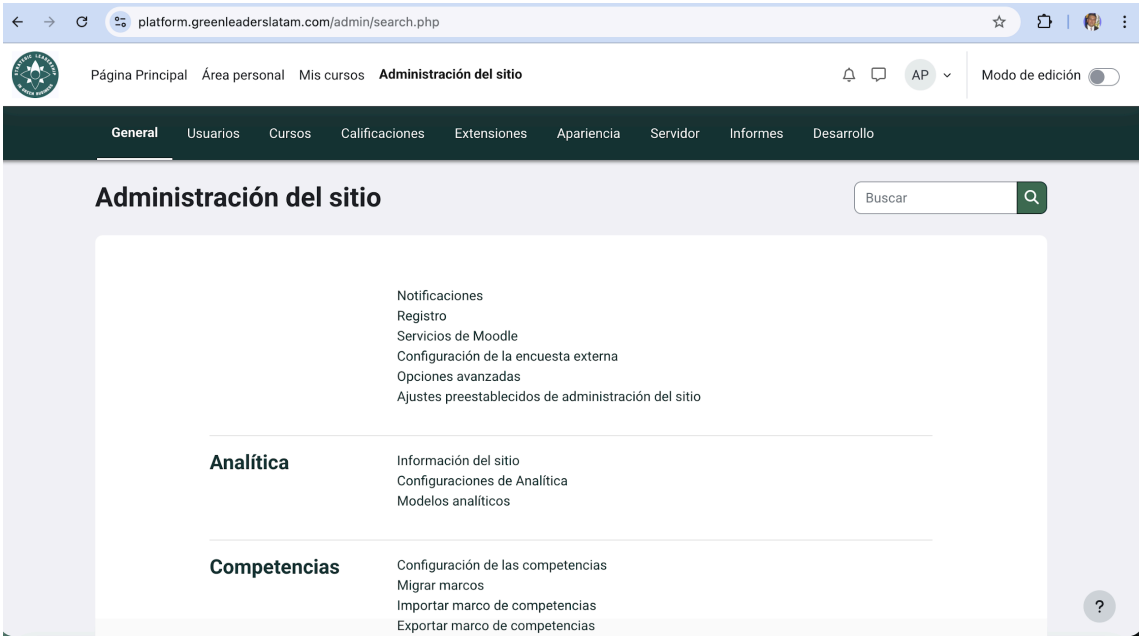

Image 14. Platform administrator menus and options screen

6. At the individual course level, the administrator can edit the design of all courses, add components, delete them, change options, and more. Everything is possible, and care must be taken with all the permissions managed by this Role on the platform. The course editing screens can be observed in images 15 and 16.

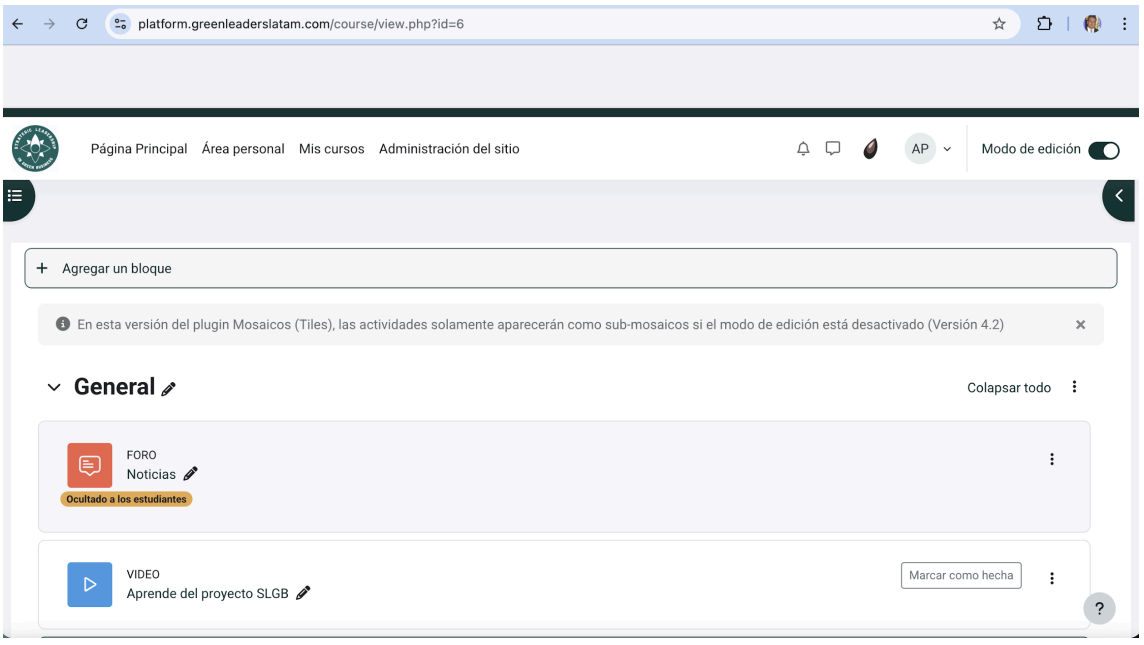

Image 15. Platform administrator course editing screen

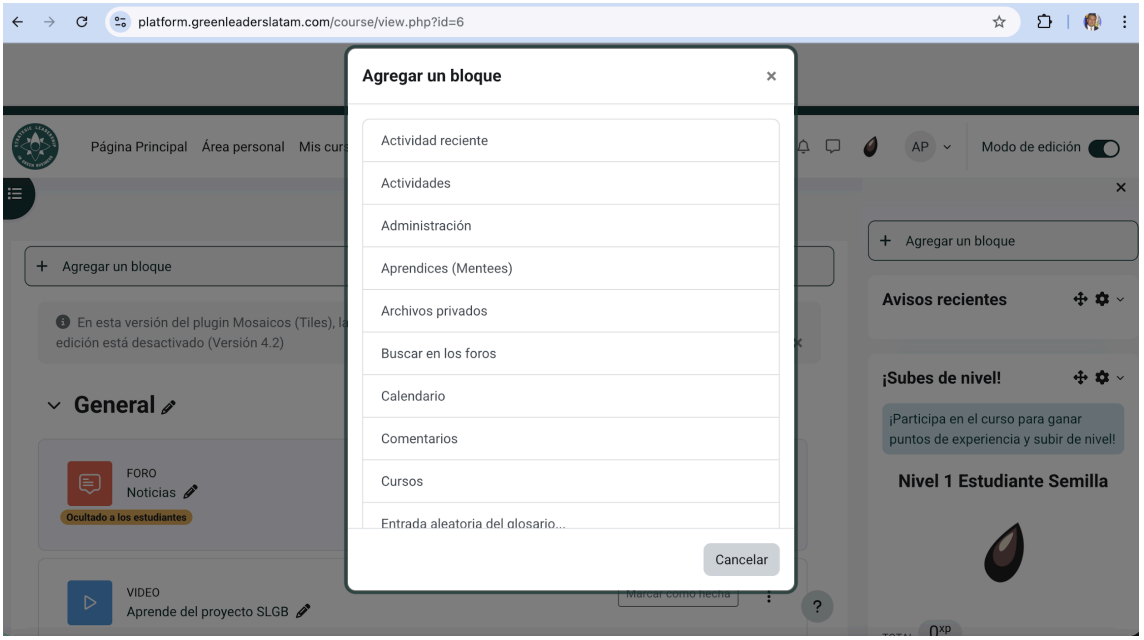

Image 16. Platform administrator course editing screen – new blocks

7. If logging in with the Teacher Role, one can have access to the same components as the administrator, with some limitations in editing, but it will be possible to update content and add activities. Examples of teacher access can be observed in images 17 and 18.

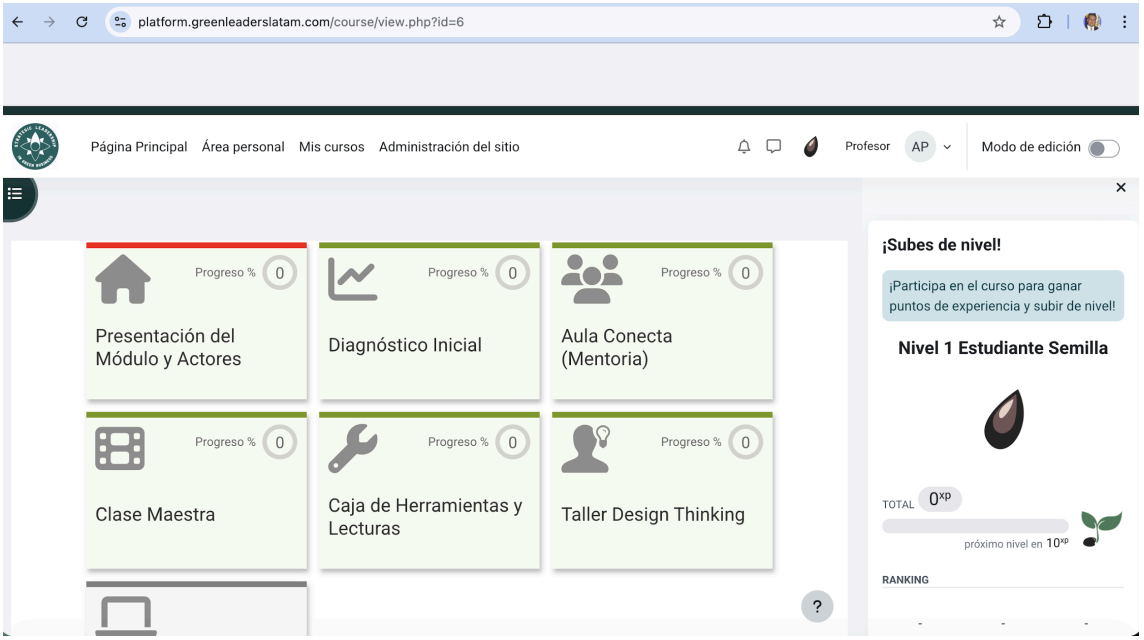

Image 17. Course editing screen as a teacher

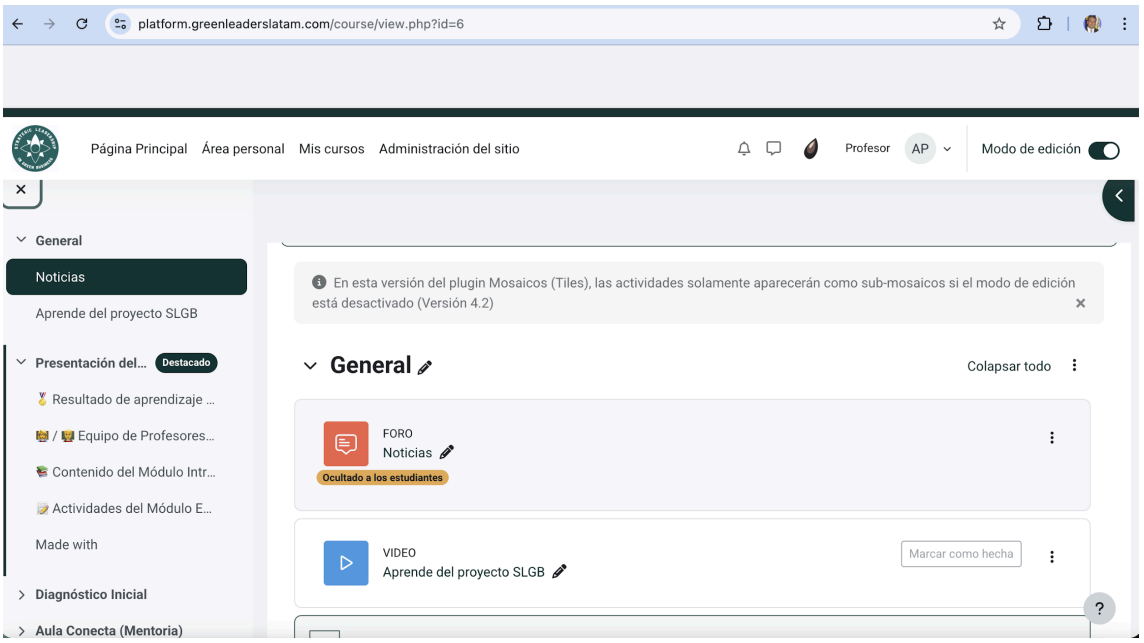

Image 18. Course editing screen as a teacher with editing mode active

8. In the Student role, access is only granted to the resources that the administrator or the teacher have prepared for the student. Images 19 and 20 show some examples of the interaction a student can have within a specific course. As can be observed in image 19, the design appears cleaner and with fewer options than the previously explained roles; that is, only the resources placed for the student are visible.

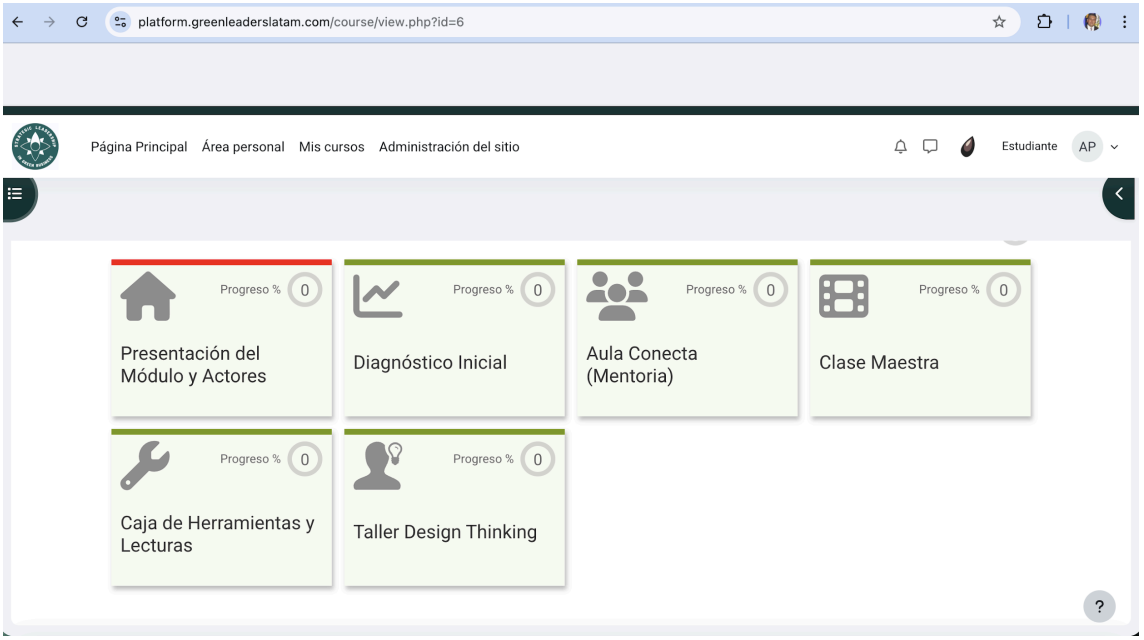

Image 19. Platform access screen as a student

Image 20. Platform access screen as a student – Components

3.4. Moodle Platform Base Course or Template:

Another action carried out in Moodle regarding the operation of the platform for the Diploma course proposed in the SLGB project, is the design of a template or Base Course. This contains all the components determined necessary for the courses to be offered to the students of the aforementioned diploma. In image 21, the access icon for the base template can be observed.

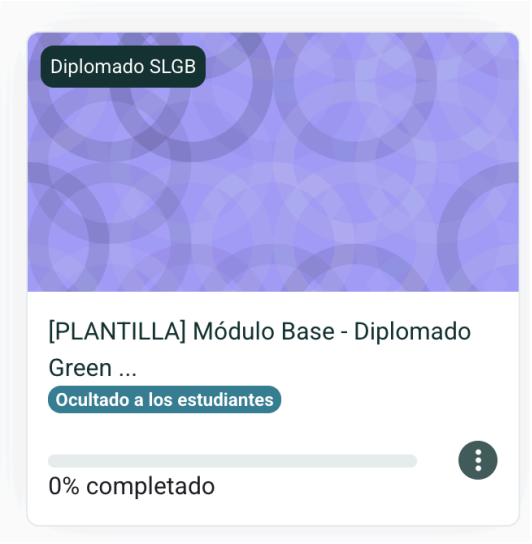

Image 21. Access icon for the SLGB Diploma course Base Template

The base course consists of the following elements, which have been validated by the WP teams in charge of these components:

- Module and Stakeholder Presentation
- Initial Diagnosis
- Connect Classroom (Mentoring)
- Masterclass
- Toolbox and Readings
- Module Workshop

In image 22, these components can be seen as they appear in the Design Thinking course.

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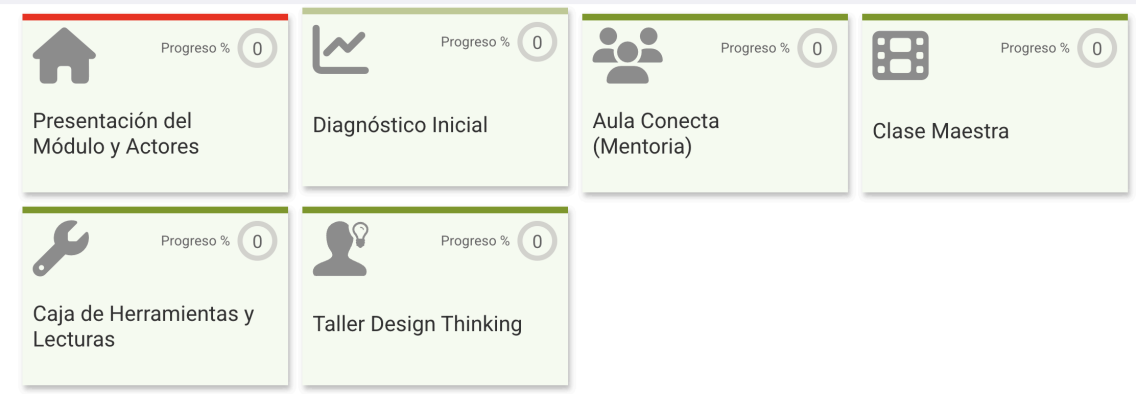

Image 22. Base module components menu

1. Module and Stakeholder Presentation contains the following information:Resultado de aprendizaje esperado
    a. Expected learning outcome
    b. Teaching team
    c. Module contents
    d. Module activities
    e. Presentation space

    Each of these activities is designed so that the student identifies what they are expected to achieve, who will help them achieve it, how much they need to study, the activities they must complete, and to initiate interaction with their peers. In image 23, these resources of the first component can be observed, starting with the learning outcome; image 24 shows the teachers, image 25 the proposed contents, image 26 the activities, and image 27 the presentation space.

Image 23. Learning outcome of the course presentation component

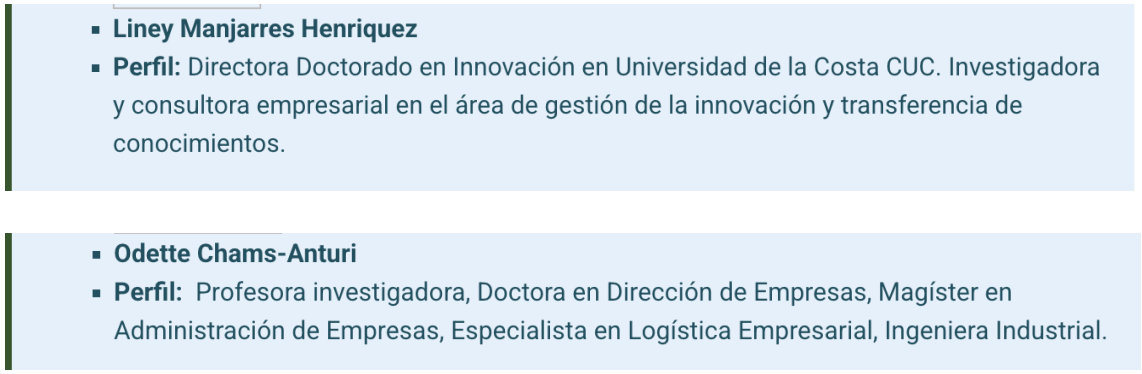

Image 24. Teachers of the course presentation component

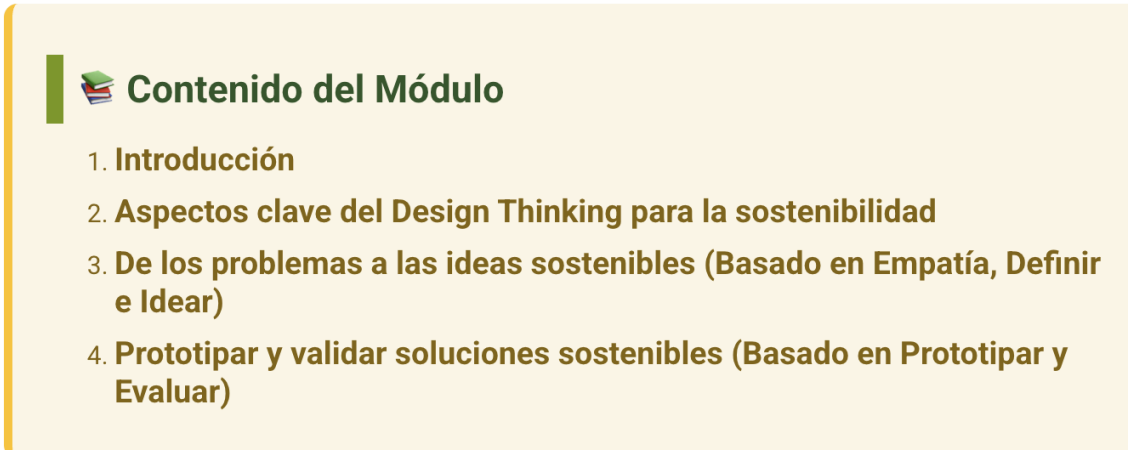

Image 25. Course contents of the course presentation component

📝 Actividades del Módulo

Este módulo se compone de las siguientes actividades:

Actividad	Descripción	Calificación
Cuestionario Inicial	Cuestionario diagnóstico de 5 preguntas sobre Design Thinking y sostenibilidad	Aprueba con 3 respuestas correctas
Diario reflexivo	Registro del aprendizaje, retroalimentación y progreso personal	Realizado / No realizado
Workshop	Sesión sincrónica introductoria de 2 horas sobre Design Thinking y uso de la plantilla de trabajo.	Asistencia / No asistencia
Entregable	Desarrollo y entrega de la plantilla de trabajo completa de Design Thinking aplicada a	Realizado / No

Image 26. Course activities of the course presentation component

Image 27. Presentation space of the course presentation component

2. The second component, as devised by the SLGB project research team, corresponds to the initial diagnosis component. This contains a questionnaire to identify the students' strengths. In image 28, the access icon can be observed, and in image 29, the method of application is shown..

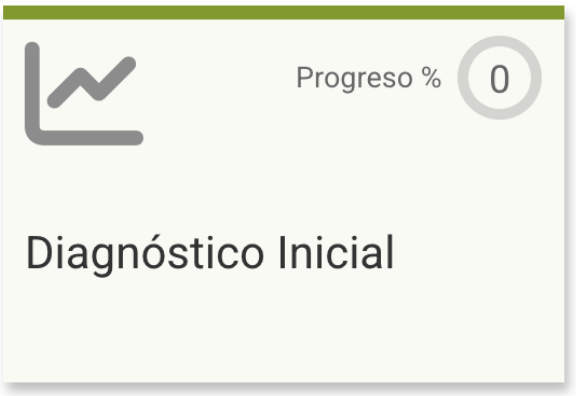

Image 28. Access icon for the course Initial Diagnosis component

Image 29. Sample question from the course Initial Diagnosis component

3. The third component of the template course corresponds to a resource called Aula Conecta (Mentoring), where the student will find a space for interaction with their teacher and can also maintain a reflective journal of what they have accomplished in the course during their studies. In image 30, the icon for this component can be seen, and in image 31, an example of its specific content is shown.

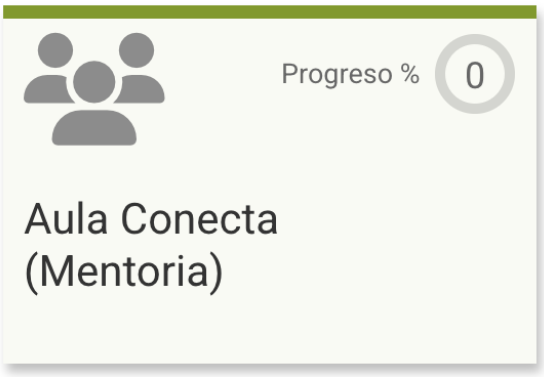

Image 30. Aula Conecta Component icon of the template course

Image 31. Aula Conecta Component content of the template course

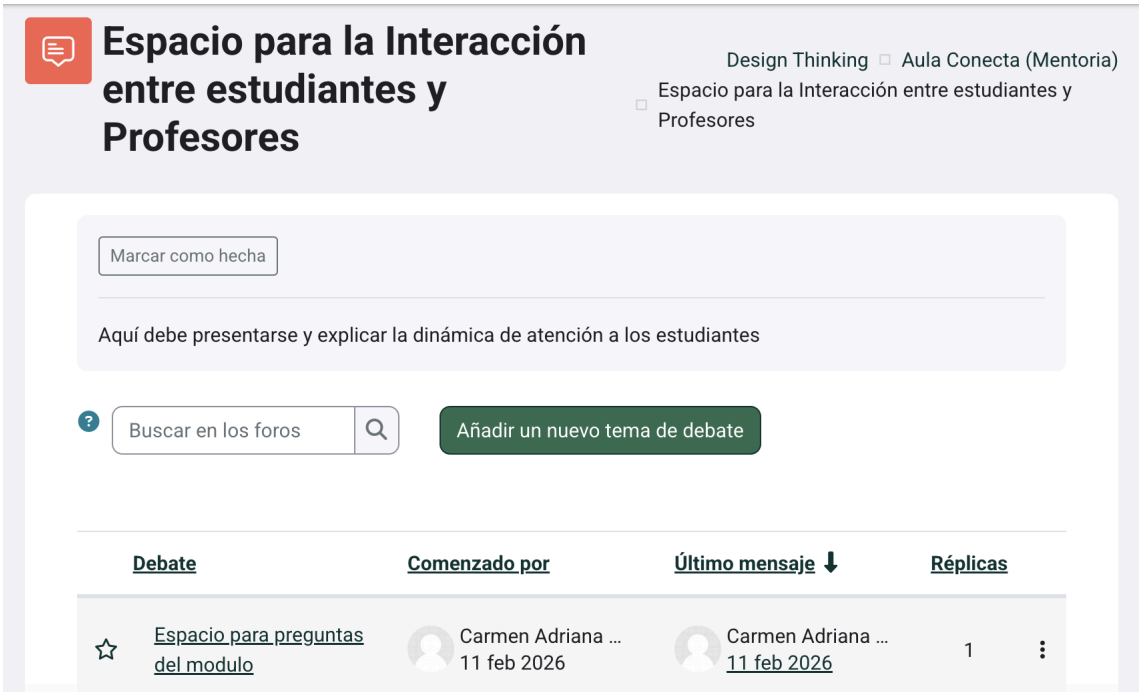

Image 32. Aula Conecta Component Forum of the template course

4. In component 4, you will find the resource named Masterclass, where the student will find at least one recorded video lesson explaining several relevant concepts of the course. In image 33, the access icon is shown, and in image 34, an example of this component's content can be seen.

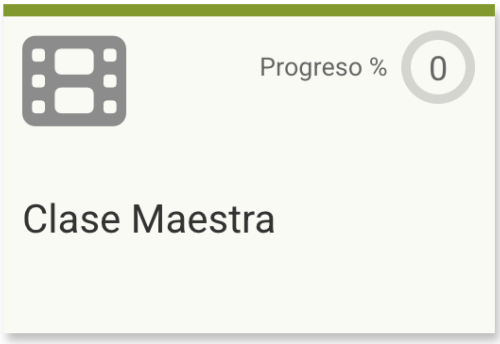

Image 33. Masterclass Component icon of the Template Course

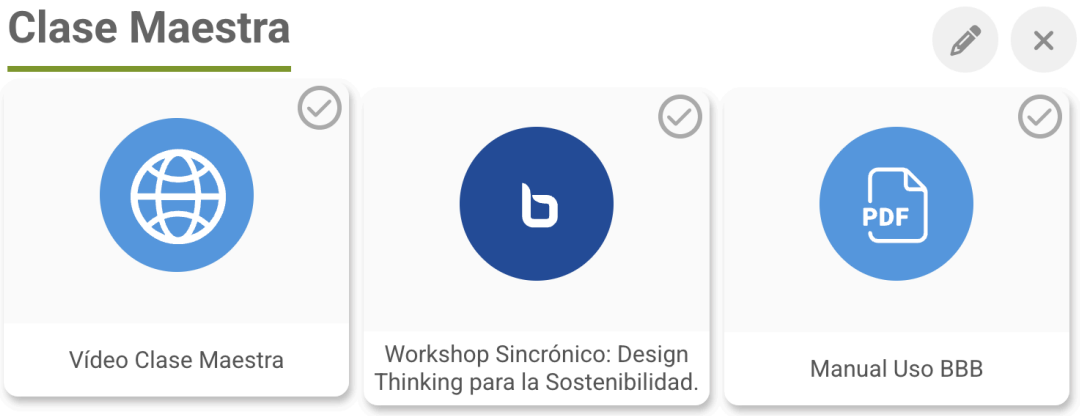

Image 34. Masterclass Component Content of the Template Course

5. In this component, you will find the suggested readings and tools that allow the student to better engage with the course; this component is called Toolbox and Readings. In image 35, the component icon can be observed, and in image 36, its content.

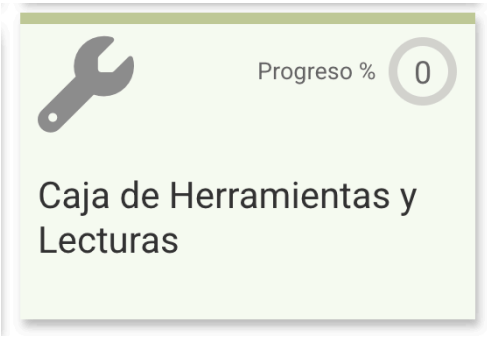

Image 35. Toolbox and Readings Component icon

Image 36. Toolbox and Readings Component content

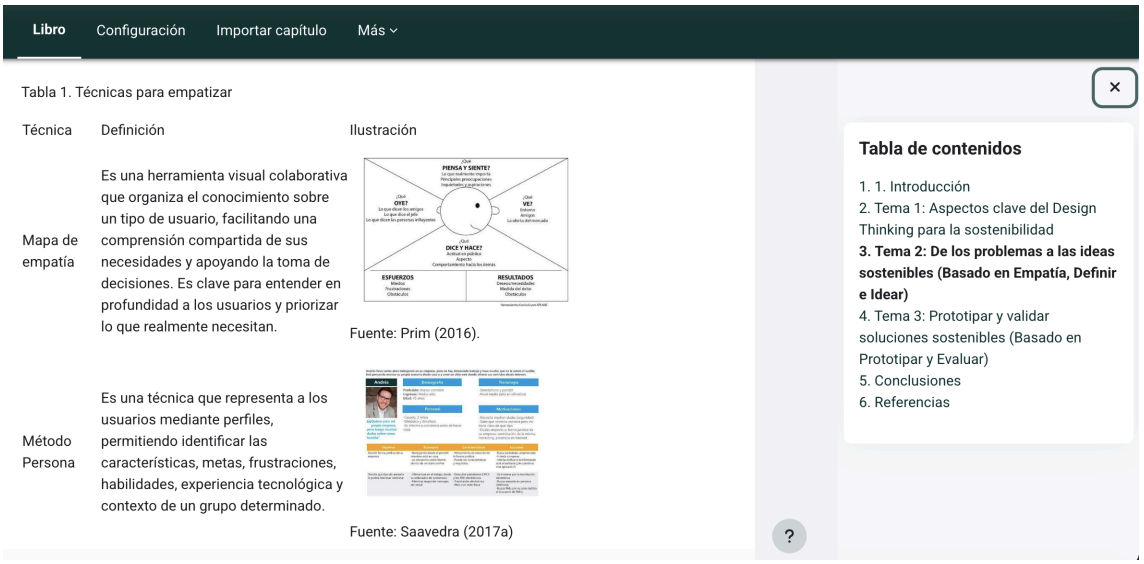

Image 37. Sample content of the Toolbox and Readings Component

6. This component is titled Course Workshop XXX, which, in the case of the example shown in this report, corresponds to the Design Thinking Course Workshop. It contains the evaluative activity that the student must complete as part of the established pedagogical proposal. In image 38, the access icon for the component can be observed, and in image 39, an example of the content of a potential workshop for a specific course is shown.

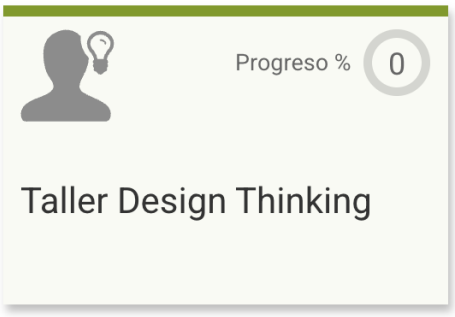

Image 38. Course Workshop Component icon

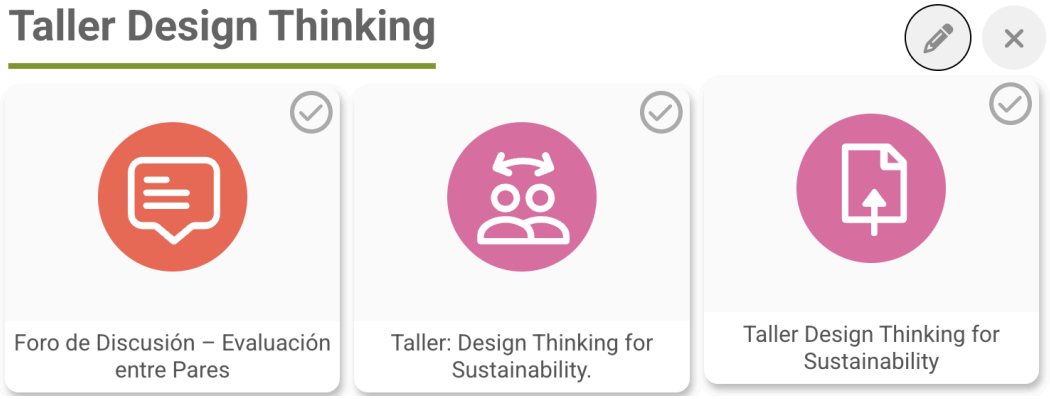

Image 39. Course Workshop Component elements

As can be observed in image 39, this component consists of three elements: one corresponding to the discussion forum, where the student will receive guidance on developing the evaluative activity; another for the workshop itself; and one more for uploading the resulting activity. In this regard, providing the student with permanent support and guidance is fundamental. In image 40, a sample workshop can be observed.

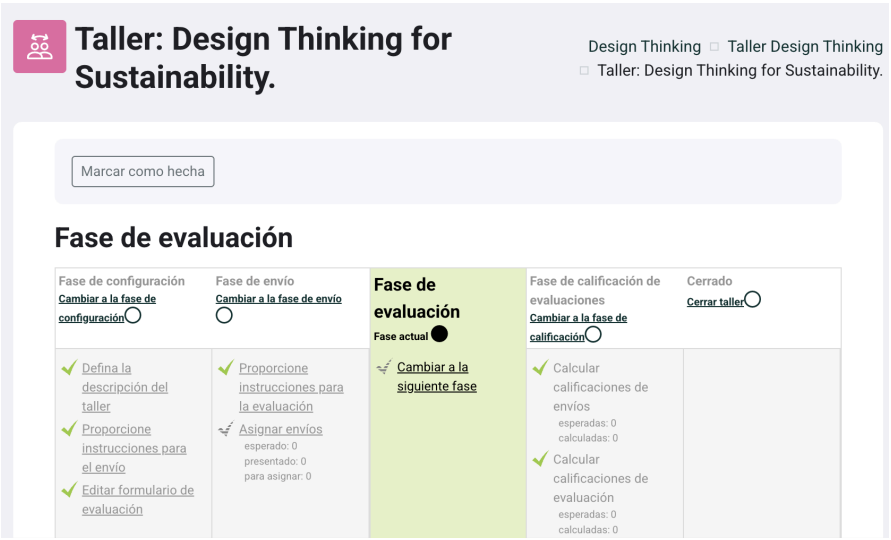

Image 40. Course Workshop Component example

7. The final component of the template course corresponds to the Support Teaching Resource, which will be personalized and adapted for the course. This tool will be designed around a specific course topic, and H5P will be used for its deployment on the platform. In image 41, the access icon can be observed.

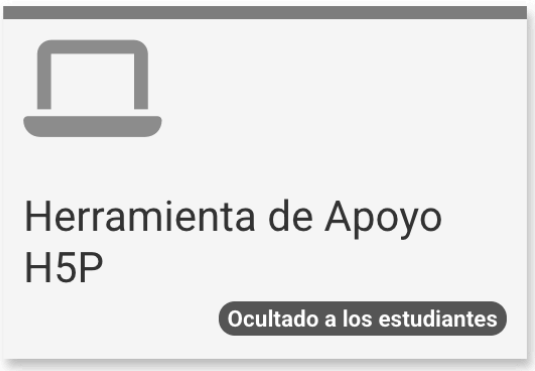

Image 41. Access Icon for the Course Support Tool Component

3.5. Base Courser or Template for the Platform's courses with proprietary software for SLGB Project:

As previously mentioned, this option has been developed from scratch, creating a template that supports all the courses to be offered in the proposed diploma program within the framework of the SLGB project. This platform runs on Node.js software and a MongoDB database; it is currently uploaded to a testing server until its official launch on the respective domain. For inquiries and access, you must go to: http://54.172.120.135:3000/. In image 42, the login screen can be seen.

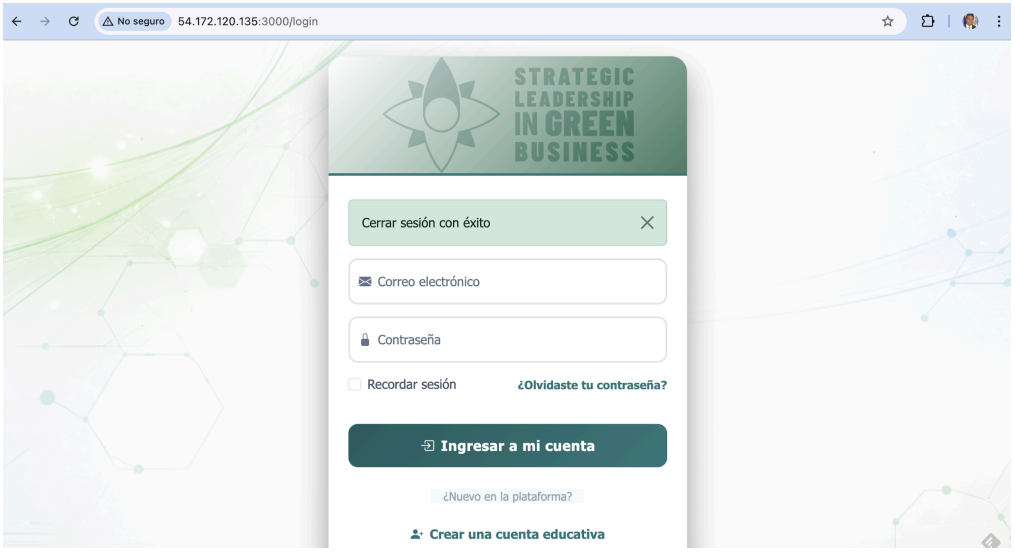

Image 42. Login screen of the platform developed for the project

Just like in Moodle, this platform features Administrator, Teacher, and Student roles; when logging in as an administrator, image 43 appears.

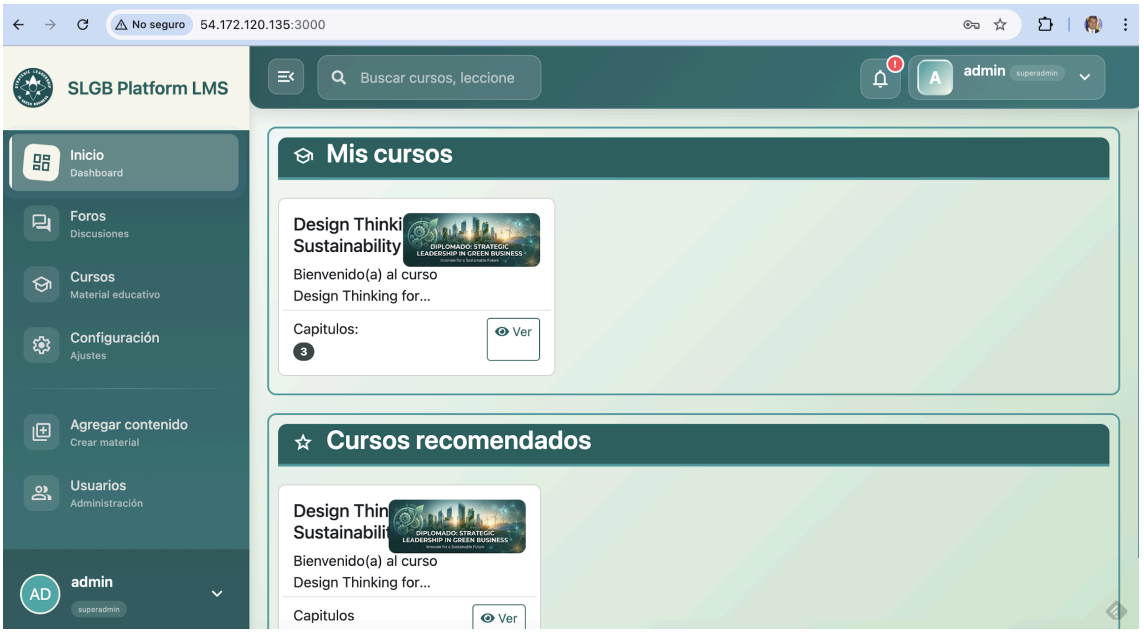

Image 43. Proprietary platform login screen as administrator

As can be observed in image 43, the options menu is located on the left side, from which the options for Forums, Courses, Settings, Add Content, and Users can be managed. In image 44, this menu can be seen individualy.

Image 44. Proprietary platform menu as administrator

If you go to "add content" and select a course, you will be able to design the course resources. In image 45, this option can be seen displayed for the Design Thinking course, which is the one that has been used as a work in progress.

Image 45. Course Editing on the proprietary platform as administrator

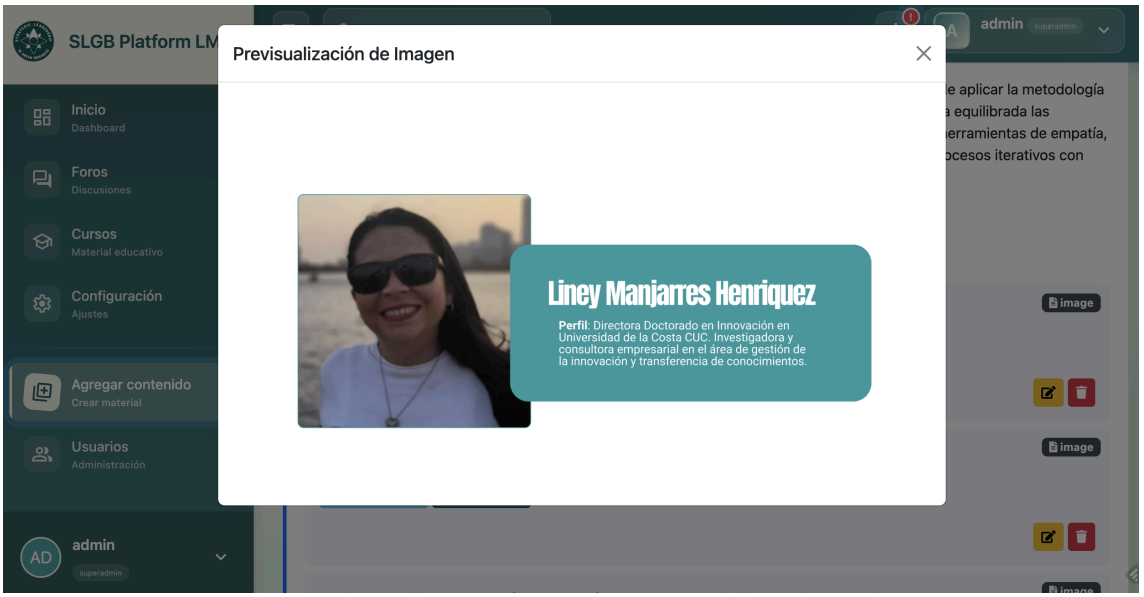

Image 46. Editing Course teachers on the proprietary platform as administrator

In this platform option, work has been progressing on a lighter design to support all the courses in the diploma program, using friendly and easy-to-implement Node.js tools to facilitate interaction for both teachers and students. Figure 47 shows the creation of a quiz-type activity.

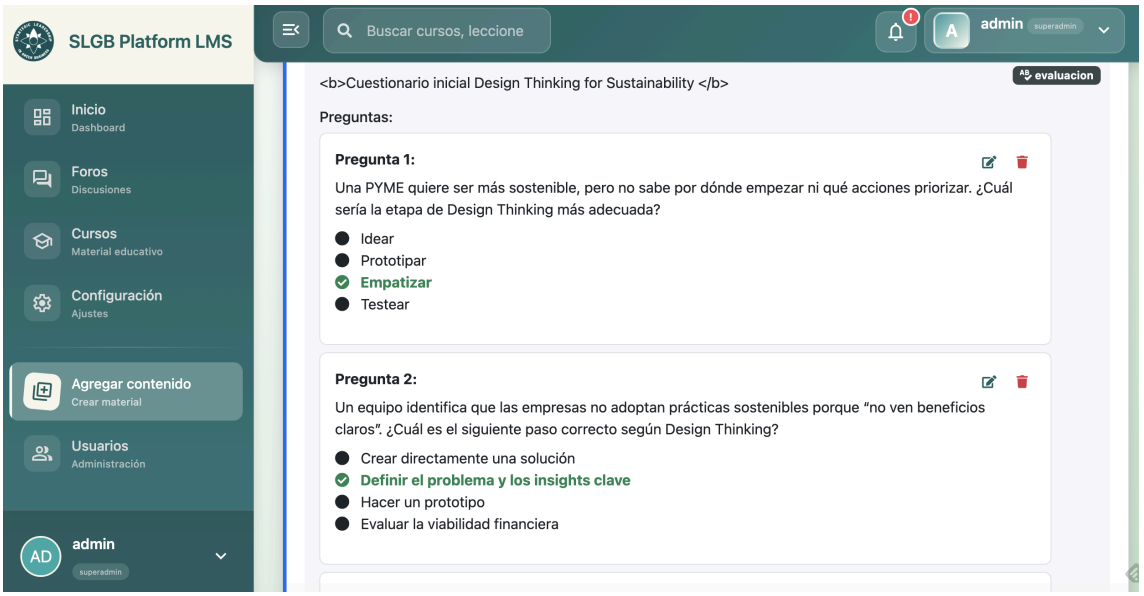

Image 47. Quiz for the Course on the proprietary platform as administrator

The intention behind a custom-built platform is to develop software that adapts to the SLGB project, rather than forcing the project to adapt to a platform. This development is still in its basic stages, but it is progressing to meet all expectations. In figure 48, an example of the interaction that students will experience when using it can be observed.

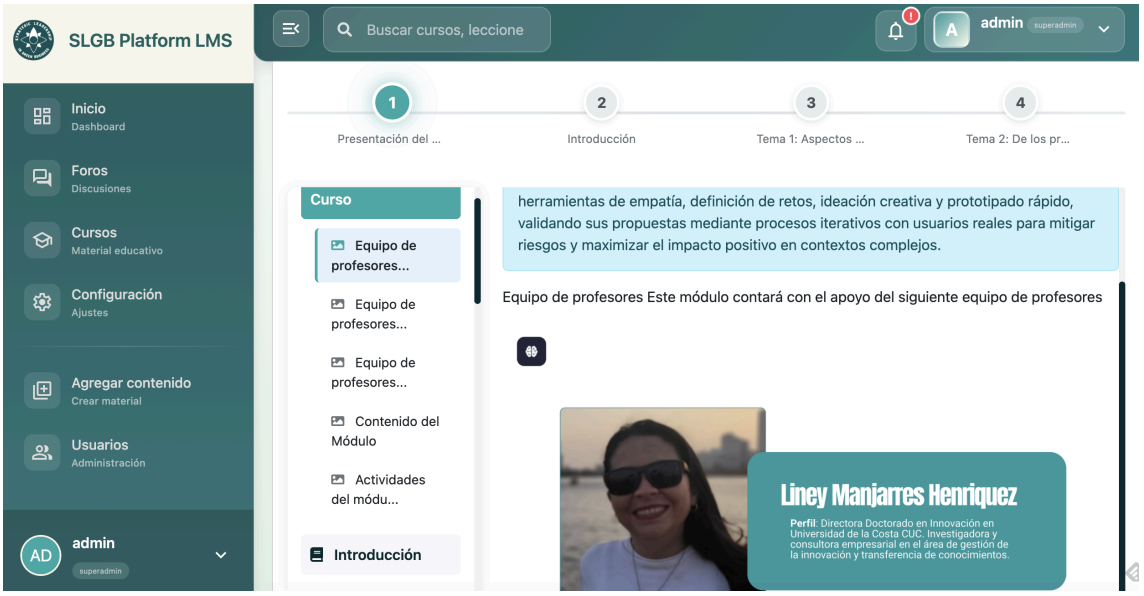

Image 48. Student interaction on the proprietary platform

4. Evolution and Growth of the LMS Platform

The LMS Platform is conceived as a dynamic and open process that will continuously evolve. Its development will take place progressively as the various courses are designed and integrated into the system, allowing for a constant update of its capabilities.

This incremental approach's main objective is to consolidate a robust and efficient platform. We aim for the virtual environment to be not just a content repository, but an integral tool that responds to the expectations and needs of both the students and the teachers supporting the process. With each new addition, the goal is to strengthen the commitment to the educational excellence proposed by the SLGB project and technological innovation linked to ecological sustainability.

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