



Zero Emission electric Vehicles enabled by haRmonised circularity

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Educational platform design and development

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ZEVR project abstract

ZEVR's main objective is to improve the circularity of light-duty EVs throughout their entire value chain, from materials supply and manufacturing to end-of-life (EoL) processes, which aligns with the European Union's goal of achieving zero CO₂e emissions by 2035, particularly in the EV value chain. To do so, ZEVR will develop a Design for Circularity (DfC) methodology and a holistic circularity assessment aimed at improving the production of electric vehicles (EVs) based on the 9Rs. This methodology will be validated by developing zero emission solutions for the most important automotive materials, covering > 84% material mix: steel, three versions of aluminium (wrought, casting, and foam), thermoplastics composites (long and continuous fibre-reinforced), unfilled/short fibre plastics, glass, tyres and Rare Earth Elements (REE). These solutions will be supported by a set of digital tools to support the manufacturing of the use cases, the assessment of circularity, traceability, and the virtual integration of components into a full replicable vehicle.

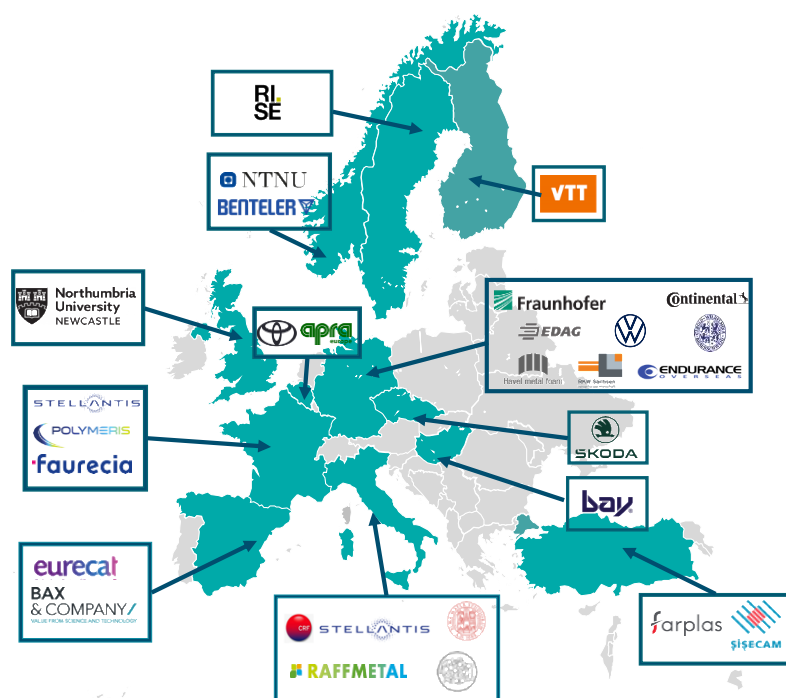


Figure 1 ZEVR Consortium

To maximise the outreach of our methodology and zero emission solutions, ZEVR will develop a dedicated training & upskilling programme for the automotive workforce and academia, together with activities aimed at increasing awareness & acceptability of the proposed zero emission solutions. Lastly, circular business models targeting EoL and logistics aimed at improving the economic feasibility of circularity in EVs are advanced. ZEVR's innovations aim to improve zero emission approaches in the life cycle and value chain of at least 59% of European EVs by 2035 through the 5 OEMs and Tier 1's that are part of the consortium, which includes industry and academia covering the entire automotive value chain.

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Abbreviations and Acronyms

Table 1 Abbreviations and Acronyms

Abbr.	Full name
9R	The 9R Framework on the Circular Economy
DfC	Design for Circularity
EoL	End of life
EV	Electric vehicle
EU	European Union
FAQ	frequently asked question section
GA	Grant agreement
GDPR	General Data Protection Regulation
ICT	Information and communication technology
KPI	Key performance indicator
LMS	Learning Management System
PDCA	Plan-Do-Check-Act
REE	Rare Earth Elements
SCORM	Sharable content object reference model
WP	Work package

Executive Summary

This report details the design and development of the ZEvRA project's training platform, a comprehensive Learning Management System (LMS) built on the open-source Moodle platform. The platform is designed to support the project's goal of enhancing the circularity of light-duty electric vehicles across their entire value chain.

Key features of the platform include:

- User-friendly interface with customizable roles and permissions
- Robust content management system supporting various media formats
- Flexible course creation tools with templates and guidelines for educators
- Assessment and feedback instruments for tracking learner progress
- Multilanguage support and accessibility features
- Communication tools to facilitate collaboration and knowledge sharing
- Comprehensive reporting capabilities for administrators and educators

The platform employs modern training methodologies, including Connectivism and Instructional Design, to ensure effective knowledge transfer and skill development. It caters to a diverse audience, including automotive professionals, researchers, students, and citizens.

By providing a centralized, scalable, and cost-effective solution for delivering educational content, the ZEvRA training platform plays a crucial role in upskilling the automotive workforce and disseminating project findings. Its open-source nature and easy maintenance ensure long-term sustainability beyond the project's duration, contributing to ongoing professional development in the automotive sector.

This report outlines the platform's structure, management features, and pedagogical approach, demonstrating its alignment with the project's objectives and its potential impact on advancing sustainable practices in the automotive industry.

Introduction

This document D5.4 Educational platform design and development presents the training platform design and development for ZEvRA's project. This report contains the basis for the platform conception and all the information regarding the structure and contents publication.

ZEvRA's multilingual training platform functions as a comprehensive Learning Management System (LMS), specifically designed to meet the unique needs of the project, ensuring efficient course management and enhanced student engagement.

Built on the versatile open-source Moodle platform, this system provides a robust framework for delivering educational content, promoting collaboration, and monitoring learner progress.

Over the following pages, a detailed review of the key features and functionalities of the multilingual training platform is provided, highlighting its usability, scalability and adaptability.

1 Training context of the platform

1.1 Project requirements

The Zero Emission Electric Vehicles enabled by haRmonised circularity - ZEvRA's project enhances the circularity of light-duty electric vehicles (EVs) across their entire value chain, from material supply and manufacturing to end-of-life processes. By developing a Design for Circularity (DfC) methodology and a holistic circularity assessment based on the 9Rs concept, ZEvRA aims to improve EV production. This methodology is validated through zero emission solutions for key automotive materials, covering over 84% of the material mix. Supported by digital tools for manufacturing, circularity assessment, traceability, and virtual integration, ZEvRA ensures comprehensive solutions.

To fully leverage the contents and findings of the project, a dedicated training and upskilling program for the automotive workforce, academia, and the citizenship is being developed. Aligned with Objective 5 of GA, this initiative includes the creation of a virtual learning environment and a robust educational platform to ensure effective training and upskilling of the industrial workforce, fostering long-term adoption of sustainable practices.

To achieve this goal, the consortium will develop a suite of courses tailored to address various aspects of professional development, encompassing soft skills, information and communication technology (ICT) proficiency, and specialized technical competencies. These training resources will provide professionals with the means to remain current in their respective fields and adapt to evolving demands.

The successful distribution of these resources needs a standardized framework that unifies the efforts of experts, coordinators, and professionals involved in course development. The platform provides a common place for all stakeholders, that provides coherence and effectiveness in the training activities.

1.2 Training methodologies

To adapt training methods to the current ZEvRA's project context, it's important to contextualize the recent methodologies applied to hybrid and digital educational ecosystems.

There are two main approaches highlighted in this document that include innovative updates on integration of latest technology advances and learning approaches that condense the acquisition of the knowledge by the learners in these new digitalized contexts.

As for this, it will be explained here Connectivism and Instructional design as key approaches proposed for this project training development.

Connectivism

Siemens, in the early 2000s, elaborated this updated theory, Connectivism, where the learner is not isolated in its own process but acquiring the knowledge in a connected reality, where the knowledge is distributed through networks and learners integrate this knowledge considering complexity ⁱ.

Connective knowledge networks have four characteristics ⁱⁱ:

- Diversity. All possible points of view should be provided.
- Autonomy. Individuals contribute to the interaction of their own free will and according to their own knowledge, values, and decisions.
- Interactivity. The knowledge that is generated is the result of interactions between members and not a sum of their opinions.
- Aperture. You have a mechanism in the network for a certain perspective to be introduced, to be heard, and to allow the rest to interact with it.

Instructional design

The roots of instructional design trace back to the World War II, where there was the urgent need to rapidly and effectively teach vast numbers of individuals highly specific tasks. In response, a method emerged: breaking down complex tasks into individual components, allowing soldiers to comprehend each step thoroughly. This wartime approach became the foundation for instructional design, a multifaceted discipline that blends education, psychology, and communications. Its primary goal is to craft optimal teaching plans tailored to distinct groups of learners, ensuring that instructions are not only delivered but are also effective and meaningful.

Instructional design is more than the creation of teaching materials; it is a meticulous process that considers how individuals learn. The principles of instructional design dictate how educational tools should be designed, created, and delivered. It should recognize the diversity of learners and aims to provide tailored solutions to help individuals and organizations achieve their goals.

One facet of instructional design is to systematically collect, process, and analyse data to evaluate the effectiveness of the education provided. If any aspect of the training falls short of established standards, instructional designers take on the responsibility of refining the course, ensuring that learners comprehend the topics thoroughly. This iterative process contributes to the efficiency of organizations, enabling them to utilize their resources wisely.

This methodology helps to create high-quality learning materials that account for the strengths and weaknesses of learners. These materials are not generic; instead, they are tailored to meet the specific needs of educators and learners alike.

1.3 Instructional design proposal for ZEvRA

For the development of training materials, Eurecat uses within its methodology an evolved instructional design model adapted from the most recognized references of pedagogical practice. From the ADDIE model, it establishes a structure for the content development process itself. Its acronym Analysis, Design, Development, Implementation and Analysis, an extension of the PDCA (Plan-Do-Check-Act) improvement model, represents a sequence of actions that are carried out throughout the life cycle of the project to guarantee its quality and ensure its continuous improvement. The proposed model also takes as a reference the recommendations that Merrillⁱⁱⁱ summarized in his well-known instructional principles that we believe are especially suitable for this project:

A course should be task-focused to incentivize students to solve real-world problems.

- A course must activate the student's prior knowledge; therefore, it helps to connect the previous knowledge with the new one.
- A course should convey knowledge through different media, textual, audiovisual, so that it takes advantage of different regions of the brain and, in this way, help students retain the content for longer.
- A course should insist on the application of the knowledge acquired in cases close to real life through exercises and assessments. These exercises should be accompanied by information and guidance on correcting errors.
- A course should offer to the extent of the possibilities of the distribution format, possibilities for the integration of knowledge into the student's world through discussion and reflection.

The resulting scheme for the instructional design that is applied is inspired by the one proposed by Robert Gagné^{iv}, which seeks to adapt to the needs and possibilities of each training project, adapting it for example to the initial level of the participants and in this case the possibilities of developing content and activities to be used autonomously by the participants through the online training platform.

In the case of this project, the instructional design is specified in a series of elements ordered to be applied in diverse ways to each of the units, modules, and activities. That is to say, just as the elements of encouragement to the student remain present in these 3 levels, the self-evaluative elements are proposed to be included at the unit and module level. In any case, this instructional design is adaptable to the needs depending on the particularities of each of the contents included in the syllabus. Some of the main constructive elements for a course can be found in the following table.

Table 2 Constructive elements of the course

Constructive elements of the course	
Element	Purpose
Encouragement to the student	Engage students with stimuli to help them focus on the content (innovative ideas or questions for reflection, etc.)
Explain Goals	Provide an explanation to students about the objectives, the expected set of outcomes, and the criteria for measuring achievement.
Self-diagnosis	Determine prior learning knowledge by measuring and referencing the student's prior knowledge before introducing and building on new knowledge.
Knowledge transfer	Present the content in comprehensible and easily "assimilated" fragments: easy to read, easy to understand, and that keep the student motivated. These can be non-interactive or interactive, where the student is asked to interact with the content to improve the efficiency of the transfer.
Exemplification and Expansion	Provide complements and alternatives to the student with examples, case studies, and other supports to complement the content.
Self-assessment and practices	To help the student check their own understanding of the content and to ensure that they have acquired the skill or knowledge that was intended. Allow students to practice their learning in exercises or simulated practices.
Feedback (after practice and assessment)	Provide feedback to the student to strengthen knowledge with responses to the results of assessments or practices, whether informative or corrective.

Evaluation	The purpose is to evaluate the performance of the training action, checking the new knowledge according to established criteria.
Summary and generalization by improving retention	Provide a final synthesis to improve knowledge retention and transfer using a summary or outline as a synthesis and recapitulation.

When selecting formats for the development of each element, it is important to consider not only their suitability for specific tasks, such as using questionnaires for evaluating elements, but also their effectiveness in conveying introductions, transfers, summaries, and similar content. The chosen format should be based on considerations regarding the medium and long-term sustainability of the course content, always guided by the principle that the course's academic coordination should be easily manageable.

All these pedagogical considerations have been used to develop the course format and the derived guide and template which can be found in this report in its corresponding sections.

2 Technological framework: LMS platform

2.1 Moodle as LMS

The educational content and most of the training activities are aimed to be in an online format to provide wide access and make the offer available across different countries. To do so, most of the project training content will be published through a Learning Management System (LMS) since it offers multiple advantages, especially considering its role as a central training source for multiple actors involved such as scientists, industry community but also students or citizens. One significant benefit is centralized access and distribution, providing a unified platform for all participating stakeholders to seamlessly access training materials across diverse locations. The LMS ensures consistency and standardization in content, crucial for maintaining uniformity in automotive industry knowledge and practices, directly impacting in the current and future workforce.

Efficient content updates become a streamlined process through a centralized LMS, allowing an easy dissemination of changes within the automotive industry to all institutions simultaneously. The scalability of the LMS aligns seamlessly with the project's expansion, accommodating a growing user base without necessitating significant infrastructure adjustments. Additionally, centralized LMS platforms offer cost efficiencies by consolidating content management in one place, resulting in savings on development, maintenance, and infrastructure costs.

Analytics and reporting tools within LMS platforms enable comprehensive tracking of learner progress, assessment of training module effectiveness, and data-driven decision-making for continuous improvement. User management is simplified, granting administrators control over access and permissions. Collaboration and knowledge sharing among automotive professionals across institutions are facilitated within the LMS, fostering a community spirit, and promoting the exchange of best practices.

The flexibility and accessibility of LMS enable automotive professionals, academic profiles and other stakeholders to access training content at their convenience, promoting engagement outside traditional study hours if needed. Customization options within LMS platforms empower institutions to tailor training materials while maintaining a common core provided by the project. The LMS can generate and track certificates, assisting professionals in meeting licensing and certification requirements and ensuring alignment with regulatory standards.

The security features of centralized LMS platforms are robust, safeguarding sensitive information and upholding privacy standards. Gathering feedback from automotive professionals across multiple institutions through the LMS aids in continuous improvement, ensuring the training content and platform evolve to meet evolving needs.

An aspect not always taken into account, the long-term sustainability of a centralized LMS becomes as a strategic advantage, facilitating ongoing funding and support by efficiently addressing the training needs of multiple institutions within the project scope.

Since the project proposal, the consortium recommended to use as distribution and management platform for the courses and its related training activities the open-source Moodle training platform.



Figure 2 Moodle Learning Management System.

Reference: <https://aulasmoodle.com/moodle/que-es-moodle/>

This selection was based in the following objective characteristics:

- **Open source and cost-effective:** Moodle is an open-source platform, making it cost-effective for educational institutions and projects with budget considerations. Being open source also means it provides flexibility for customization according to specific project requirements.
- **Robust and mature platform:** Moodle has a proven track record as a mature and reliable LMS. With over two decades of development, it has evolved into a robust platform with a large user community. The extensive user base contributes to ongoing improvements, security updates, and a wealth of available plugins.
- **User-friendly interface:** Moodle offers a user-friendly interface that is intuitive for both educators and learners. Its design focuses on simplicity and ease of navigation, ensuring a positive user experience for those creating courses as well as those participating in them.
- **Flexibility and customization:** Moodle provides extensive customization options, allowing educators to tailor the learning environment to their specific needs. The platform supports the creation of diverse course formats, varied content types, and personalized learning paths, enhancing the adaptability of the courses.
- **Collaborative learning features:** Moodle facilitates collaborative learning through features such as forums, wikis, and group activities. These tools promote interaction among learners, fostering a sense of community and engagement within the online learning environment.
- **SCORM compliance:** Moodle is SCORM (sharable content object reference model) compliant, ensuring interoperability with various e-learning content. This compatibility allows for the seamless integration of standardized e-learning materials, supporting the project's goal of

delivering consistent and high-quality content, and allowing the repurpose of the materials in further educational context.

- Robust assessment and tracking tools: the platform offers a range of assessment and tracking tools, including quizzes, assignments, and detailed analytics. Educators can easily monitor learner progress, track achievements, and implement diverse assessment methods to ensure effective evaluation.
- Community support and resources: Moodle benefits from a vibrant and active community of users, administrators, and developers. This community support provides access to a wealth of resources, forums, and documentation, facilitating continuous learning and problem-solving.
- Scalability: Moodle is highly scalable, capable of accommodating a large number of users and courses. This scalability ensures that the platform can grow alongside the project's expanding needs, making it a sustainable choice for long-term use.
- Compliance with educational standards: Moodle aligns with educational standards and specifications, ensuring that courses developed within the platform adhere to recognized benchmarks. This alignment contributes to the project's commitment to delivering high-quality educational content.

This open source and easy maintenance characteristics of the platform will facilitate to maintain the courses open for consultation for a longer time after the project ends with a minimum of dedicated resources involved.

As it will be seen within this document, Moodle also permits to integrate different resources and provides diverse tools to the students tracking, teacher tools, course management, etc. All this with the aim to provide the courses with the most complete pedagogical tools in the online sphere to support both online and face to face training activities.

2.2 ZEvRA's LMS Structure and management

2.2.1 Registration and Access

The main page includes registration (Create new account) and access (Log in) for users:

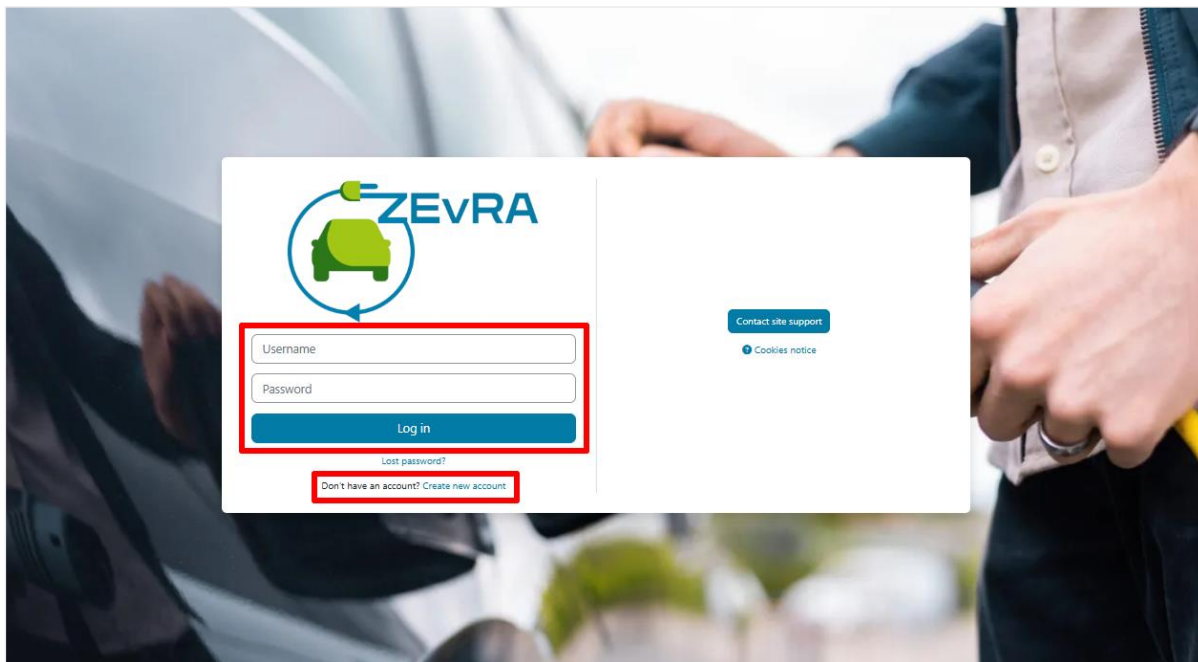


Figure 3 ZEvRA's platform registration and access.

To access the inner area of the platform, where the training contents are hosted, the users need to be registered. The registration asks for some mandatory data (with an * in the list) and some additional that is optional:

- Username*
- Password*
- Email address*
- First name*
- Last name*
- City/town
- Country

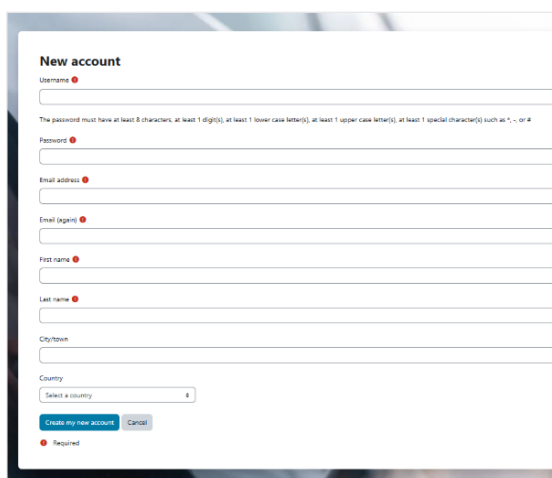


Figure 4 ZEvRA's platform registration.

This information gathered also serves for tracking the user progress within the platform and for reporting purposes.

2.2.2 User management

For user's management, Moodle provides different tools grouped in these two categories:

- Permissions. All users potentially can view, interact, edit courses, manage courses or manage users. These permissions are administered considering who can make the different actions within the platform, and to each role, as it can be seen below, different permissions are given.
- Roles. For this project, the roles initially established (from fewer to more permissions) are the following:
 - Student: Users in this role can view the basic elements of the platform (e.g. My courses, Calendar or Community of knowledge), take the courses they are enrolled in (autoenrollment or enrolment via the manager) and interact on the platform.
 - Observer: Has the same permissions as the student role but does not count for reporting purposes, it would be a guest or listener profile.
 - Professor - Non-editor: Users in this role have the same permissions as the student and it is added that they can reply in the forums and correct the student material for the courses in which they are enrolled (the Manager has to enrol them).
 - Teacher – Editor: Same permissions as above, plus they can edit the courses they are enrolled in (the Manager has to enrol them).
 - Manager: This is a training administrator, focused on managing the users and the courses. He has permission to perform all the above actions in all the courses and to organise the users and their roles.
 - Administrator: This role is the top manager on the platform. It is focused on the possibility of making changes mainly at a technical level, although it also has the control over user accounts, roles, and permissions.

The roles management is key within the Moodle platform to provide the indicated permissions to the different users and the Manager or Admin can modify the permissions at any time (e.j. upgrading to Teacher an user initially indicated as Student). Moreover, one user can have different roles in different areas of the platform, for example, one single user can have Teacher permissions in one specific course and can be a Student in other course.

The options given by the platform allow creating private courses or contents for a specific group of users by using manual enrolment (see below).

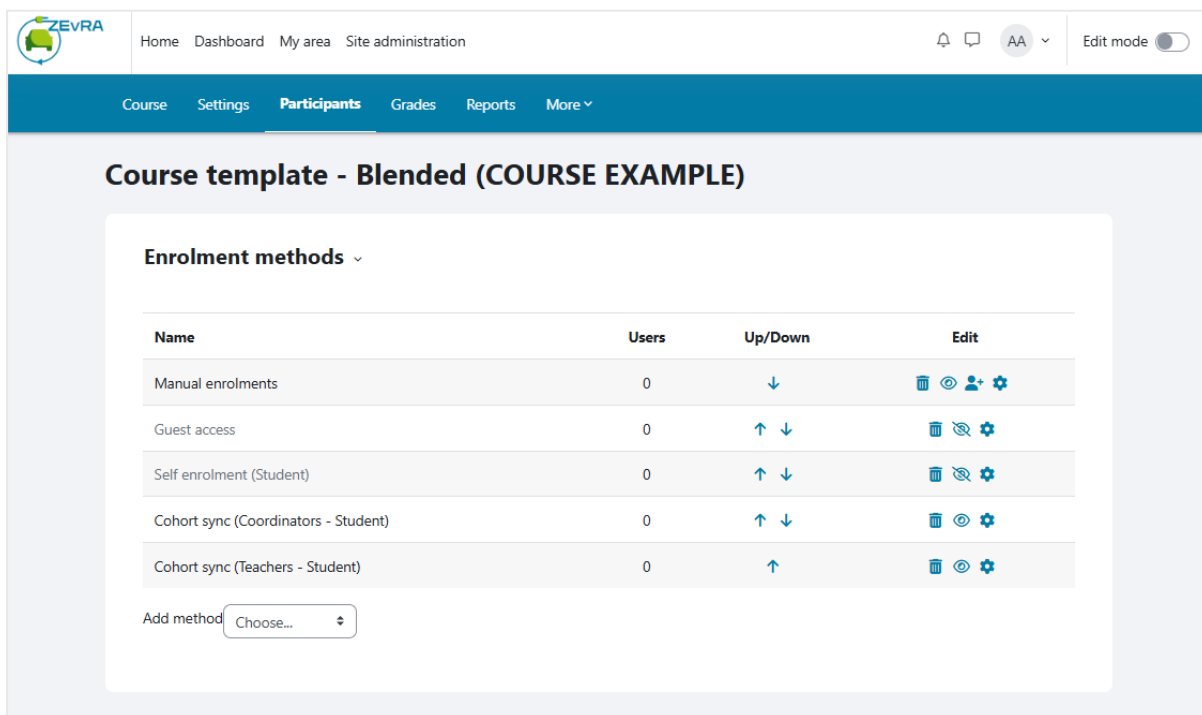
User authentication, enrolment management, and access control mechanisms ensure security and streamlined user experience.

Enrolment to the courses

Although the roles are administrated by the Manager, the platform asks to the users interested in the training activities a preliminary enrolment to the courses to effectively track their progress and provide indicators to the project coordinators. The enrolment to courses could be performed in several modalities:

- Autonomous (Self enrolment): the users enrol themselves to courses
- Upon approval (Manual enrolment): platform managers validate enrolment.
- Managed: a manager of the platform can include manually new users individually or in groups (bulk) by training managers importing lists of students in an Excel file.

The enrolment of students in groups generates entities called groups (or Cohorts), that groups students that facilitates course editions management.



The screenshot shows the ZEVRA platform interface. The top navigation bar includes 'Home', 'Dashboard', 'My area', and 'Site administration'. The main navigation bar has 'Course', 'Settings', 'Participants', 'Grades', 'Reports', and 'More'. The 'Participants' tab is active, showing a 'Course template - Blended (COURSE EXAMPLE)'. Below this, the 'Enrolment methods' panel is displayed, containing a table of enrolment methods.

Name	Users	Up/Down	Edit
Manual enrolments	0	↓	   
Guest access	0	↑ ↓	  
Self enrolment (Student)	0	↑ ↓	  
Cohort sync (Coordinators - Student)	0	↑ ↓	  
Cohort sync (Teachers - Student)	0	↑	  

Below the table, there is an 'Add method' section with a 'Choose...' dropdown menu.

Figure 5 Enrolment options panel

2.2.3 Menus

Inside the platform the users will find initially a home page that provides them access to the different menus, this view can change depending on the role and permissions of each user:

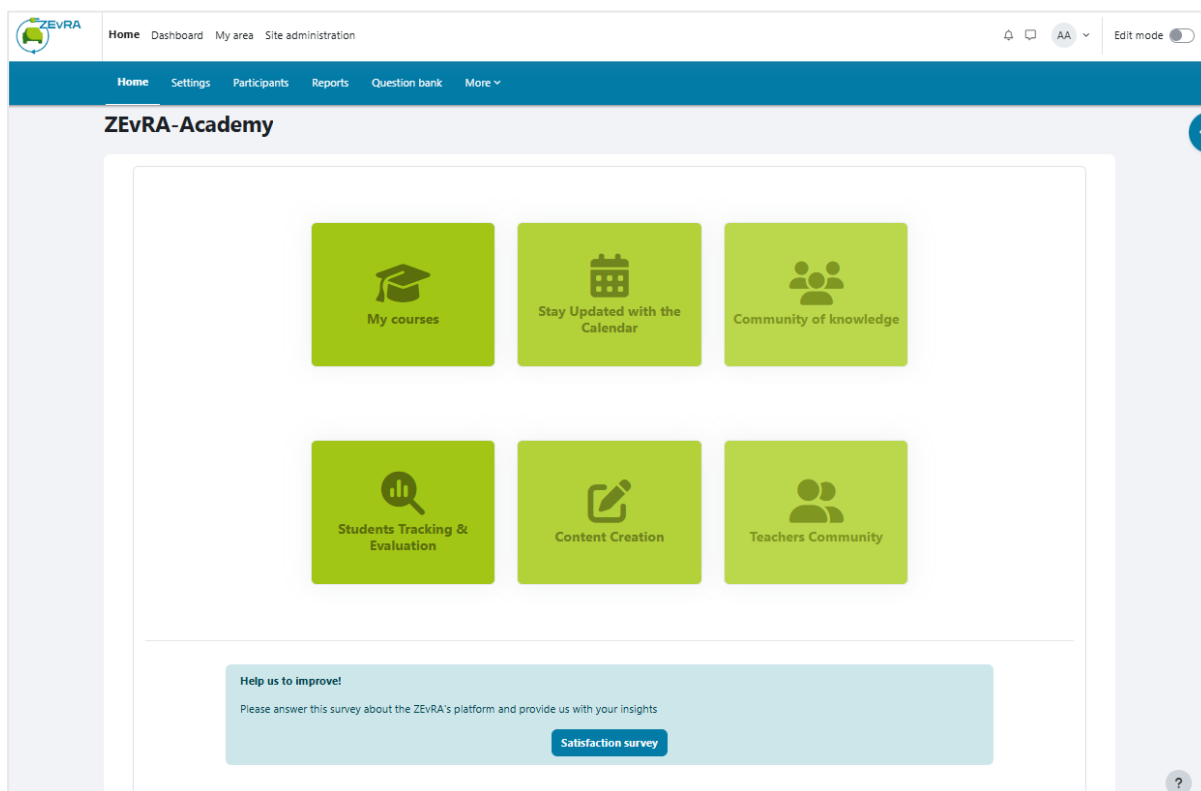


Figure 6 Information available once logged-in

The menus contain the following information:

- My courses: Access and manage your enrolled courses.
- Stay updated with the calendar: Keep track of important dates and deadlines.
- Community of knowledge: Engage with peers and share resources.
- Students tracking and evaluation: Monitor and assess student progress.
- Content creation: Develop and organize course materials.
- Teachers community: Collaborate and share best practices with other educators.

Although different permissions can be provided to the users, it can be shown two different menus, the three firsts are intended to be Student's areas, including the courses, calendar and community of knowledge (communication tools). And the three lasts are planned for Teachers (editors and non-editors) and Managers.

It can be seen the initial configuration regarding the access to the different menus considering the roles given:

Table 3 Access level assigned to roles

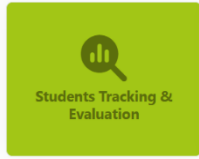
ACCESS	Administrator	Manager	Teacher	Student
My courses	X	X	X*	X*
Calendar	X	X	X	X
Community of knowledge	X	X	X	X
Students Tracking and Evaluation	X	X	X**	
Content Creation	X	X	X	
Teachers Community	X	X	X	

*Teachers and students can access only at the contents they are enrolled at.

**Teachers have access at this space only for the courses and users they are working with directly.

2.2.4 Trainer's area

As it can be seen above, the platform features three menus only accessible for teacher, manager and administrator roles. These three menus will be described here for better comprehension.



Students tracking and evaluation:
Within this menu the user will find some reports available to monitor and assess general students' progress and course completion.

Students Tracking & Evaluation

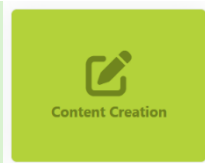
▼ **Reports** Collapse all

Here you will find direct access to various reports that will allow you to track platform usage and students' performance.

- 🔗 [Logged students \(DRAFT\)](#)
- 🔗 [Enrolled in courses \(DRAFT\)](#)
- 🔗 [List Students with enrollment and completion \(DRAFT\)](#)

Figure 7 Students tracking and evaluation resources

These are examples of reports, which can be modified according to the needs of the project



Content creation: Develop and organize course materials. Includes two submenus: Guidelines and resources for teachers and Templates.

Content Creation

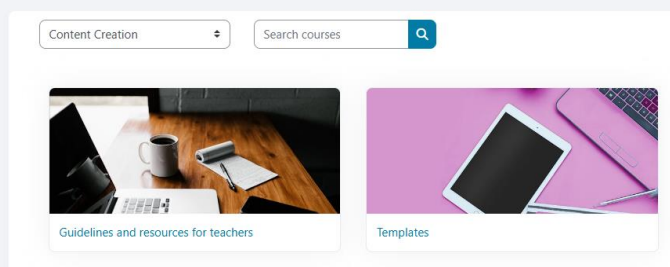


Figure 8 Content creation submenus

Within the first one, users can find information and guidelines for content creation, as for example how to record a video or how to use activity templates:

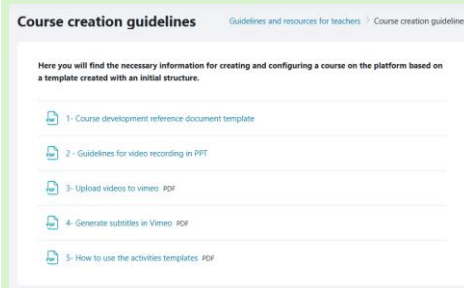


Figure 9 Content creation guidelines list

In the second one, Templates, the creator can use the structure for its new course:

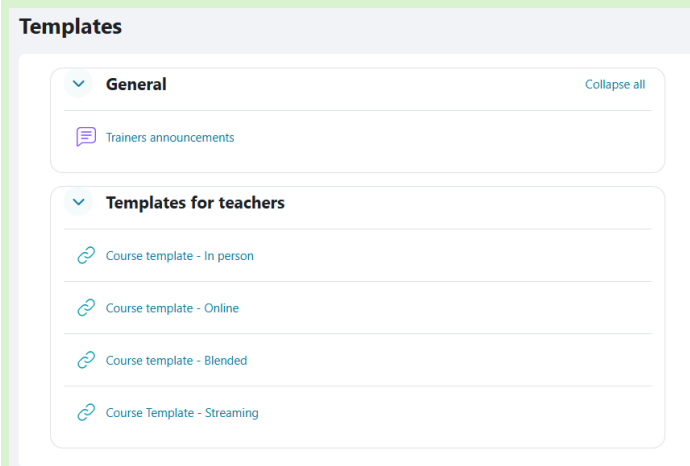
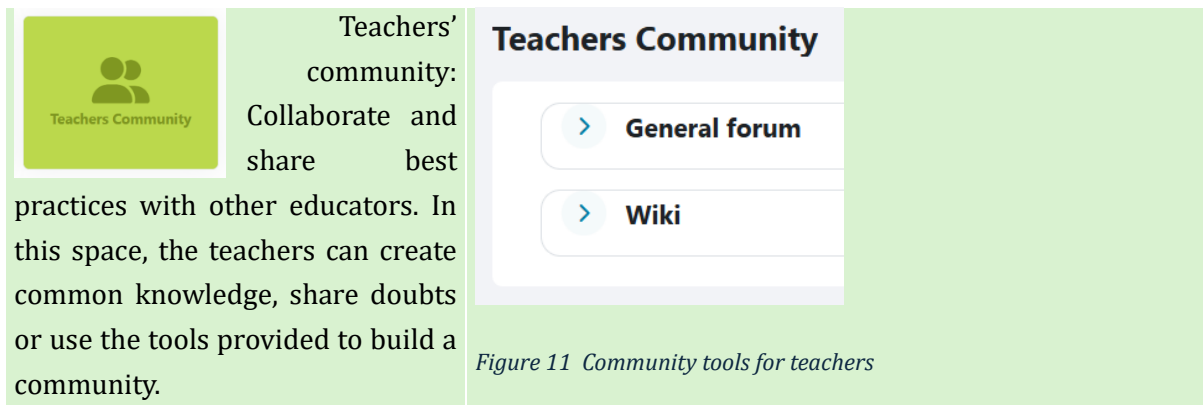


Figure 10 Templates for course creation list



This Trainers' area can be filled with as many resources as needed for the teachers and managers, in this space some interactive resources (e.g. sticky notes) are included to help teachers with their sessions, this area is flexible and can be enriched with more activities and resources according project's needs.

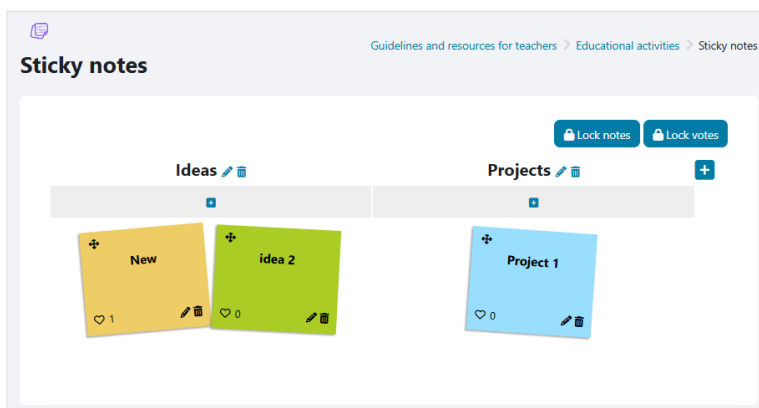


Figure 12 ZEvRA's platform registration and access.

2.2.5 Course management

The platform provides intuitive tools for creating, organizing, and managing courses.

Course administrators (Managers and Teachers-editors) can easily upload course materials, create assessment activities, and facilitate activities to engage learners effectively.

The platform could be used to host courses in several modalities:

- Self-training
- Tutored training
- Blended or hybrid courses

The platform is configured to host training content in Moodle native format or SCORM packages as are considered industry standards.

2.2.6 Content authoring and delivery

The platform offers versatile content authoring tools to create engaging and interactive learning materials.

Multimedia support allows for the integration of various types of content, including text, images, interactive activities, and video.

To help the course creators in the authoring tasks, several tools are provided:

- Guidelines for course creation
- Templates for courses, that following the guidelines, offer a simplified way to start the creation of courses.
- Other resources covering specific aspects of the contents creations (videos, bibliographies, references to external contents)

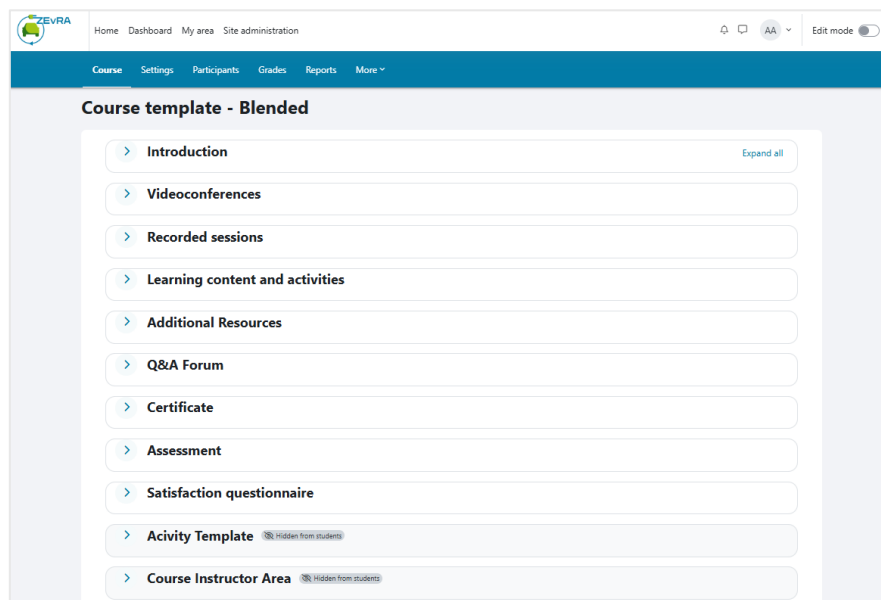


Figure 13 Example of template available in the platform

Common sections of the template for the courses are prefilled with suitable activities.

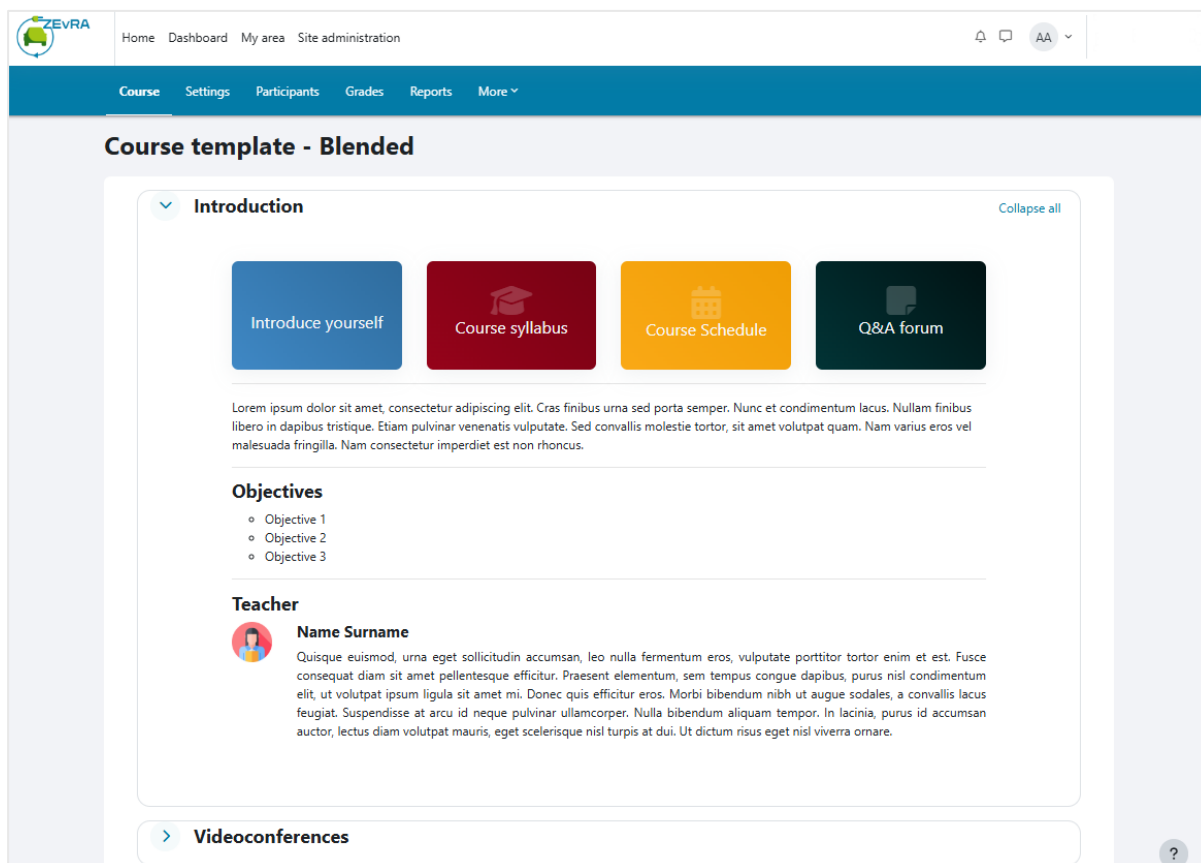


Figure 14 Example of structure content proposal

Eurecat will provide to the consortium members training sessions covering course creation, users' management, and basic platform management tasks to familiarize with the platform and its features.

2.2.7 Assessment instruments

The platform offers to the course developers assessment methods, including quizzes and questionnaires that can be used for self-assessment or for evaluation of performance of the students.

The resulting academic information that also includes the tracking of the participants through the content of the courses, will be easily retrieved using easy to use pre-configured reports. These reports will be available in every course management area, which is only accessible by the teacher, manager and administrator roles.

2.2.8 Feedback instruments

The platform prepared includes satisfaction questionnaires as a general instrument to gather feedback from the users of the courses and the platform.

Home Dashboard My area Site administration
Q [] [] Edit mode

[Course](#) |
 [Settings](#) |
 [Participants](#) |
 [Grades](#) |
 [Reports](#) |
 [More +](#)

Course template - Blended

- > Introduction [Expand all](#)
- > Videoconferences
- > Recorded sessions
- > Learning content and activities
- > Additional Resources
- > Q&A Forum
- > Certificate
- > Assessment
- Satisfaction questionnaire**

[Satisfaction questionnaire](#) Completion ▾

Training Satisfaction Survey

Course template - Online Course > Satisfaction questionnaire > Training Satisfaction Survey

Help us to improve!

Please answer the following questions about the ZEvRA training course you have attended.

There are 6 questions in this survey.

***This questionnaire is anonymous.
The information obtained here is collected for training improvement and reporting purposes only.*

Edit questions |
 Preview questions |
 Answer the questions

Mode Anonymous

1. Which training course have you completed?

2. How useful was the course in developing your knowledge and skills?

☐ Extremely useful

☐ Very useful

☐ Useful

☐ Slightly useful

☐ Not useful

3. Was the quality of the content consistent with the objectives?

☐ Strongly Agree

☐ Agree

☐ Neutral

☐ Disagree

☐ Strongly Disagree

4. How would you rate the learning materials in these courses? Were they interactive enough to keep you engaged and help you learn effectively?

☐ Excellent

☐ Good

☐ Neutral

☐ Poor

☐ Very Poor

5. How would you rate the overall training experience?

☐ Excellent

☐ Good

☐ Neutral

☐ Poor

☐ Very Poor

6. Do you have any additional comments or suggestions to improve our training program?

Submit your answers
Cancel

Figure 15 Satisfaction surveys for the courses

The image displays two screenshots related to the ZEvRA platform. The left screenshot shows the 'ZEvRA Academy' website, which features a navigation menu with links for Home, Settings, Test results, Support, Question bank, and More. The main content area includes six icons representing different features: My courses, Stay updated with the calendar, Community of knowledge, Feedback Training & Evaluation, Customized Questions, and Feedback Community. A red box highlights a feedback prompt at the bottom: 'Help us to improve! Please answer this survey about the ZEvRA platform and provide us with your insights.' Below this prompt is a 'Feedback survey' button. The right screenshot shows a prototype of the 'ZEvRA navigation platform'. It features the ZEvRA logo, a green car icon inside a circular arrow, and the text 'ZEvRA navigation platform'. Below this, a message states: 'We value your feedback to help us improve the platform. Please take a few minutes to explore the prototype and share your insights below.' At the bottom of the prototype is a button labeled 'Empezar ahora'.

Figure 16 Survey for platform improvement

2.2.9 Accessibility and multilanguage support

The platform is designed to be accessible to users with diverse needs and abilities, adhering to accessibility standards and best practices.

To facilitate the access to users with visual impairments, users can select different font sizes, high contrast colour combinations, and fonts typefaces to facilitate reading.

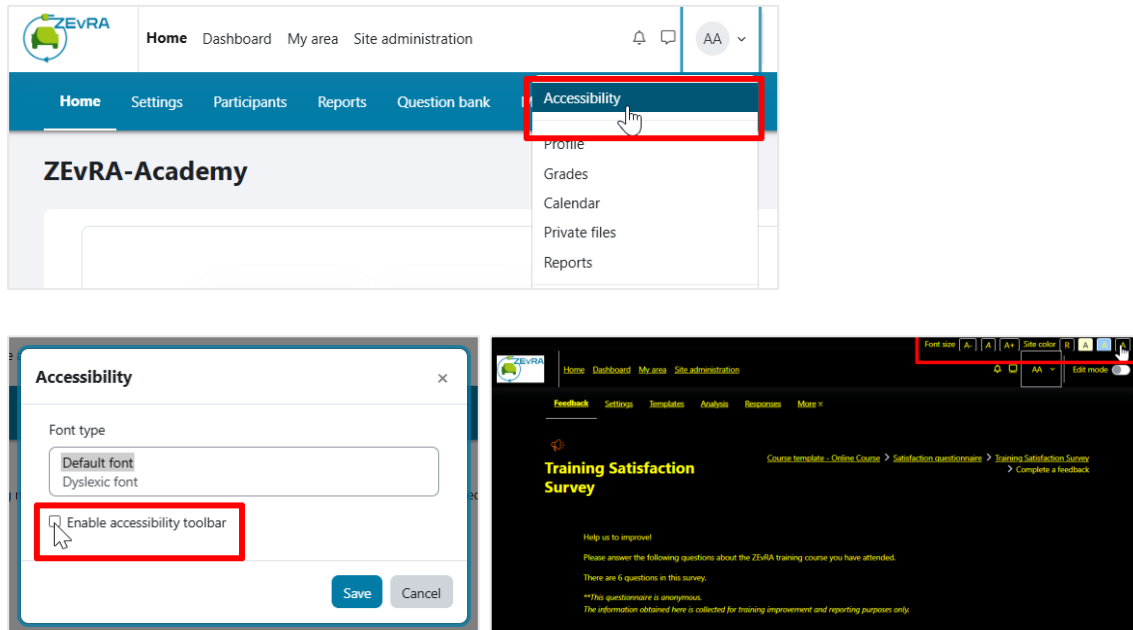


Figure 17 Reading aids configuration

Multilanguage support enables learners to access content in their preferred language, enhancing inclusivity and usability. The localised versions include two kinds of elements: the interface and the content itself. While there are existing language packages for the interface to allow navigation in multiple languages, the content should be translated manually.

2.2.10 Communication tools

The platform offers communication tools to maintain good quality communication with the users. Automatic messages are generated in key steps of the processes, like registration, enrolment, finishing. Purpose specific messages could be sent by teachers or managers to individual students or groups.

All automatic messages arrive to users directly from the messaging service of the platform. A whitelist tool (Twilio Sendgrid) is used to prevent messaging to go to spam folders.

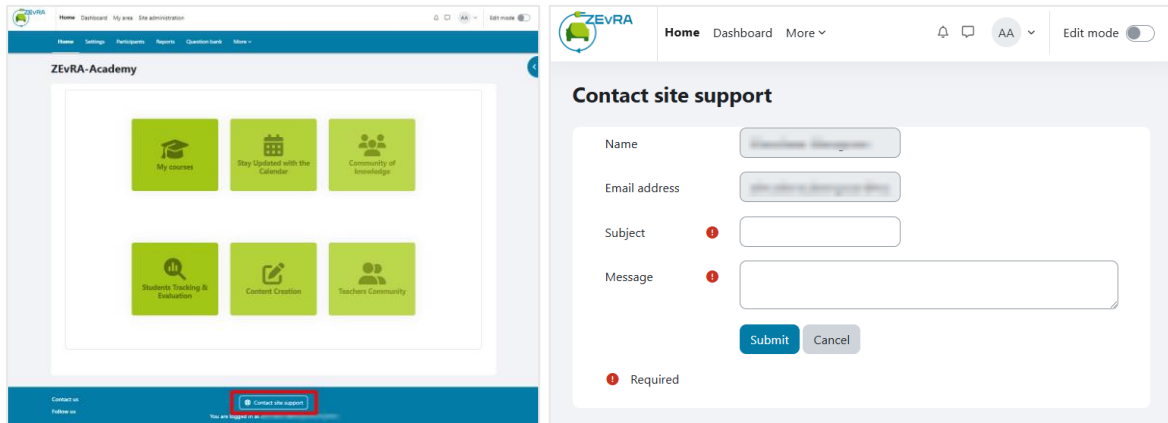


Figure 18 Contact site

A support email has been setup to receive messages from users: help.academy@eurecat.org. This email is configured to resend the messages to the corresponding team members. This generic email provides an improved contact point than personal emails since it could be reconfigured as project advances, redirecting to several people dynamically.

To provide support a frequently asked question section (FAQ) is available in the platform for all users.

2.2.11 Reporting

The ZEvRA training platform includes several tools to compile indicators that support a KPIs framework for assessing the effectiveness of the training program.

Reporting instruments are available for administrators of the platform and designated teachers in the trainer's area. These reporting instruments are intended to provide information at platform level.

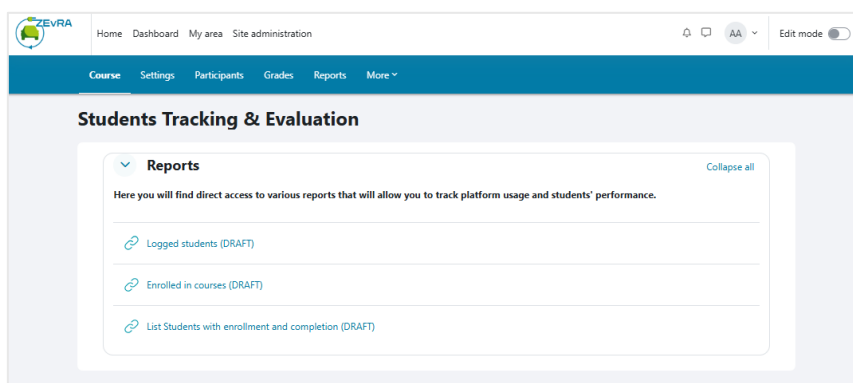


Figure 19 Reporting tools available in the trainer's area

Here are the key features:

- **Platform-Level Reporting**
 - User Activity Overview: Tracks overall user engagement across the platform.
 - Course Enrollment Statistics: Provides data on the number of users enrolled in each course.
 - Completion Rates: Shows the percentage of users who have finished courses.
- **Course-Level Reporting**
 - Individual User Tracking: Allows monitoring of a user's progress through specific activities within a course.
 - Content Engagement Metrics: Measures how users interact with different types of content (e.g., videos, quizzes, forums).
- **Data Integration and Analytics**
 - The platform's includes capabilities for:
 - Custom Report Generation: Likely allows for the creation of tailored reports to track specific KPIs.
 - Real-Time Monitoring: The platform offers real-time data updates, allowing for immediate performance insights. It enables quick identification of trends or issues and allows for timely adjustments based on current data.

All this information will be complemented with subjective data from user feedback as described in section **Feedback Instruments**

3 Post-Project Maintenance Plan

To ensure the long-term success and sustainability of the ZEvRA training platform, a comprehensive post-project maintenance plan is essential.

Oversight and Management

The maintenance and updates of the platform will be overseen by a dedicated team consisting of:

- A project manager from Eurecat, responsible for coordinating Technical maintenance activities
- One developers familiar with the Moodle LMS and the customizations made for ZEvRA
- One point of contact with the support staff comuncate user inquiries and feedback

This team will be responsible for implementing updates, addressing bugs, and ensuring the platform's continued alignment with project goals.

3.1 Open-Source considerations

The ZEvRA training platform will remain open-source after the project's completion. This decision aligns with the project's commitment to transparency and collaboration within the automotive industry. By maintaining its open-source status, we ensure that:

- The community can contribute to the platform's improvement.
- Other organizations can benefit from and build upon our work.
- The platform remains flexible and adaptable to future needs.

3.2 Accessibility Period

The ZEvRA training platform will remain accessible for a minimum of two years post-release. During this period:

- All courses and materials will be available to registered users
- The platform will allow the maintenance of the educational resources available.
- Support will be provided for users and administrators

After the two-year period, the consortium will evaluate the platform's usage and impact to determine if an extension of the accessibility period is warranted. We will explore partnerships with educational institutions and industry bodies to extend the platform's lifespan or investigate the possibility of transitioning the platform to a community-maintained project.

3.3 Maintenance and user support practices

To keep the platform current and functional, the following maintenance practices will be implemented:

- Continuous system monitoring and logging
- Security updates and patches will be installed when available by Moodle.
- Data Management: To ensure data integrity and security:
 - Regular backups will be performed
 - Data will be stored in compliance with EU data protection regulations
 - User data will be retained only for the duration necessary for the project's purposes

User Support

Ongoing support for platform users will be provided through:

- A dedicated help desk email: help.academy@eurecat.org
- Regular updates to the FAQ section
- Availability of satisfaction surveys to gather feedback and identify areas for improvement

4 Impact Assessment Aligned with EU Sustainability Goals

Platform's Contribution to EU Green Deal Objectives

The ZEvRA training platform aligns with the EU Green Deal's objectives by facilitating knowledge dissemination on circular economy practices in the automotive sector. The platform's impact can be assessed through:

- Number of users trained.
- Increase in knowledge and skills (pre- and post-training assessments)
- Application of learned concepts in professional settings (ex-post surveys)

Environmental Impact of the Platform

The digital nature of the platform contributes to reducing the environmental footprint of training activities mainly by reduction in travel-related emissions for training purposes and decrease in physical material usage (e.g., printed handouts)

5 GDPR Compliance and Data Privacy

To ensure compliance with the General Data Protection Regulation (GDPR) for EU users, the ZEvRA training platform implements several key measures:

Data Collection and Consent

The platform only collects necessary personal data from users, such as names, email addresses, and course progress information. Clear opt-in forms are provided during registration, explaining why data is collected and how it will be used. Users can accept or reject cookies through a banner, and can opt-out of communications at any time.

Data Security and Access

Robust security measures are in place to protect user data, including encryption and access controls. The platform implements data protection "by design" and "by default", ensuring privacy-friendly settings from the start.

User Rights

Users can request a digital copy of their personal data or ask for its deletion, with the platform obligated to fulfill these requests within one month at no charge. Easy-to-find options for data requests are provided within the platform interface.

Intellectual Property Rights

The ownership of training materials created for the ZEvRA platform is a complex issue that depends on several factors:

- Faculty-created content: In many cases, professors retain full copyright ownership of the traditional academic materials they create⁵. However, this may be subject to university policies or specific agreements.
- Work-for-hire: If materials are created as part of an employee's job duties, the employer (in this case, the project or institution) may own the copyright.
- Collaborative work: Materials created collaboratively may have shared ownership among contributors.

To clarify usage rights and prevent unauthorized redistribution:

- Clear licensing agreements are established with users, outlining how content can be used and prohibiting unauthorized sharing or reselling.
- Terms of use are displayed prominently, and users must agree to them before accessing course materials.

- The platform's terms and conditions explicitly state that users may not copy, redistribute, or republish materials without written permission.
- Exclusive vs. non-exclusive licensing agreements are considered for distribution through third-party platforms. Attribution requirements are specified for any authorized use of materials.

6 Early Feedback and Improvement Process

In the final stages of the platform development, we implemented a early check step to gather feedback from the training Work Package participants. This proactive approach aimed to identify potential areas for improvement and ensure the platform's alignment with the project's training objectives.

Feedback Gathering Process

- **Platform Preview:** We provided the training WP team with early access to a beta version of the platform.
- **Structured Feedback Sessions:** We organized online meetings and workshops to walk the team through the platform's features and functionalities.
- **User Testing:** Team members were encouraged to interact with the platform, simulating real-world usage scenarios.
- **Feedback Collection:** We used surveys and open-ended questionnaires to collect feedback on various aspects of the platform, including usability, content organization, and technical performance.

With the gathered Information after the first survey, the development team will proceed to improve the areas of the Platform that have been pointed out by the participants in the internal review.

7 Summary

The development and implementation of the training platform for the ZEvRA's project represent a significant milestone in the project's mission to enhance the capabilities of automotive professionals, researchers, students and citizens. Through this comprehensive Learning Management System (LMS), the stakeholders gain access to a diverse range of courses tailored to address various aspects of professional development and specialized technical competencies.

Utilizing the versatile open-source Moodle platform has enabled the creation of a robust framework for delivering educational content, fostering collaboration, and tracking learner progress. The platform's user-friendly interface, coupled with extensive customization options, ensures a positive and engaging learning experience for both educators and learners.

Key features such as centralized access, content consistency, scalability, and robust analytics contribute to the platform's effectiveness in meeting the project's objectives. The flexibility of the platform allows for the creation of diverse course formats, accommodating the unique needs of automotive professionals across different institutions and countries. The platform's adherence to educational standards, including SCORM compliance and accessibility best practices, ensures the delivery of high-quality educational content to learners.

The establishment of clear roles and permissions within the platform facilitates effective course management and user engagement. Managers and Administrators have control over user accounts, roles, and permissions, ensuring security and streamlined user experience. Additionally, robust assessment instruments and feedback mechanisms enable educators to evaluate learner progress effectively and continuously improve course content and delivery.

The long-term sustainability of the platform is supported by its open-source nature, easy maintenance, and strategic advantage in addressing the ongoing training needs of multiple institutions. By providing ongoing access to training resources beyond the project's duration, the platform contributes to the continued professional development of automotive professionals and the stakeholders advancement of automotive practices.

8 References

ⁱ<https://pressbooks.pub/lidtfoundations/chapter/connectivism-a-learning-theory-for-the-digital-age/>

ⁱⁱ [Conectivismo como teoría de aprendizaje: conceptos, ideas y posibles limitaciones. - Dialnet \(unirioja.es\)](#)

ⁱⁱⁱ<https://books.google.es/books?id=kPB-L4lcOoC&printsec=copyright&hl=es#v=onepage&q&f=false>

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