Supporting Circular ecOnomy thRough Education (SCORE)

TECHNICAL SPECIFICATIONS

Table des matières

1. Context and definition of the project

The concept and implementation of a circular economy (CE) is now widespread across the arenas of business and policymaking in Europe and across the world. It represents one of the most viable solutions to converging environmental, social and economic crises and an alternative to the challenges brought about by 'take, make, waste' production and consumption systems.
Developing CE education and related initiatives can play a major role in achieving sustainable global change (Goncalves et al., 2012; Marouli, 2002) and empowering young people to take action.

The Erasmus+ SCORE project will make the opportunity of education for a circular economy available to schools in Europe and beyond. Envisaged as an open platform that provides tailored pedagogical contents, materials and e-learning tools for teachers and others, SCORE brings together expertise from universities, Fab Labs, schools and NGOs to cultivate the vision of a circular, sharing economy and cooperative society.

In line with the objectives of the EU's New Circular Economy Action Plan (2019) to achieve a more circular society as well as climate neutrality, SCORE aims to adapt and promote circular economy education for a 11-24 age group in order to invite sustainable behaviour changes amongst younger people and their communities.

2. Project objective

2.1. Learning objectives

6 key learning objectives were defined:

- **Enhancing teachers' skills towards circular economies**

  As a generic objective, it specifies the main target and topic of the training, respectively the teachers and circular economy topic.

- **Enabling teachers to design and implement challenge-based projects in their schools**

  A challenge-based approach is gaining more space and relevance in current educational practices. The objective for Score is to help teachers to organise transversal activities based on circular challenges that can foster empowerment and interest for students. This means to support them in identifying challenges, engaging their local ecosystem, structuring step-by-step learning paths for students that emphasise circular thinking and the adoption of circular principles on the way.

- **Learning how to reflect with human-centred design approaches**

  The Score training aims to overcome the gaps in current high school courses making more accessible more complex and human-centred design practices targeting not only material flow and lifecycle approaches but adding on sustainable behaviours.

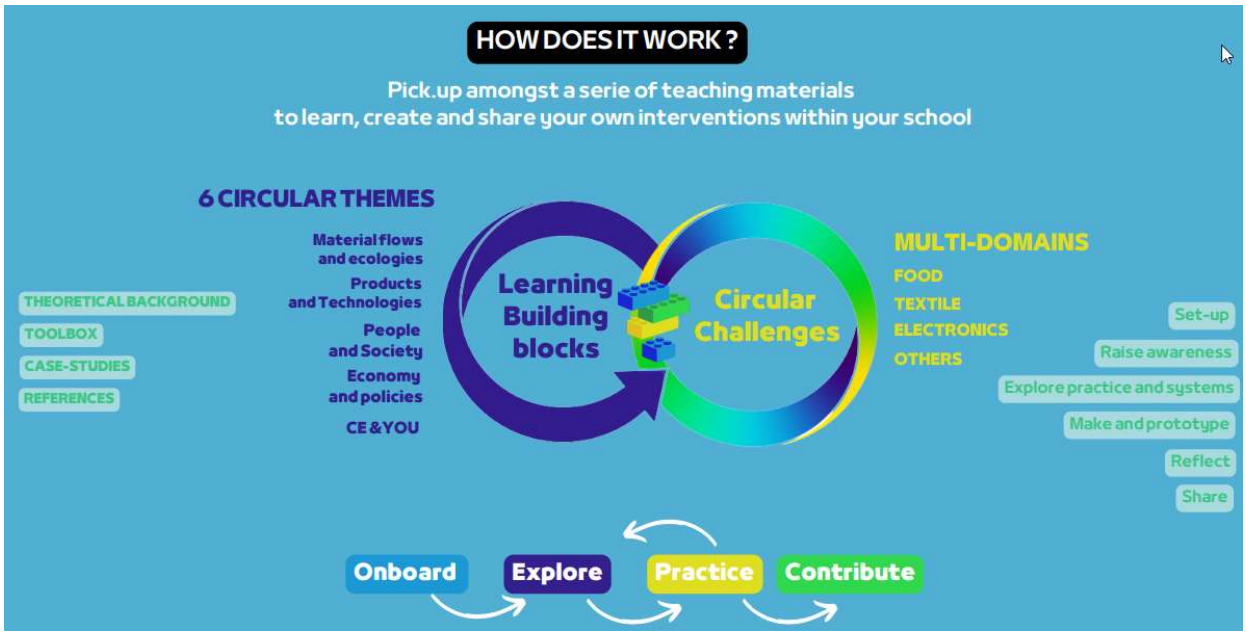
- **Fostering interaction and collaboration inside and outside the classroom**

  One of the objectives is to provide teachers with tools to engage with the current school policy and practice, the administration team and the high school students. Besides, collaboration with local associations, companies and other stakeholders is making more tangible knowledge about the circular economy, enhancing the immersion and engagement of participants.

- Supporting teachers in understanding and considering student eco-anxiety
- Empowering teachers and students through inspiring circular transitions pathways

2.2. Pedagogical approach

- **Circular Schools Challenges as a core pedagogical tool for boosting guided learning**
  A Circular School challenge consists of a real circular design challenge presented in a particular context that is being explored within the ecosystem of schools by teachers, students and other relevant stakeholders.



3. Perimeter

The Erasmus+ SCORE would allow:

- for all visitors: a free download of the contents available on the site already edited by the consortium
- for users: the uploading by users of their own contributions against the creation of an account

4. Functional description of needs

4.1. Users Area:

Requirements	N° req	SCREEN
SOCLE		
As a user, when I visit the website "SCORE", the header of the website is composed of: • Logo • About Circular Economy • Learning Blocks • Circular Challenges • Feedback and Contribute • Languages • Sign in of administrator	001	1
As a user, when I visit the website "SCORE", The website is available in 4 languages: • FR • EN • ES • LT	002	1
PACKAGE 1: About Circular Economy		
As a user, when I visit the "About Circular Economy" page, I have access to various valuable resources, including: • The definition of Circular Economy • A video explaining the concept of Circular Economy • 3 learning blocks related to Circular Economy • 3 circular challenges related to Circular Economy	101	2
PACKAGE 2: Learning Blocks		
As a user, when I visit the "Learning Blocks" page, I can view learning blocks published by the administrators. the display order of learning blocks is sorted by the date of publication by administrators.	201	3
As a user, when I visit the "Learning Blocks " page, I have the ability to search for specific Learning Blocks using different criteria: ➢ Themes, ➢ Format, ➢ Sectors. The Themes, Formats and Sectors are configured by the administrator	202	3

As a user, when I visit the "Learning Blocks" page, When I change the language, • The terms related to the themes or formats or domain change. • The learning blocks will be retrieved based on the selected language	203	3
Every card in the learning Block set is characterized by distinct and specific information: ● Titre ● short description ● duration ● Number of views ● Number of likes ● View	203	3
As a user, when I select a learning block, I am presented with the information set by the administrators: ● Title ● Picture ● Author of Institution ● Duration ● Number of views ● Number of likes ● Like button ● Facebook Share ● LinkedIn Share ● Twitter Share ● Long description ● Student's main objectives ● Links ● Files ● Step by step description	204	4
As a user, I can like / unlike a learning block As a user, I can share a learning block in facebook As a user, I can share a learning block in twitter As a user, I can share a learning block in linkedIn	205	4
PACKAGE 3: Circular Challenge		
As a user, when I visit the "Circular Challenge" page, I can view practices published by the administrators. the display order of learning blocks is sorted by the date of publication and administrators.	301	5
As a user, when I visit the " Circular Challenge " page, I have the ability to search for specific practices using different criteria:	302	5

➢ Sectors ➢ Circular strategies		
Every card in the circular challenge set is characterized by distinct and specific information: ● Titre ● short description ● duration ● Number of views ● Number of likes ● View	303	5
As a user, when I select a circular challenge, I am presented with the information set by the administrators: ● Title ● Picture ● Duration ● Number of views ● Number of likes ● Like button ● Facebook Share ● LinkedIn Share ● Twitter Share ● Long description ● The challenge ● Circular strategies ● The Main Goals ● References ● Links ● Files ● Grouping of learning block by category : ➢ Setup ➢ Raise awareness ➢ Explore practice and systems ➢ Make and prototype ➢ Reflect ➢ Share	304	6
PACKAGE 4: FEEDBACK AND CONTRIBUTE		

As a user, I have the ability to send feedback to the administrator, enabling me to contribute to the ongoing development of the platform.	401	7
As a user, I provide all the necessary information in the feedback form to send to administrators: ● Share : link to https://discord.com/invite/XXssXCxk ● Feedback ● Contribute ➢ Learning blocks ➢ Circular challenge	402	 8 9

4.2. Administrator Area:

PACKAGE 5: ADMINISTRATOR		
As an administrator, I connect for administration area with Login et password	501	10
For the first connexion, I complete my profil and initialize my password via a link send by SOCRE	502	10
As an administrator, when my connection is successful, the dashboard is displayed and contains: ● My profile ● Notifications ● Messaging ● Home ● About Circular Economy ● Learning blocks ● Circular challenge ● Institutions ● Tasks ● Feedback ● Team	503	11
As an administrator, I have the ability to view my profile at the top right corner of the dashboard page: Every profil is characterized by distinct and specific information: ● Account ➢ Picture ➢ Title ➢ Name ➢ Last Name ➢ Institution ➢ Email	504	12

		➢ Phone ➢ Country ➢ Address ➢ Language ➢ About ● Security		
As an administrator, I have the ability to update my password.			505	12
Home		As an administrator, I consult: ● Visitors Overview ● learning blocks ➢ Number by language (saved / published) ➢ Charts of views ➢ Charts of likes ➢ Most Viewed ➢ Most liked ● circular challenges ➢ Number by language (saved / published) ➢ Charts of views ➢ Charts of likes ➢ Most Viewed ➢ Most liked	506	13
About circular Economy		As an administrator, I have the ability to configure the page of About circular Economy for users.	507	14
Learning blocks	Content	As an administrator, when I consult page learning blocks > Content, I consult all learning blocks I have the ability to search for specific Learning Blocks using different criteria: ➢ Language ➢ Themes, ➢ Format, ➢ Keywords ➢ Sectors, ➢ Institutions	508	15
		Every card in Learning block set is defined by specific information ● Titre ● short description ● duration	509	15

			• Number of views • Number of likes • View		
			As an administrator, I can add a new building block • Title • Picture • Author of Institution • Duration • Number of views • Number of likes • Like button • Facebook Share • LinkedIn Share • Twitter Share • Long description • Student's main objectives • Links • Files	510	16
			As an administrator, I have the ability to • update • delete • duplicate the content of building block	511	17
	Setting	Sectors	As an administrator, I have the ability to introduce a new building block sector that encompasses multiple languages	512	18
			As an administrator, I have the ability to update or delete a building block Sectors	513	18
		Relevant For Which Themes	As an administrator, I have the ability to introduce a new building block format that encompasses multiple languages	514	19
			As an administrator, I have the ability to update a building block format	515	19
		Pedagogical Formats	As an administrator, I have the ability to introduce a new building block Pedagogical Formats that encompasses multiple languages	516	20
			As an administrator, I have the ability to update a building block Pedagogical Formats	517	20

		Keywords	As an administrator, I have the ability to introduce a new building block Keywords that encompasses multiple languages	518	21
			As an administrator, I have the ability to update a building block Keywords	519	21
Circular challenges	Content	As an administrator, when I consult page circular challenges > Content, I consult all Circular challenges I have the ability to search for specific Circular challenges using different criteria: ➢ Language ➢ Sectors, ➢ Keywords, ➢ Circular strategies		520	22
		Every card in Circular challenge set is defined by specific information Picture ● Titre ● short description ● duration ● Number of views ● Number of likes ● View		521	22
		As an administrator, I can add a new circular challenge: ● Title ● Picture ● Duration ● Number of views ● Number of likes ● Like button ● Facebook Share ● LinkedIn Share ● Twitter Share ● Long description ● The challenge ● Circular strategies ● The Main Goals ● References ● Links ● Files ● Grouping of learning block by category :		522	23

		➢ Setup ➢ Raise awareness ➢ Explore practice and systems ➢ Make and prototype ➢ Reflect ➢ Share			
		As an administrator, I have the ability to • update • delete • duplicate the content of circular challenge		525	24
	Setting	Sectors	As an administrator, I have the ability to introduce a new building block sector that encompasses multiple languages	526	25
			As an administrator, I have the ability to update or delete a circular challenge Sectors	527	25
		Circular strategies	As an administrator, I have the ability to introduce a new circular challenge Circular strategy that encompasses multiple languages	528	26
			As an administrator, I have the ability to update a building block Keywords	529	26
		Keywords	As an administrator, I have the ability to introduce a new circular challenge Circular strategy that encompasses multiple languages	530	27
			As an administrator, I have the ability to update a building block Keywords	531	27
Institutions		As administrator, I have the ability to add a new institution		532	28
Tasks		As administrator, I have the ability to view list of task by the team		533	29
Feedbacks		As an administrator, I have the capability to view feedback submitted by users		534	30
Teams		I have the ability to view list of team of project		535	31

5. Work Plan

The implementation of the project is defined in five (5) phases:

- Project initialization
- Design of the solution
- Development of the solution
- Testing the solution
- Deployment Solution for Users

5.2. Project initialization

This phase allows the project to be launched:

5.2.1. Communication Plan

- Define the URLs Target and logo of the solution, As our solution will be Web accessible via Internet or Intranet, it is necessary to validate the availability of URLs.
- Define the training plan: At the end of the work, it is necessary to arrange a training plan for all users.

5.2.2. Requests and Requirements

- Present the list of Functionalities requests in the specifications in section **4. Functional description of needs.**
- Define wording translation between different language in section Annexe 1 (wording)

5.2.3. Macro Planning

Macro planning makes it possible to define the phases and tasks to be carried out with their scheduling, their approximate duration, their allocation of resources and the necessary technical means, the different milestones (Gantt chart).

Project Phase	N°	Phase	From	To
Project initialization	1	Project initialization	01/06/2023	01/09/2023
Design of the solution	2.1	Technical architecture	01/06/2023	10/06/2023
	2.2	Portal Design	01/06/2023	30/06/2023
Development of the solution	3.1	Package A	01/06/2023	30/06/2023
	3.2	Package B	01/07/2023	30/07/2023
	3.3	Package C	01/08/2023	30/08/2023
	3.4	Package D	01/09/2023	30/10/2023
Testing of the solution	4	Testing	15/10/2023	30/10/2023
Deployment Solution for Users + formations of users	5	Validation of Solution	01/11/2023	31/10/2024

5.3. Design of the solution

5.3.1. Portal Design

- Define the interface zoning:
  - Define zones for the different types of pages: They are simply blocks that are prioritized according to their importance (information that the user wants to give first, the elements that allow him to continue browsing once at the bottom of the page, etc.).
  - It is also important to highlight the call-to-action of the page, according to the objectives of the page and the links allowing navigation. It is also at this moment that we lay the foundations of the responsive. Indeed, the contents must be adapted to all screen sizes
- Propose a prototype:

- This method consists of developing prototypes of the final portal interface either by a virtual prototype or by a prototype elaborated by our development team (Proof Of Concept).
- Define a Design for the implementation of the solution: example of a design project implemented by our team.

Our proposal allows to define a Design for the implementation of the solution detailed in Annex 2. This design is an example of a design project implemented by our team.

5.3.2. Technical architecture

- The 3-level architecture, also known as the three-layer architecture, is a client-server architecture in which are coexisting and maintained independent modules following the rendering of a user interface, logical, functional and business processes and access to data.
- The 3-level architecture presents quality criteria:
  - The flexibility to work on a project likely to evolve,
  - The portability to consider a dynamic change in the evolution needs within a company.
  - In addition, it is much more structured, it allows to have a clean and good code

Presentation Layer | Business Layer | Database access Layer

Our proposal allows to suggest to the 3 layers of this architecture:

- Presentation Layer: The solution must be compatible with the technical bases (Responsive application):
  - Web browser: Internet Explorer, Google Chrome, Firefox...
  - Smartphone and tablet mobility: hardware and OS versions Android, Apple...
- Business layer: The implementation of secure REST services accessible through the Presentation layer
- Database access layer:
  - The data storage layer in a database management system
  - Define the design of databases
  - The layers communicate with each other.

IPAG has chosen some technologies for every Layer:

Database access Layer	Business Layer	Presentation Layer
MY SQL	Nodes JS	Angular

The actions between layers:

1. AJAX Calls Node-API: the demand by action for solution

2. CRUD: repositories of solution
3. SERVICES: the result in repository injected to services
4. Json Objects: the result of demand of Action 1

The advantages of each technology:

- ❖ Presentation Layer:
  - Angular JS:
    - ➢ Smoother navigation for the visitor
    - ➢ Better dynamic content management
    - ➢ Extensible and modular platform
    - ➢ Benefits of languages: Robustness, ease of use and maintenance
    - ➢ Our team is expert in angular JS

- ❖ Business Layer:
  - Node JS
    - ➢ Single-page JavaScript App
    - ➢ Event-Driven, single-threaded
    - ➢ ORM-centered API development
    - ➢ Self-do cumenting API
    - ➢ Wrap external services
    - ➢ Exposed wrapped services in REST
  - JUNIT
    - ➢ Open-source framework for the development and execution of automated unit tests.
    - ➢ The test unit is a dedicated Java class that groups test cases that perform the following tasks:
      - o create an instance of the class and any other object needed for testing.
      - o call of the method to be tested with the parameters of the test case.
      - o comparison of the expected result with the result obtained: in case of failure, an exception is thrown.
    - ➢ Our tester and team are experts in JUNIT

- ❖ Business Layer:
  - MySQL
    - ➢ Popular SQL Database
    - ➢ Wrapped with loopback ORM

5.4. Development of the solution

5.4.1. Methodology of development

Our methodology of development and acceptance will be Scrum. It is the most adopted agile methodology for implementing web-based solutions and offering different benefits such as customer satisfaction in priority, accepting of change requests, and delivering operational versions of the application to the customer as often as possible.

The working process of this metrology is based on the decomposition of the development phase into several sprints. Each sprint takes one month, during which the development team implements and tests the planned features. A test and acceptance phase will be carried out by our team after the end of each sprint.

5.4.2. Tools of development

Tools	Version
GITLAB	16
GITLAB RUNNER	2
DOCKER	2
Template Fuze	17
Angular	16
NodesJS	15
MYSQL	2019

5.4.3. Tools of deployment

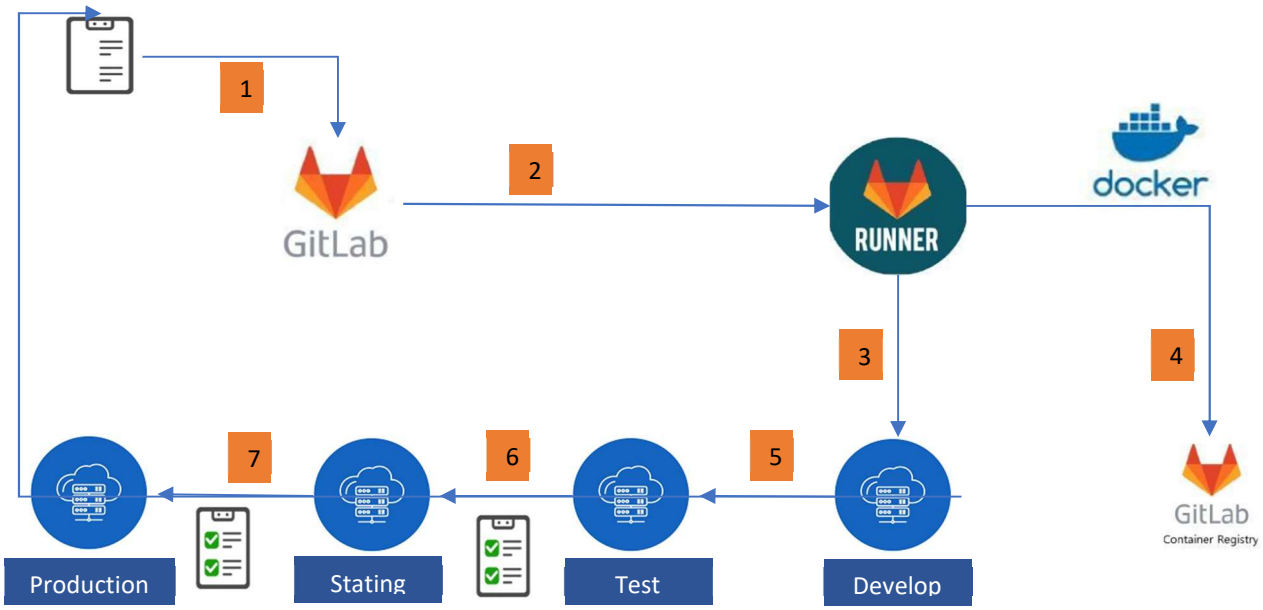
Today, continuous integration is commonplace and its effectiveness is well established. It is a prerequisite for to modernize development practices.

Automation of integration deployments is becoming more prevalent, adding visibility to developers for their achievements.

Once the chain of development up to the qualification mastered, it remains only one step to reach the continuous deployment in production. Only a handful of actors have taken the leap, by the nature of their activity (Google, Twitter, Amazon, etc.).

It is here that change is perceived as the most important, as the human impact is great. Noticeable organizational brakes remain (respect for standards, reluctance, communication during production), and the benefit is not obvious for everyone.

Our deployment model:



The tools of Delivry

- Gitlab:
  - GitLab is free software. It's a bug tracking system, continuous integration and continuous delivery.
  - The GitLab application offers features that automate the entire DevOps lifecycle from planning to creation, construction, verification, security testing, deployment and monitoring,
  - It offers high availability and replication, as well as scalability and availability for storage in site or cloud.
- Gitlab Runner
  - GitLab Runner is the open-source project that is used to run the jobs and send the results back to GitLab.
  - It is used in conjunction with GitLab CI, the open-source continuous integration service included with GitLab that coordinates the jobs.
- GitLab Container Registry:
  - GitLab Container Registry is a secure and private registry for Docker images. Built on open-source software, GitLab Container Registry is not just a standalone registry; it's completely integrated with GitLab.
  - It allows the user to create a pipeline in GitLab, by visualizing its conversions, tests, deployments and any other stage of its software life cycle
- Docker
  - Docker is free open-source software that automates application deployment.
  - It is a container virtualization platform that allows to design, test and deploy the applications quickly.
  - With Docker, it is easy to deploy and scale applications in any environment by ensuring automatic code execution.

The process of delivery:

1. The developer develops the functionality requested in Backlog.
2. With each push of code from the developer, the Gitlab runner packages the push content into the development server of the development team.
3. After each Run, the functionalities developed by the development team will be deployed on the development server so that they can be used by other developers.
4. A backup of the implemented developments will be stored in the Gitlab register in order to have versions of the solution in the form of a docker.
5. At the end of each sprint completed by our development team, the sprint content will be deployed in the test environment for testing by our test team

6. After validation of our test team of requested developments, the package will be deployed in the staging environment
7. After validation of the SOCRE TEAM of developments deployed on the staging environment, the solution will be deployed in the production environment

5.5. Testing of the solution

During this phase, the client engages a test performer to ensure that the solution complies with the specifications. This process typically involves formulating a testing strategy and creating test cases to evaluate the functionality and performance of the solution. The formulation phase focuses on defining the scope of testing, identifying the necessary resources, and establishing the criteria for determining the success of the tests.

The following steps are typically involved in the formulation phase:

- **Test Strategy:** The test performer collaborates with the client to develop a comprehensive test strategy. This includes defining the objectives of testing, determining the testing approach (such as manual testing, automated testing, or a combination), and establishing the test environment.

- **Test Design**: In this step, the test performer creates test cases based on the specifications provided by the client. Test cases are formulated to cover various functional requirements and scenarios, ensuring thorough testing of the solution. The test design phase also includes identifying test data, test environment setup, and any necessary test tools or frameworks.

- **Test Execution**: Once the test cases are formulated, the test performer executes them against the solution. This involves running the tests, recording the outcomes, and reporting any issues or defects found during testing. Test execution may involve manual testing or automated testing, depending on the chosen approach.

- **Test Evaluation**: The test performer analyzes the results of the test execution and compares them with the expected outcomes specified in the requirements. Any discrepancies or issues are documented as defects and reported to the client for further action. The test evaluation phase helps ensure that the solution meets the specified requirements and is functioning as expected.

By engaging a test performer during this formulation phase, the client can ensure that the solution is thoroughly tested and validated before its deployment. This helps identify and address any issues or deviations from the specifications, ultimately improving the overall quality and reliability of the solution.

5.6. Deployment Solution for Users

After validation of the recipe phase, the solution was deployed to users.

5.7. Hosting of the solution

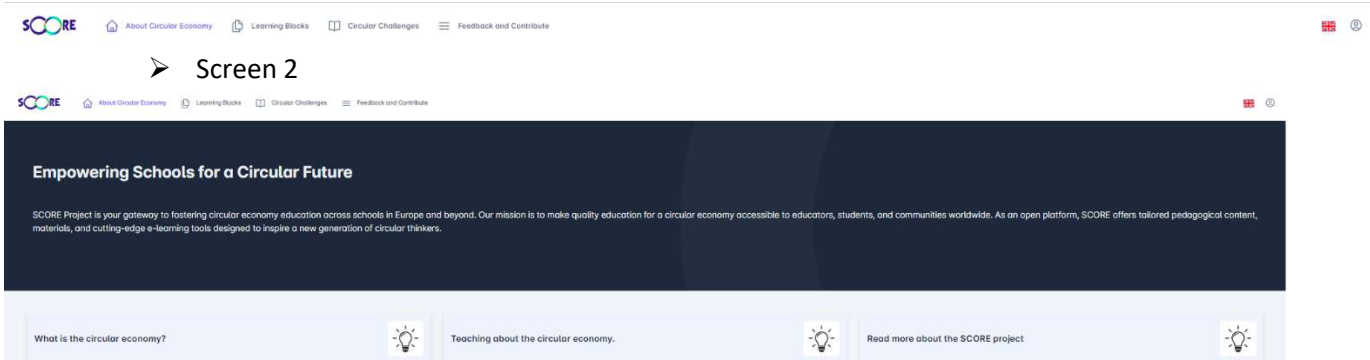
The solution is hosted on OVH servers

Configuration	**Hypervisor :** PROXMOX **Distribution: UBUNTU** **CPU Intel Core i7-7700K - 4c/8t - 4.2 GHz/4.5 GHz** **RAM 32 Go ECC 2133 MHz** **Disks de données 2×450 Go SSD NVMe Soft RAID**		
VM	**Platform**	**IP**	**URL**
	Staging	5.39.17.241:3306	https://staging-plateform.projectscore.eu/
	Production	178.33.108.29	https://plateform.projectscore.eu/

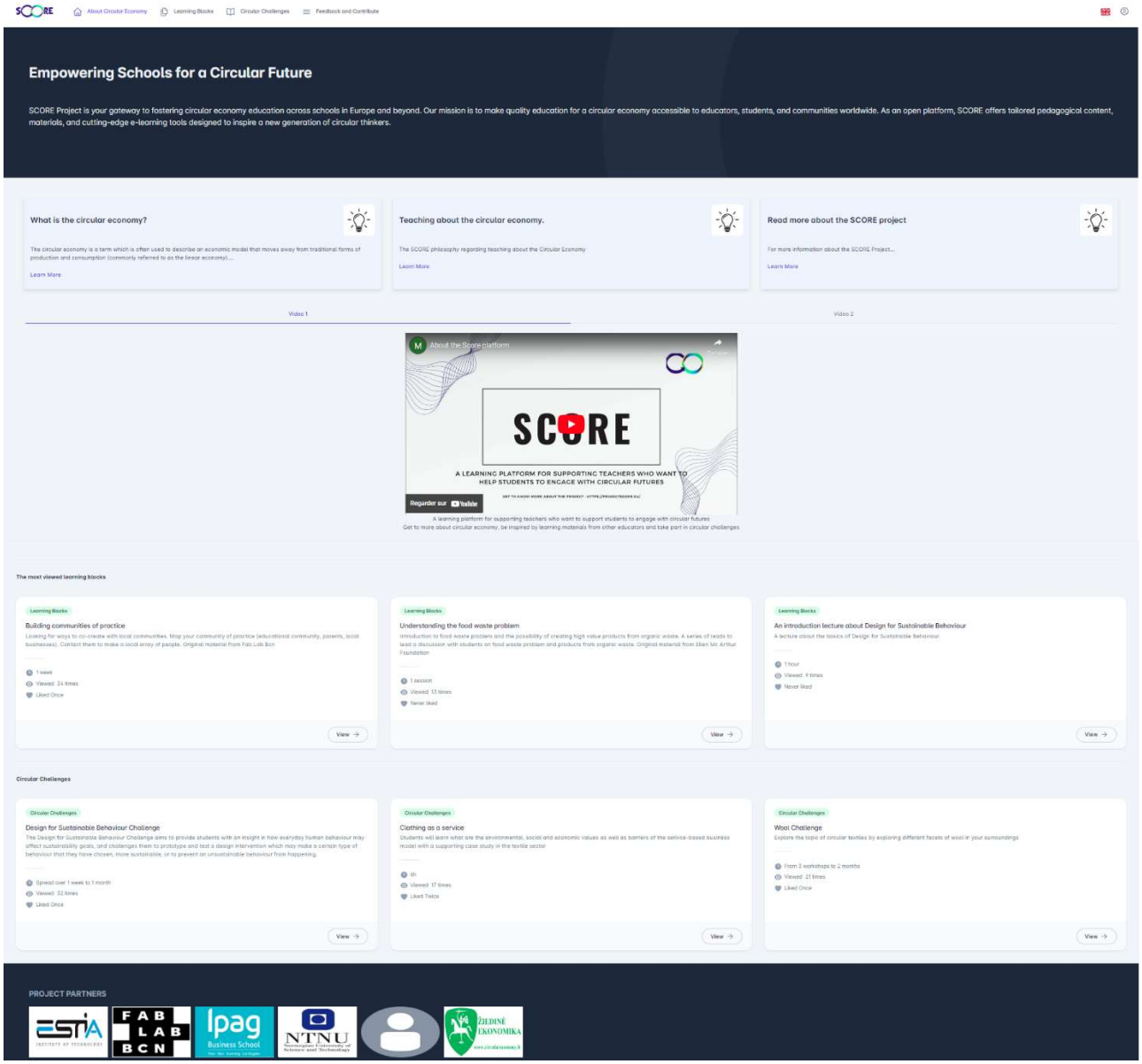
6. Annexe

6.1. Annexe 1: SCREENS

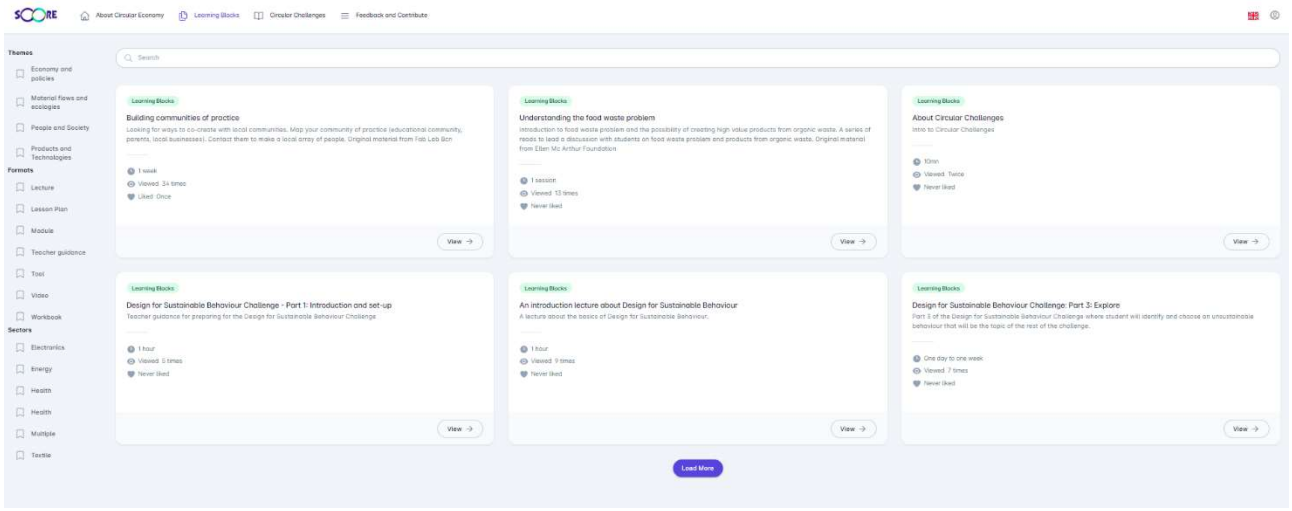
- Screen 1:



- Screen 2



- Screen 3



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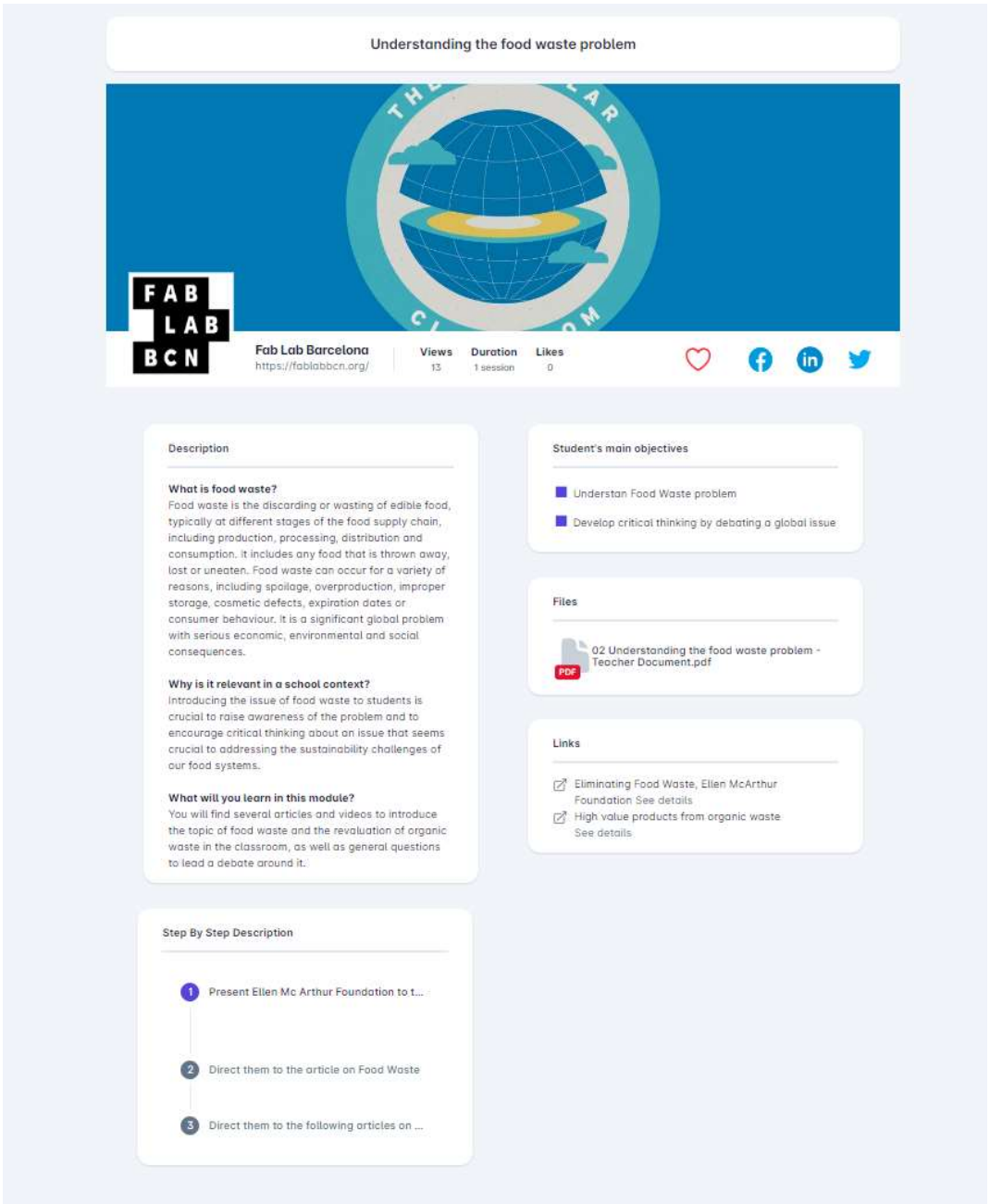
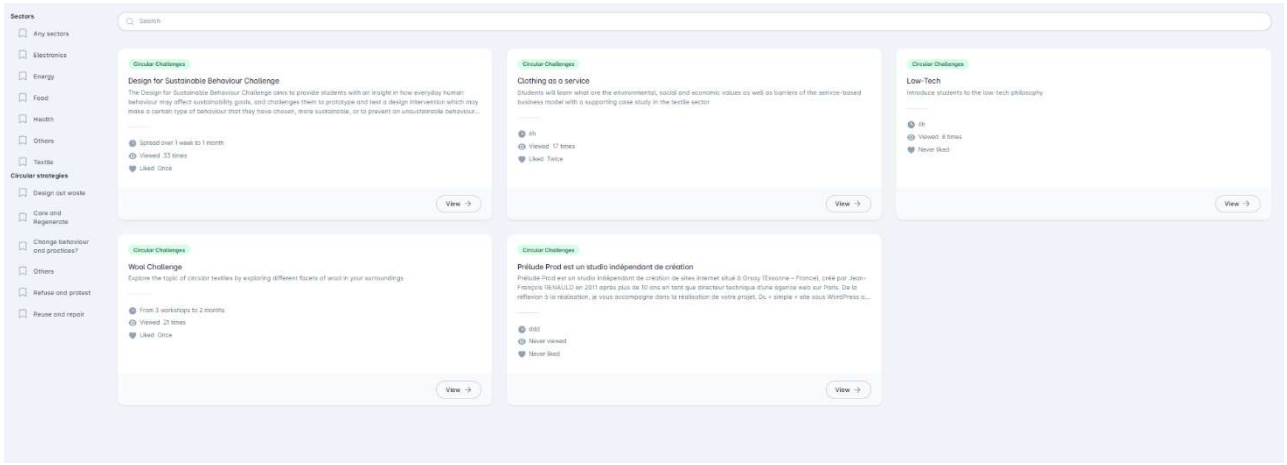


➢ Screen 5



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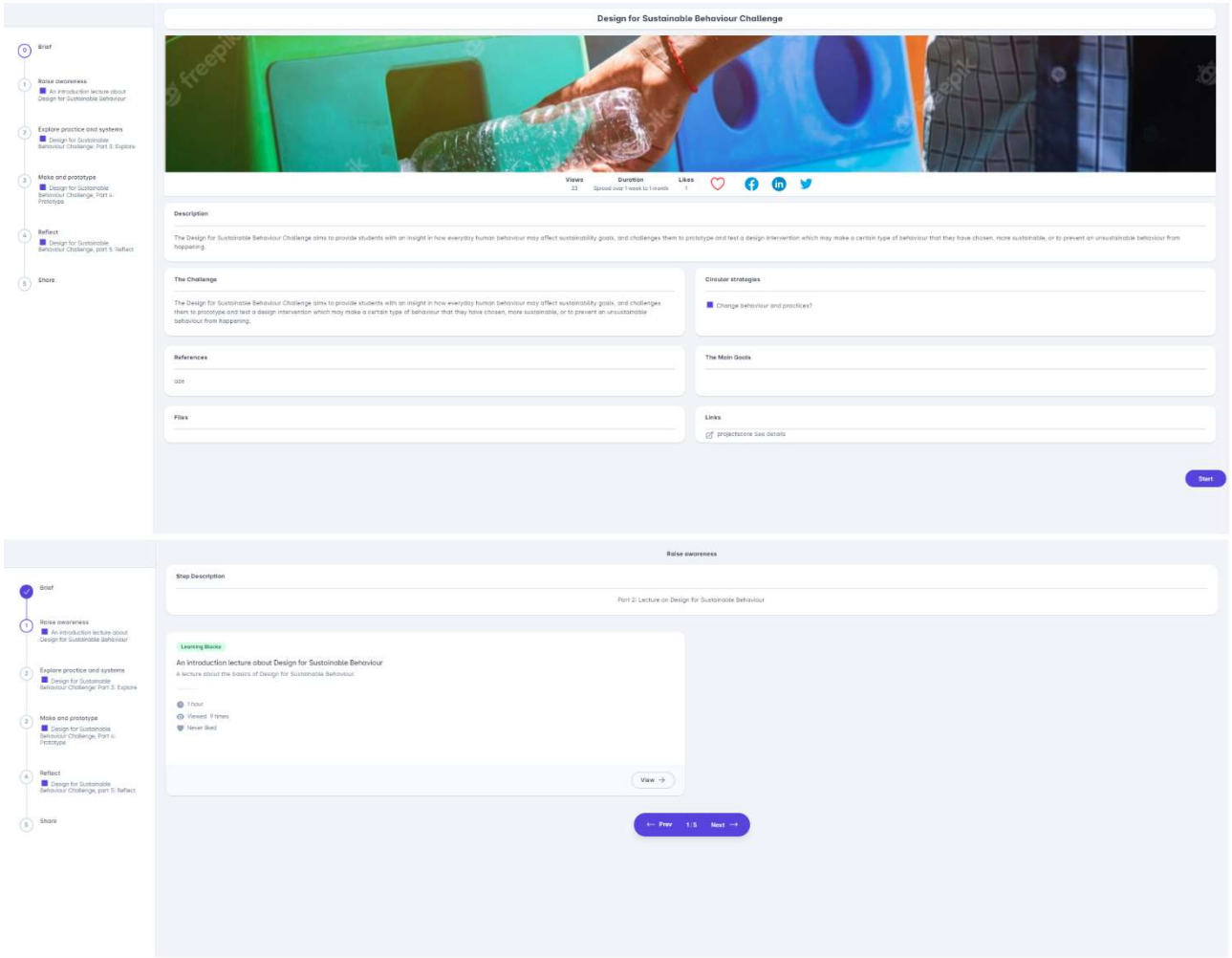

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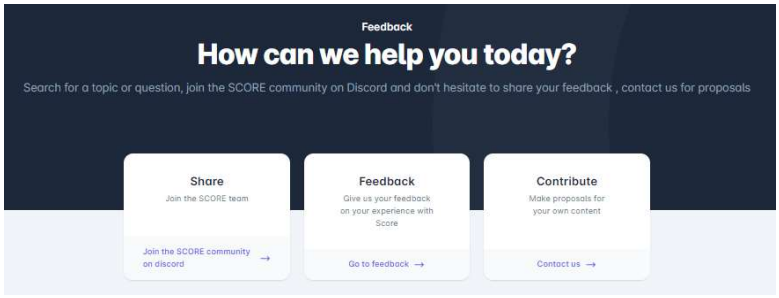

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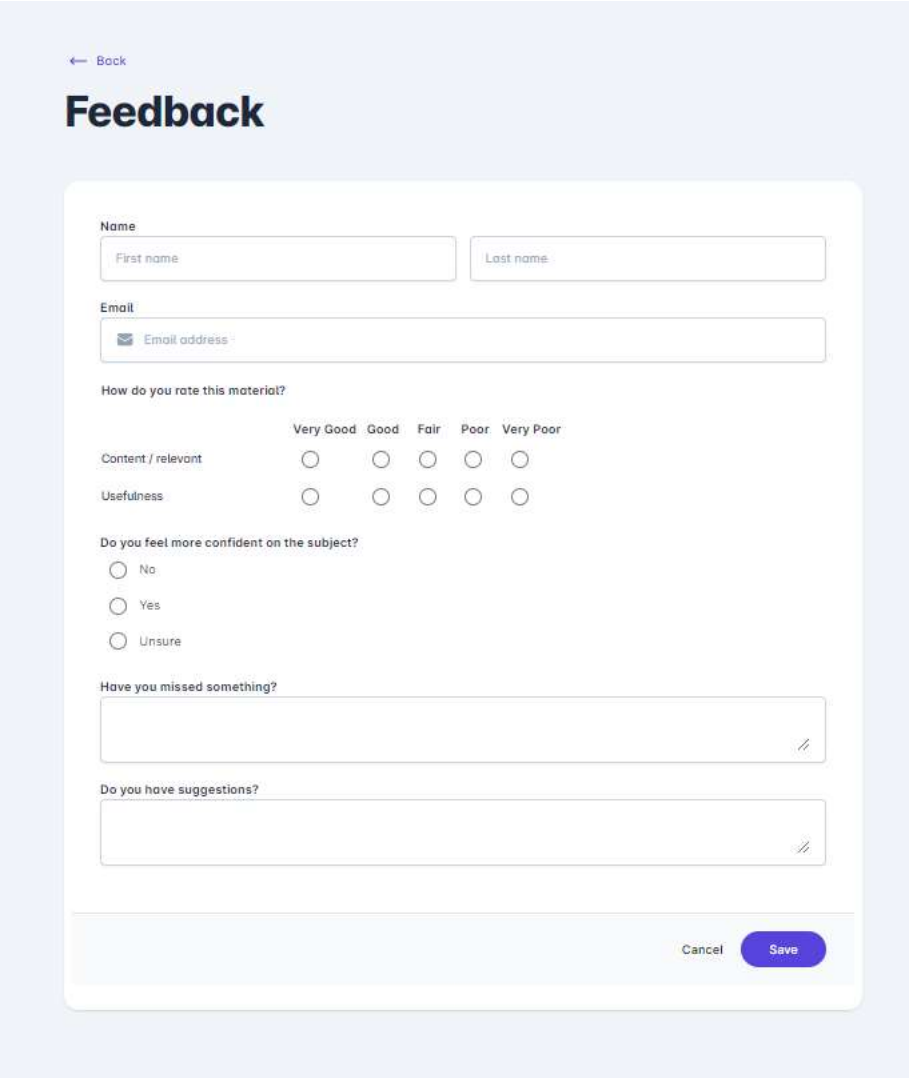
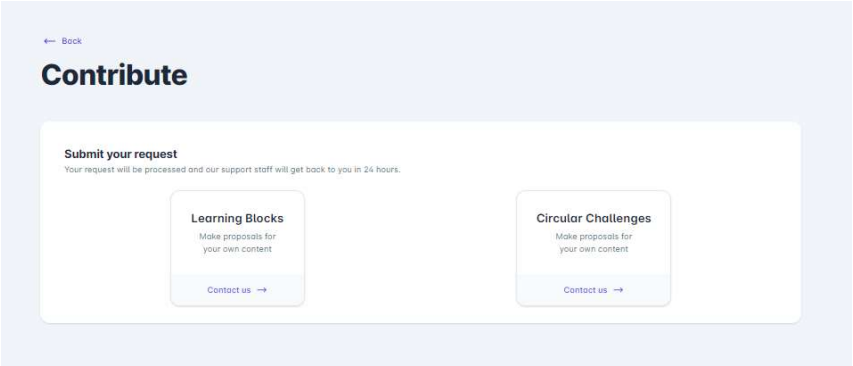
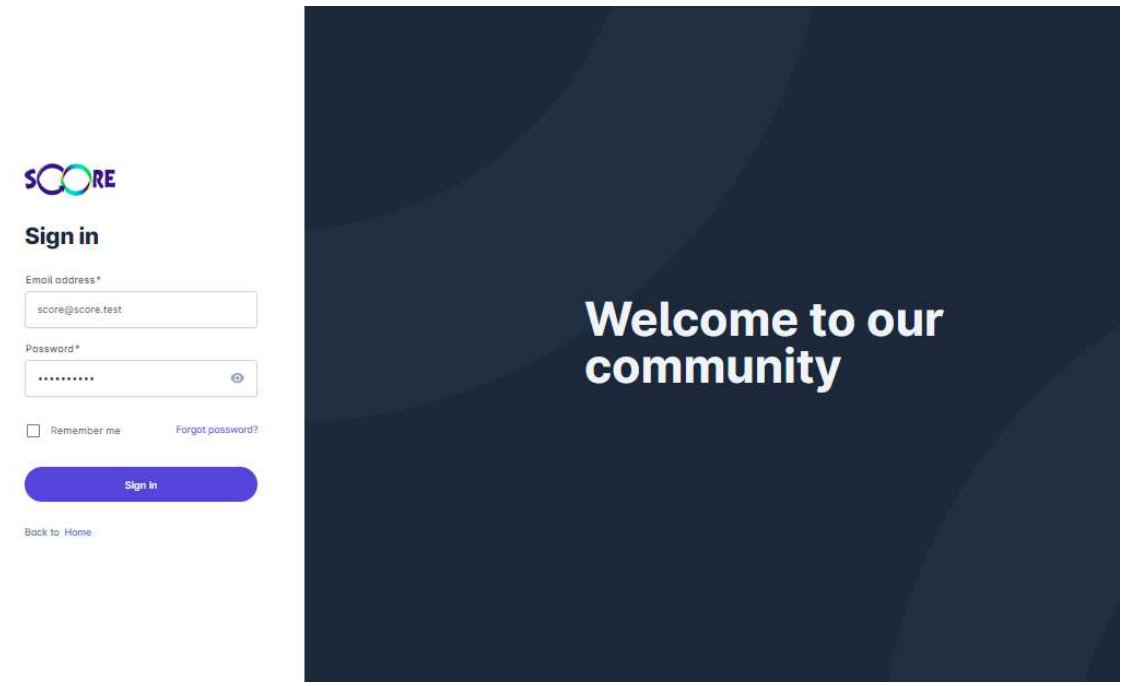


- Screen 9

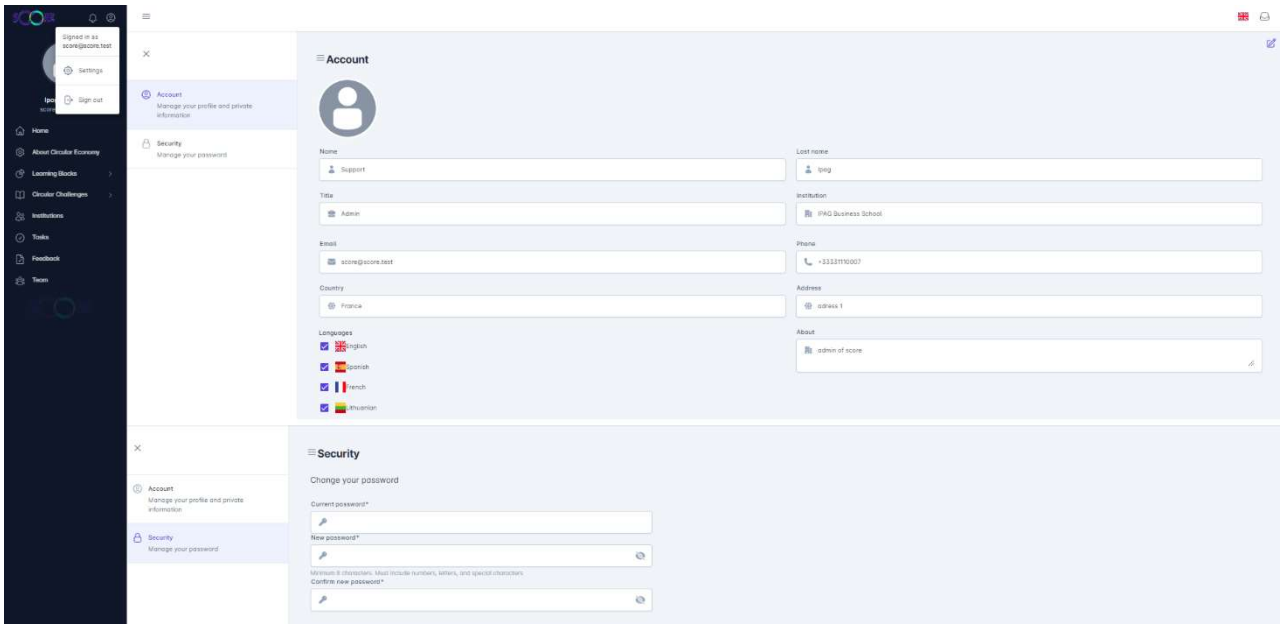


➢ Screen 10

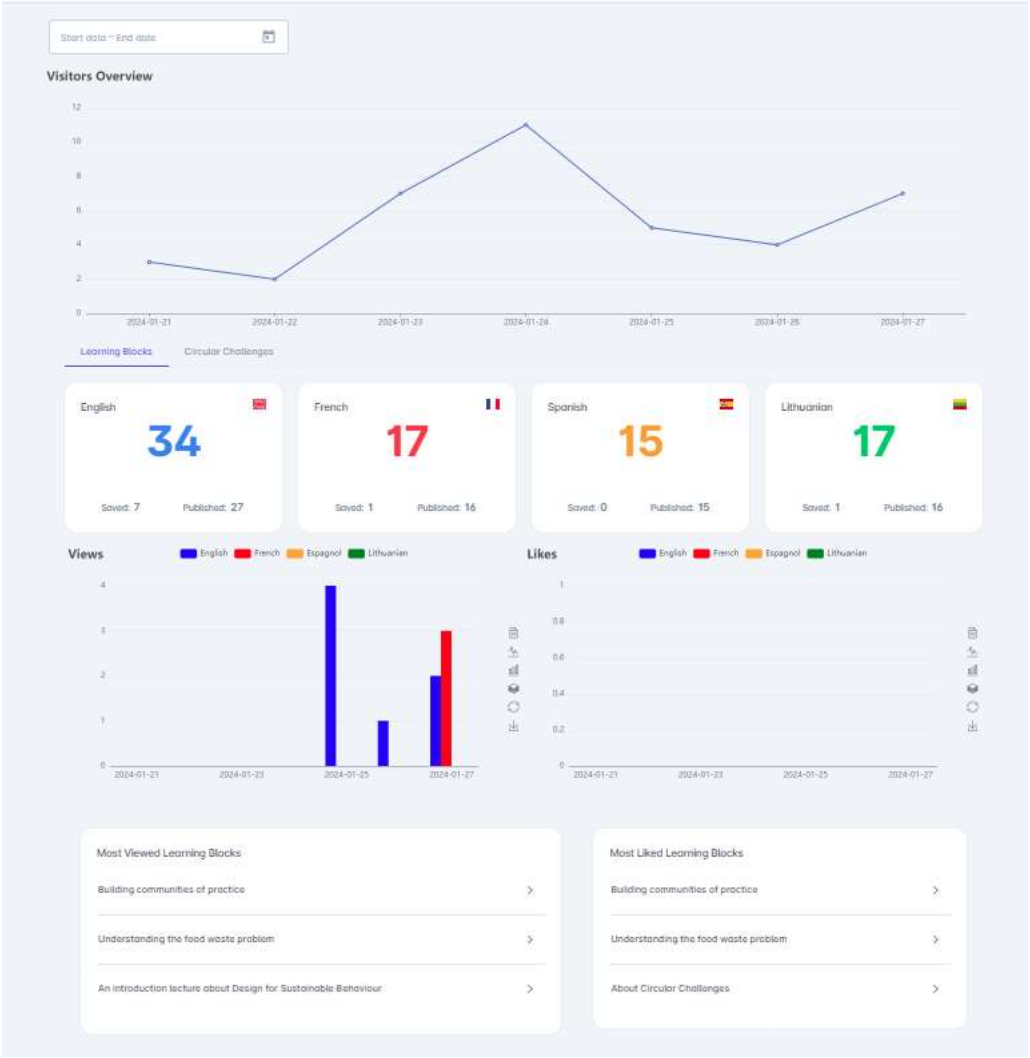


➢ Screen 11

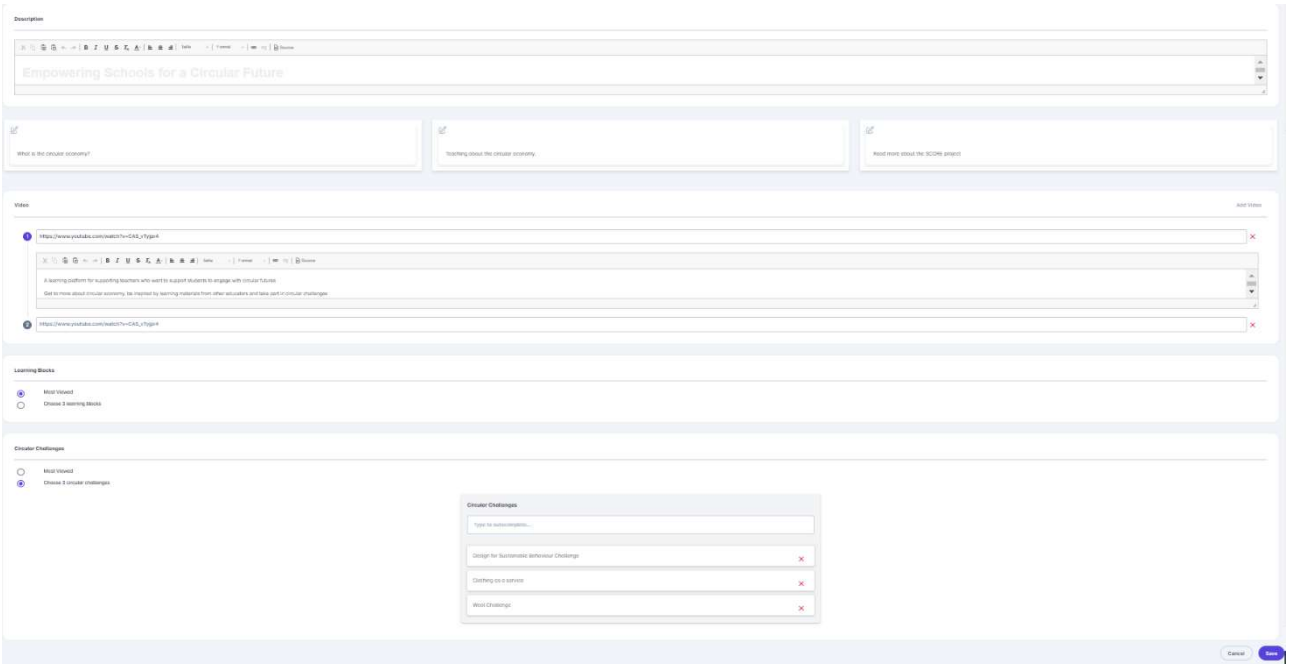
➢ Screen 12



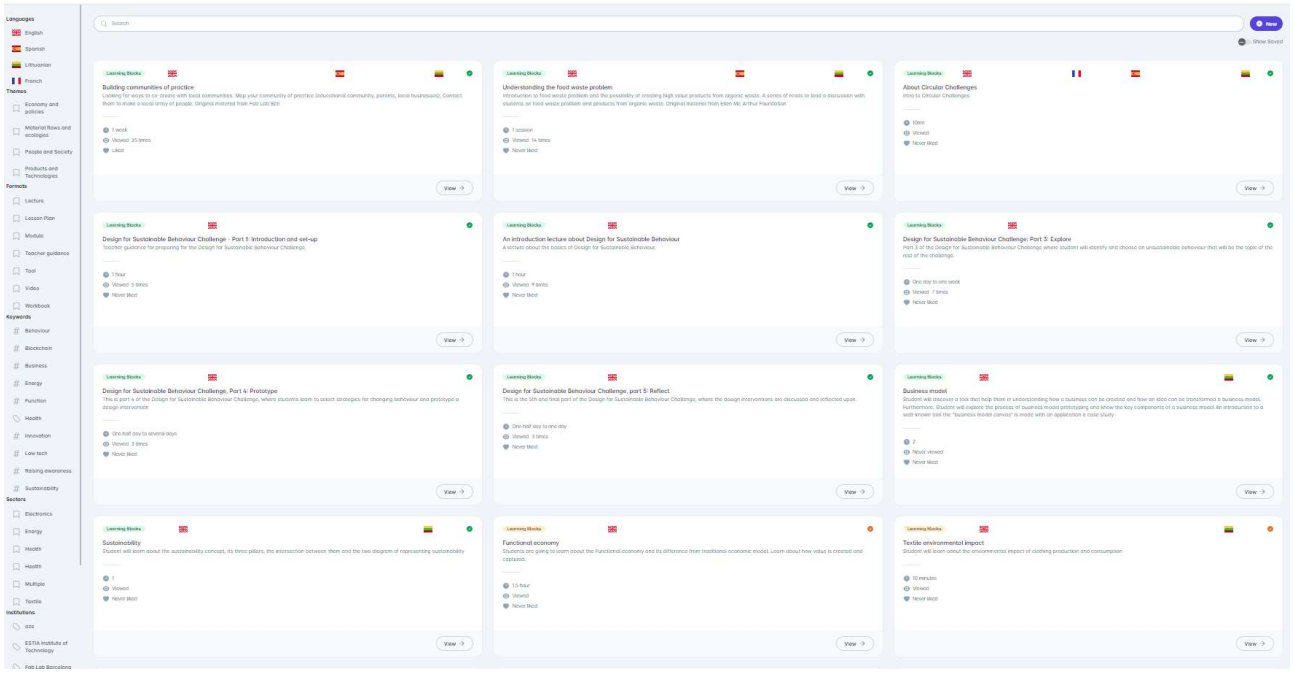
- Screen 13



- Screen 14



- Screen 15



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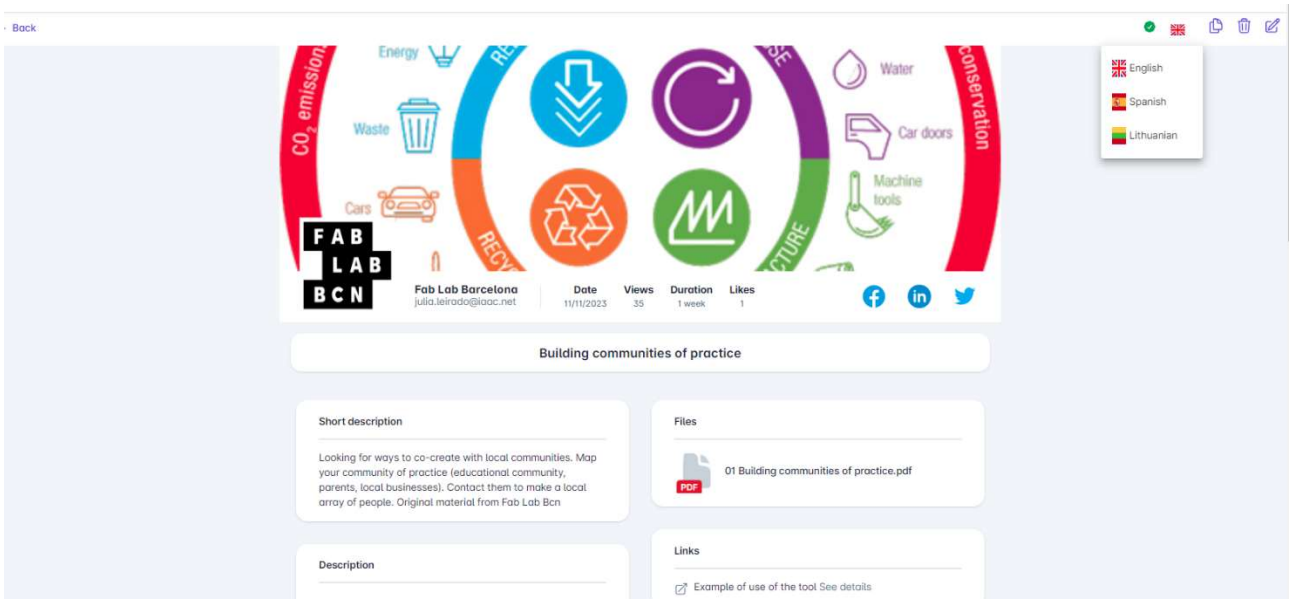
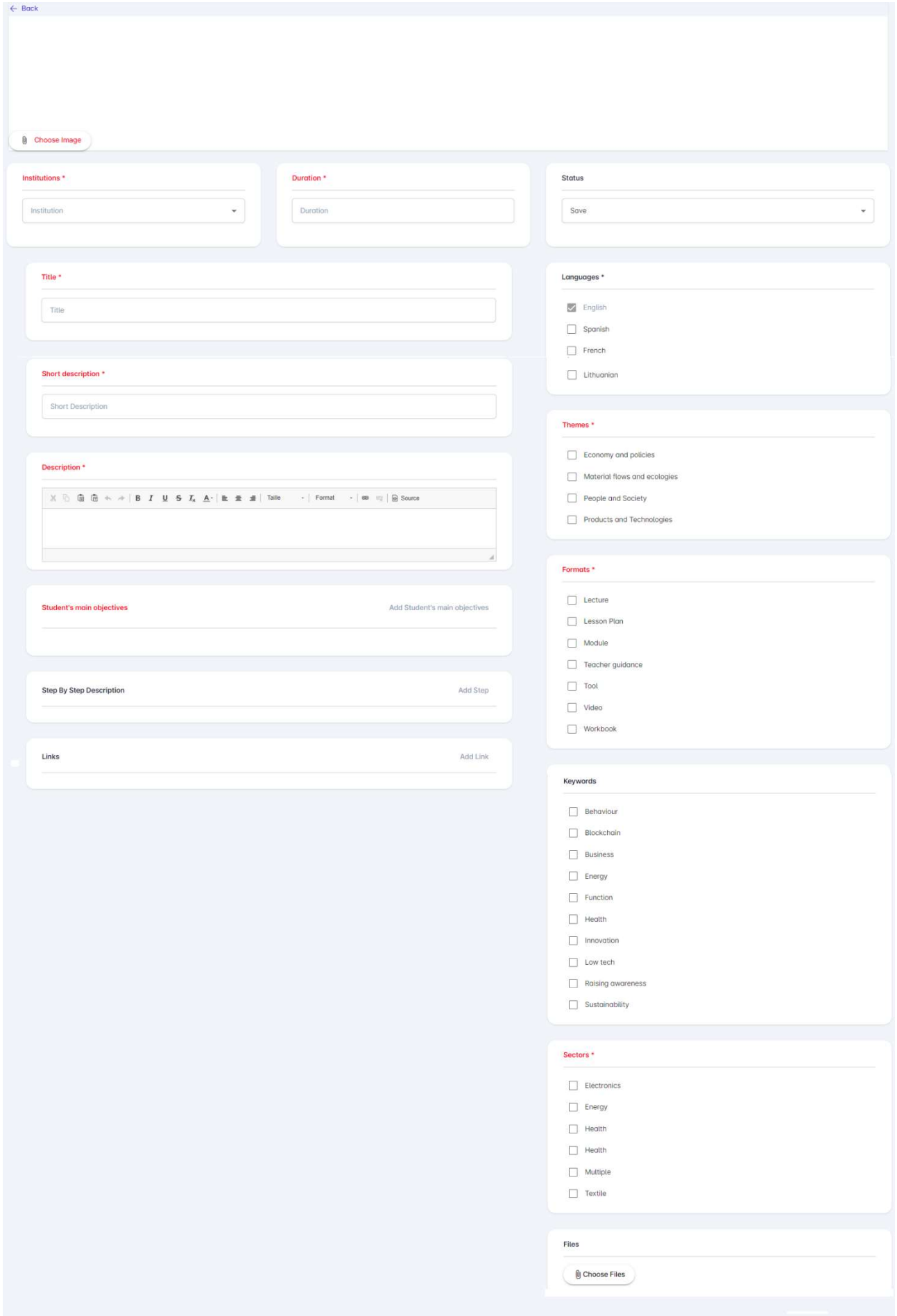


- Screen 17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Sustainability
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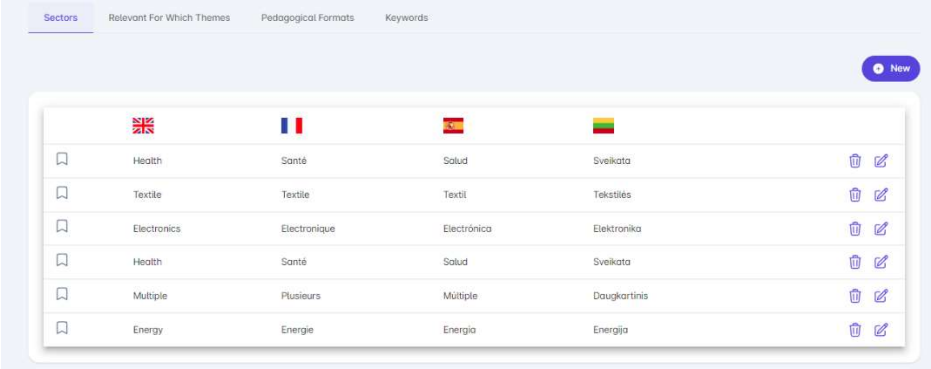
➢ Screen 18



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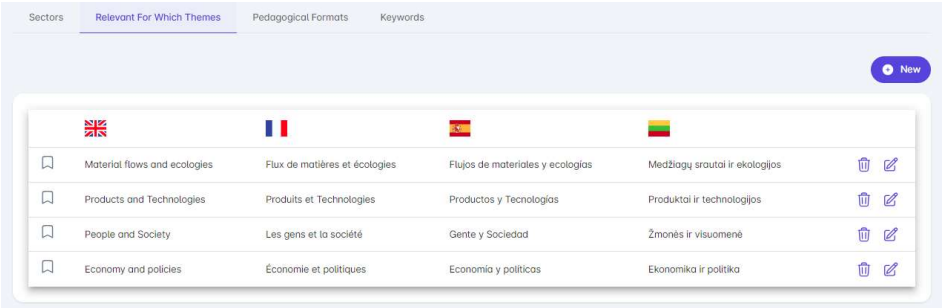

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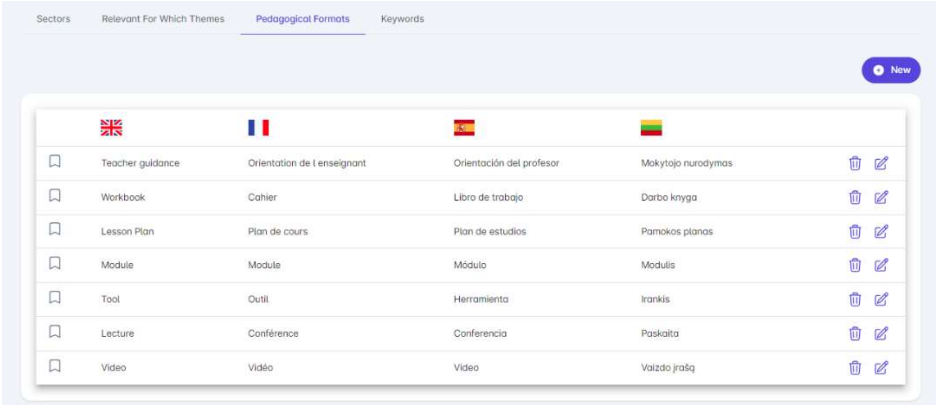
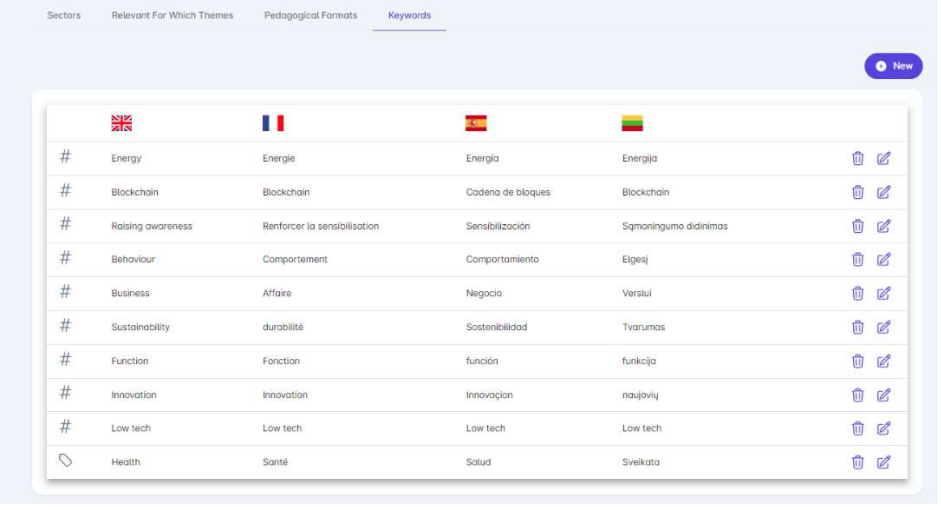
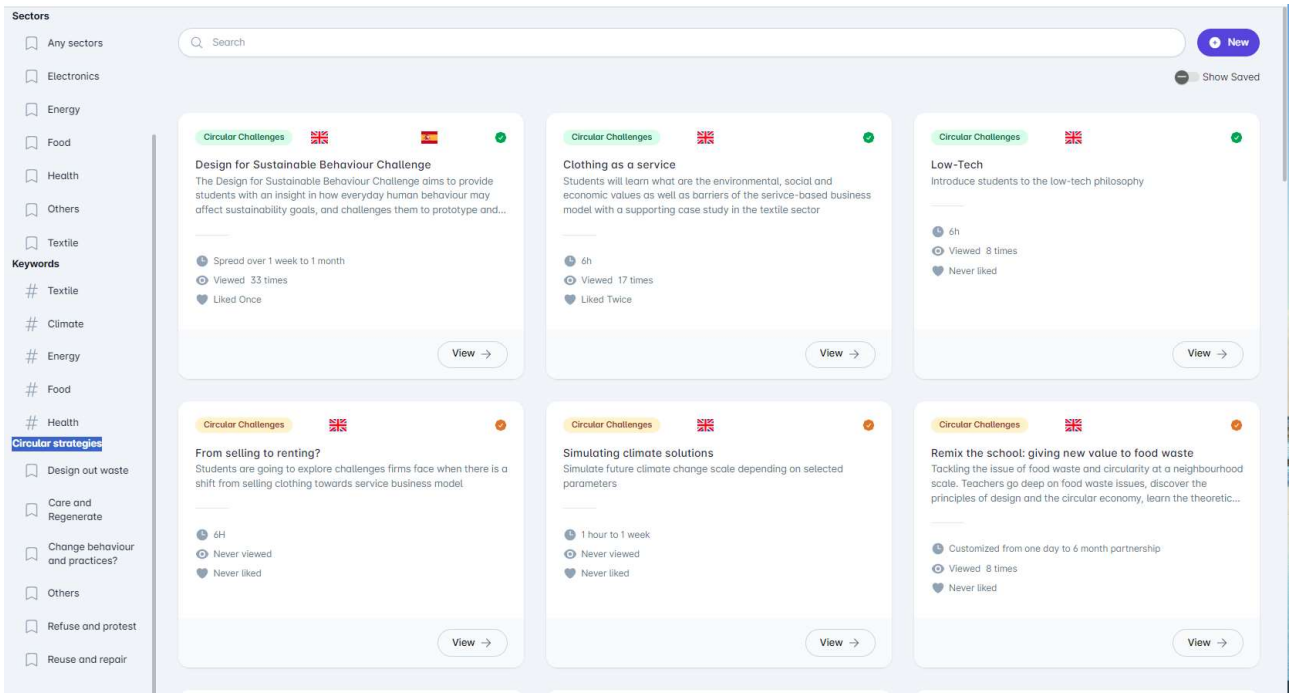


➢ Screen 21



➢ Screen 22



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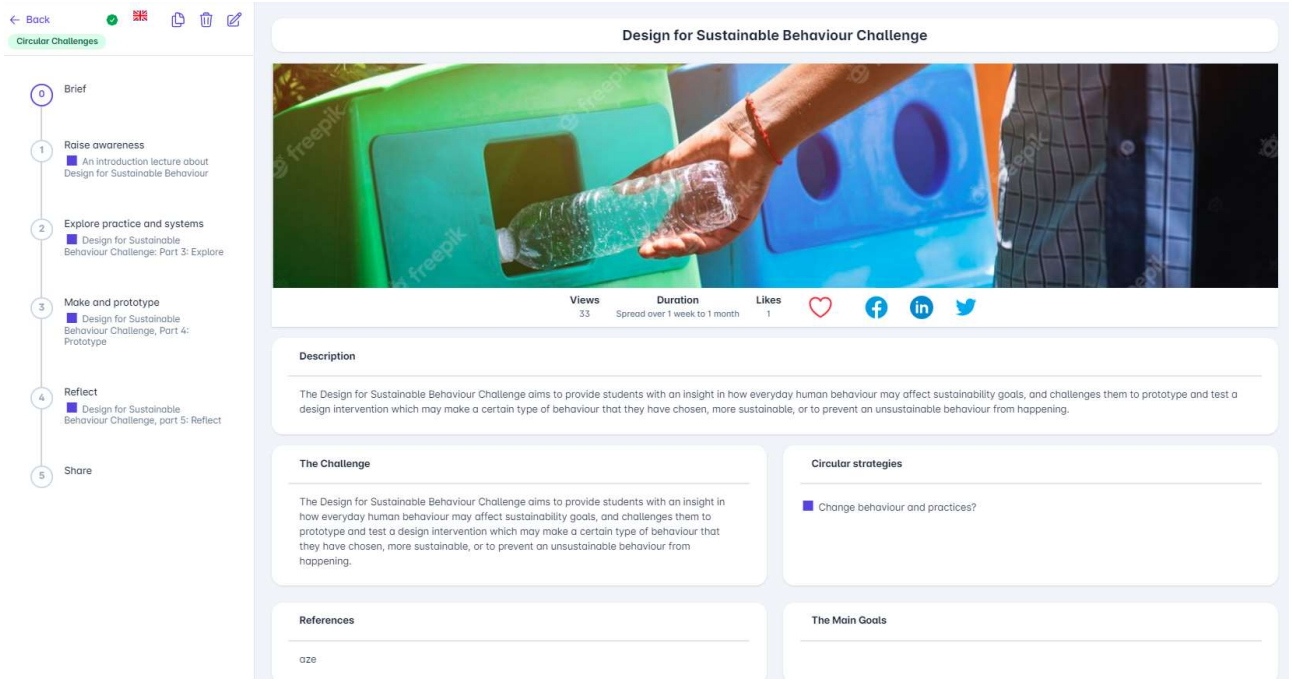
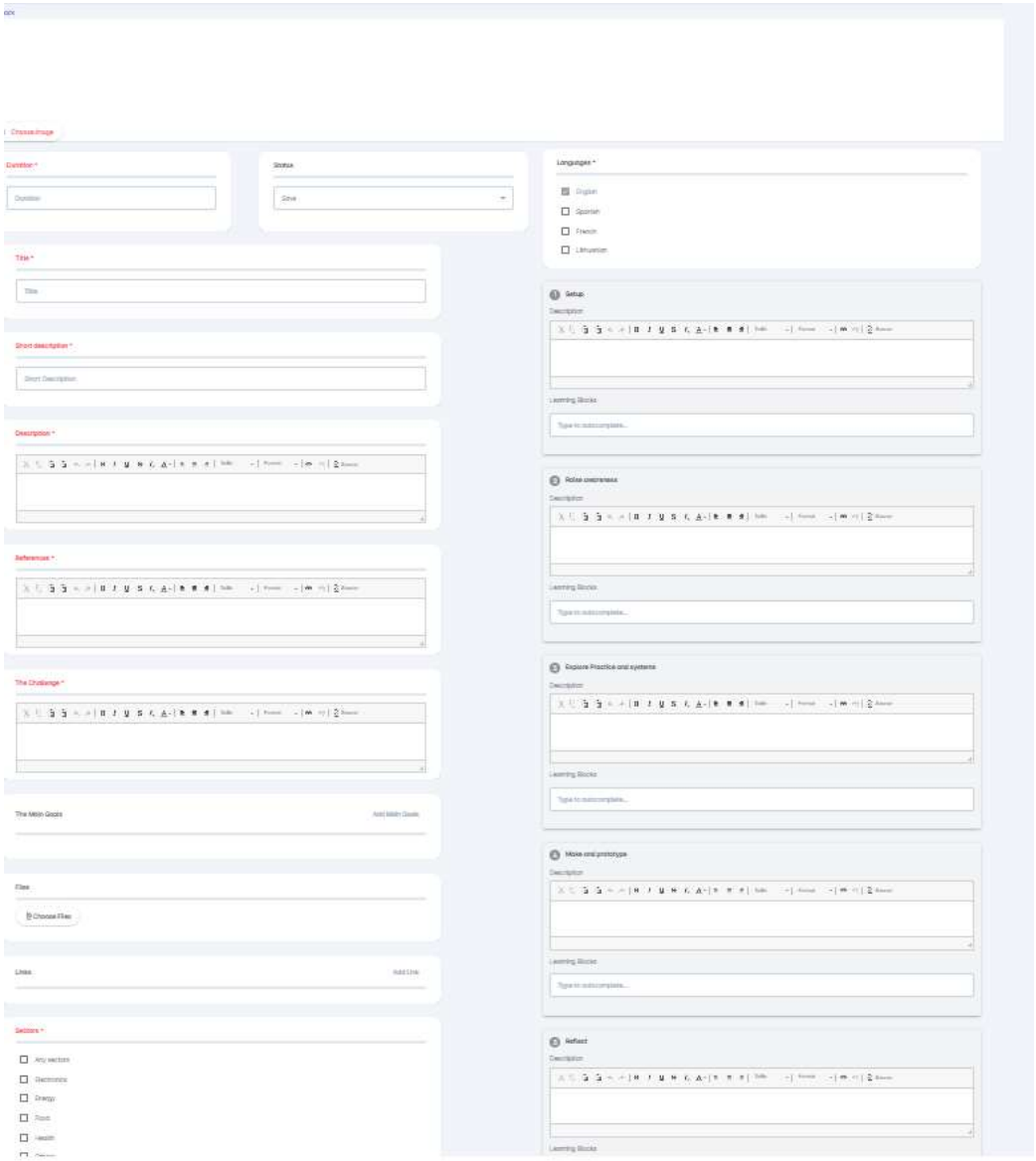
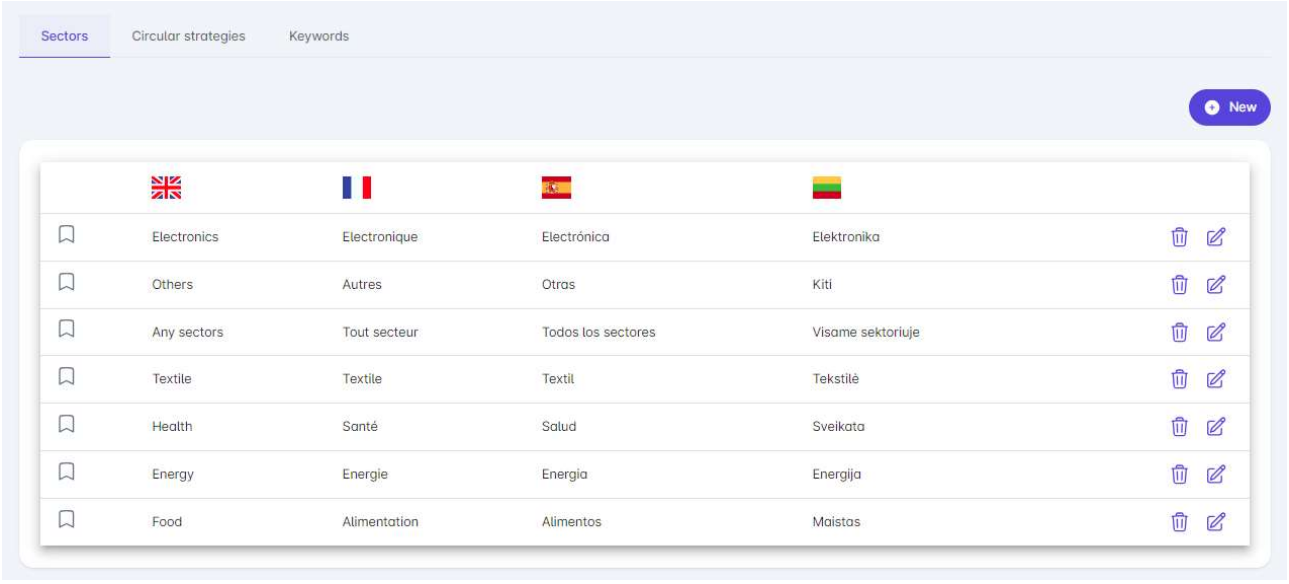


➢ Screen 24



- Screen 25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Kiti
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Tout secteur
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Energía
Energija
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Alimentos
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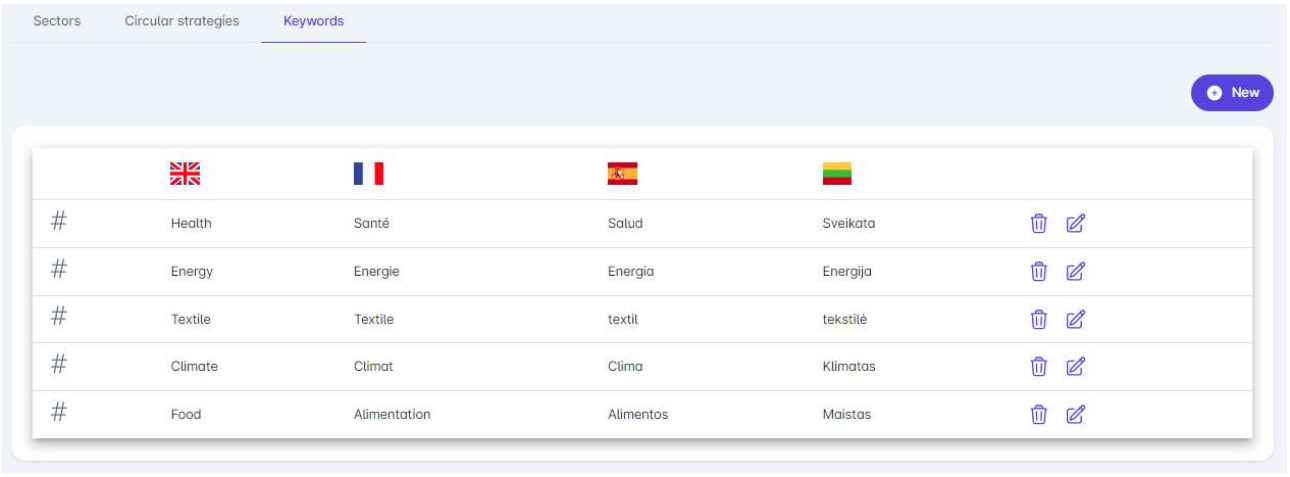
➢ Screen 26

➢ Screen 27



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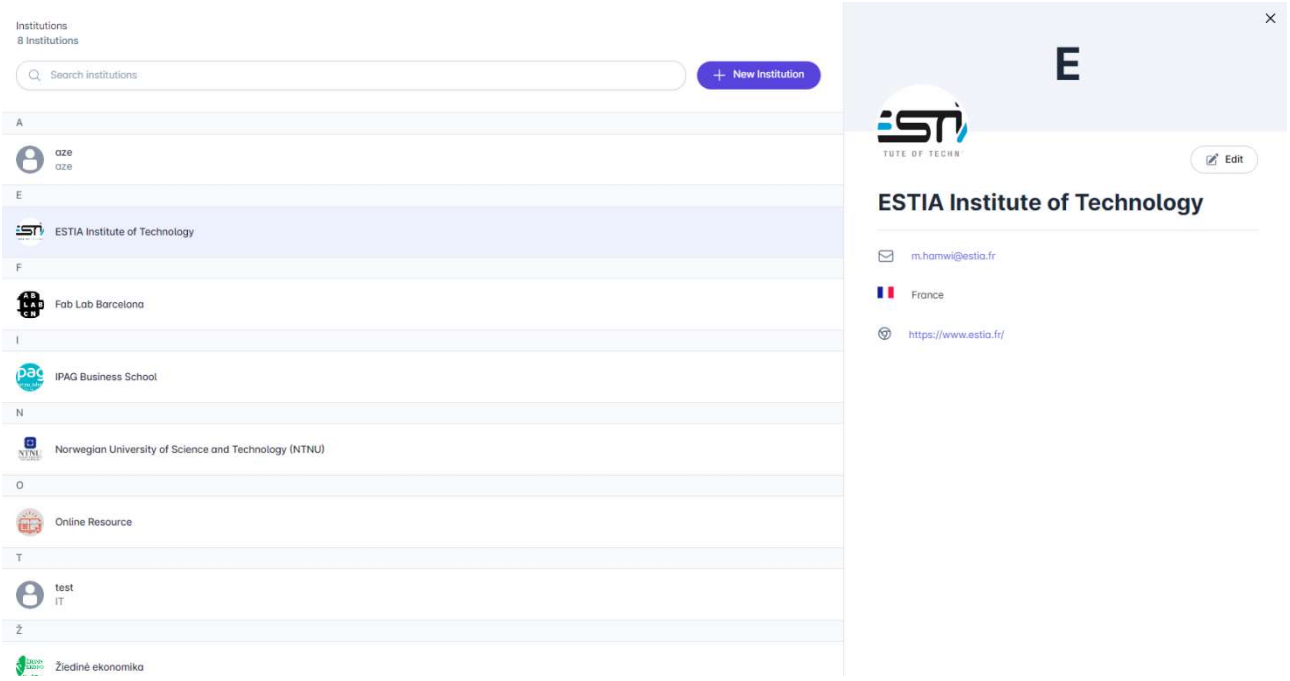

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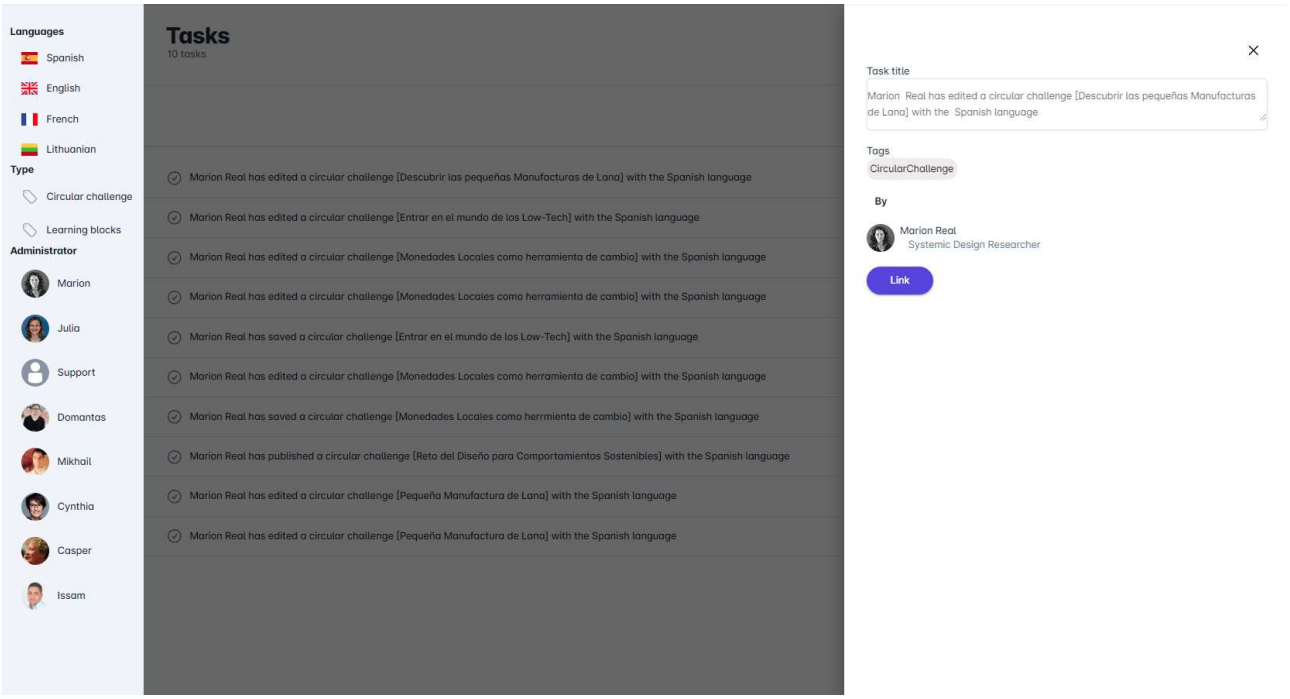

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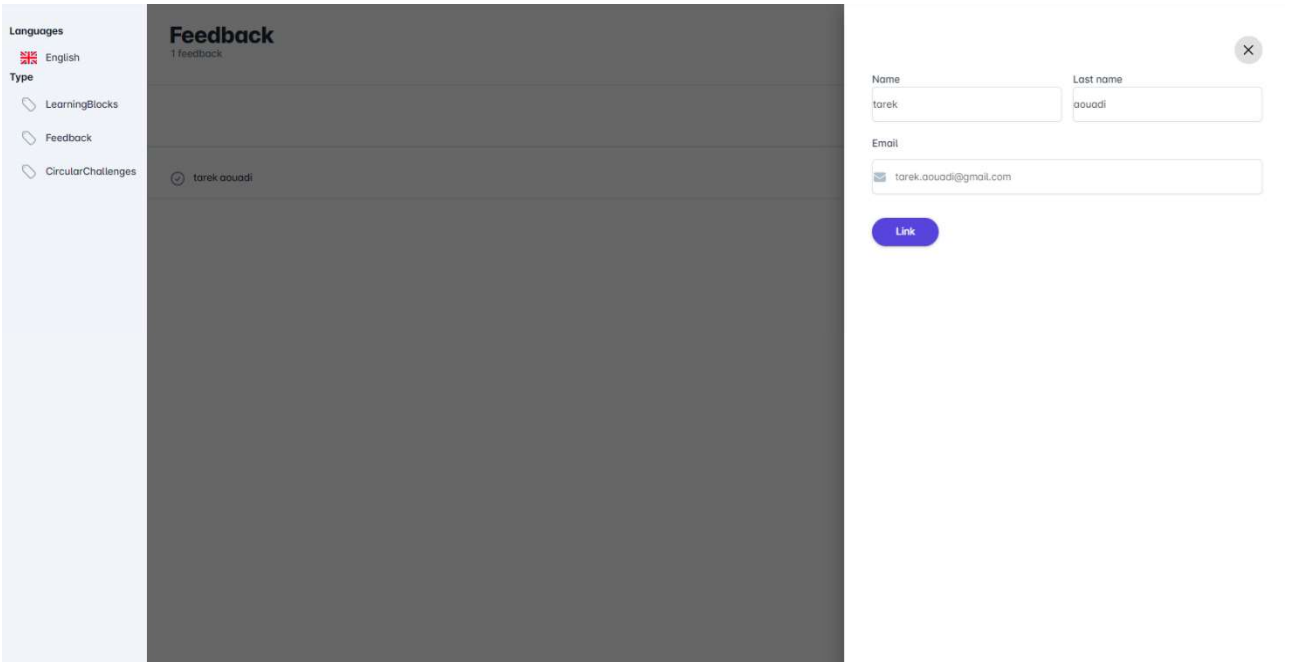

➢ Screen 31

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