



WARP PROJECT

WASTE AND RECYCLING PRACTICES FOR DUAL
TRANSITION IN VOCATIONAL EDUCATION

PROJECT NUMBER
101183410

D2.1 Virtual Learning Space



Co-funded by
the European Union

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

Document Information

Project Full Title	Waste and Recycling Practices for Dual Transition in Vocational Education
Project Acronym	WARP
Programme	ERASMUS-EDU-2024-CB-VET
Project Number	101183410
Start Date	01.01.2025
Ending date	31.12.2027
Deliverable	D2.1 Virtual Learning Space
Work Package	WP2
Date of Delivery (in months)	M19 (July 2026)
Lead Organization	ReadLab P.C.
Dissemination Level	PU-Public
Type	OTHER
Authors	ReadLab P.C
Document Description	This deliverable presents the WARP Virtual Learning Space (VLS), describing its technical architecture, educational structure and core functionalities. It outlines the methodology followed for the platform's design and development, the implementation of multilingual learning pathways, user navigation, accessibility features and the integration of the WARP Open Educational Resources. The document demonstrates how the Virtual Learning Space supports the project's pedagogical objectives by providing a robust, user-friendly and sustainable digital environment for Vocational Education and Training (VET) professionals across Europe.

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or EACEA. Neither the European Union nor the granting authority can be held responsible for them.

Disclaimer

The information, documentation and figures in this deliverable are written by the WARP project consortium under EC grant agreement 101183410 and do not necessarily reflect the views of the European Commission. The European Commission is not liable for any use that may be made of the information contained herein.

This deliverable contains original unpublished work except where clearly indicated otherwise. Acknowledgement of previously published material and of the work of others has been made through appropriate citation, quotation, or both. Reproduction is authorised provided the source is acknowledged.

Any dissemination of results reflects only the author's view, and the European Commission is not responsible for any use that may be made of the information it contains. The sole responsibility for the content of this publication lies with the authors.

Copyright message (only for public reports)

This report, if not confidential, is licensed under a Creative Commons Attribution 4.0 International License (CC BY 4.0); a copy is available here: <https://creativecommons.org/licenses/by/4.0/>.

Document History (only major changes to the document structure)

Version	Date	Submitted by	Reviewed by	Notes
VER0	15/07/2026	ReadLab P.C.		
VER1				
VER2				

Document Location

The latest version of this controlled document is stored in Basecamp.

Table of Contents

List of Tables	5
List of Figures	5
Executive Summary	6
1. Introduction	9
2. Technical Specifications	10
2.1 Methodology.....	11
2.2 Analysis	13
2.3 Design.....	14
2.4 Development	16
2.5 Open Educational Resources Licensing.....	18
2.6 Platform Availability and Maintenance	19
3. The WARP Virtual Learning Space	20
3.1 Landing Page.....	20
3.2 Registration/Login.....	22
3.3 Footer	25
3.4 Account Features.....	25
3.5 Module Content and Navigation.....	28
3.5.1 Learning Structure	29
3.5.2 Delivery and interface	32
3.5.2.1 Theoretical Content	33
3.5.2.2 Multimedia Resources	33
3.5.2.3 Interactive Activities	35
3.5.2.4 Self-assessment.....	37
3.5.2.5 Discussion Forums.....	38
3.5.3 Customisable learning experience	38
3.6 Assessments.....	38
3.7 Accessibility.....	40
3.7.1 WAVE Report.....	41
4. Future Development and Validation	43
5. Conclusion	44

List of Tables

Table 1 Table of Abbreviations	8
--------------------------------------	---

List of Figures

Figure 1 Example of a WARP Module development in RISE Articulate	11
Figure 2 ADDIE instructional design model	13
Figure 3 WARP VLS Mockup 1 - Landing Page and Modules List	15
Figure 4 WARP VLS Mockup 2 - Module screen and Forum	15
Figure 5 WARP Landing Page - AL	17
Figure 6 WARP Landing Page - EL	17
Figure 7 WARP Landing Page - ES	18
Figure 8 WARP VLS Licensing	19
Figure 9 WARP Landing Page - EN	21
Figure 10 WARP VLS log in screen	23
Figure 11 WARP VLS user registration form	24
Figure 12 WARP VLS Footer	25
Figure 13 WARP VLS My courses page	26
Figure 14 WARP VLS user profile page	26
Figure 15 WARP VLS Menu	27
Figure 16 WARP VLS Modular organisation - example	28
Figure 17 WARP Learning pathways overview	30
Figure 18 WARP VLS Modules - starting screen	31
Figure 19 WARP VLS - Module structure	31
Figure 20 WARP VLS Module progress indication	32
Figure 21 WARP VLS Module - Theoretical content example	33
Figure 23 WARP VLS Modules - multimedia content – pie chart	34
Figure 24 WARP VLS Modules - multimedia content – graphics	35
Figure 25 WARP VLS Modules - concept matching activities	36
Figure 26 WARP VLS Modules - downloadable content	36
Figure 27 WARP VLS Modules - Case studies	37
Figure 28 WARP VLS – Modules - flashcards and multiple-choice quizzes	37
Figure 29 WARP VLS Module-integrated assessment quiz example	39
Figure 30 WARP VLS Accessibility options screen	40
Figure 31 WARP VLS WAVE accessibility evaluation	41

Executive Summary

This deliverable presents the WARP Virtual Learning Space (VLS), developed by ReadLab under Task 2.1 – Design and Delivery of the Virtual Collaboration and Training Space. The platform constitutes the project's central digital learning environment, supporting the implementation of the WARP educational programme by providing VET educators and trainers with a collaborative, multilingual and accessible online space for professional development, knowledge exchange and lifelong learning. Developed using the Moodle Learning Management System (LMS), the Virtual Learning Space integrates the project's Open Educational Resources (OERs) developed under Task 2.2 of the project, including interactive learning activities, assessment mechanisms and collaborative tools into a unified educational ecosystem.

The report documents both the technical and pedagogical development of the platform, presenting the principles, methodologies and implementation processes that guided the creation of the WARP Virtual Learning Space. Particular emphasis is placed on usability, accessibility, multilingual delivery and learner-centred instructional design, ensuring that the platform effectively supports the diverse professional needs of the project's target groups.

Following the introductory chapter, Chapter 2 presents the technical specifications of the Virtual Learning Space. It describes the technological infrastructure supporting the platform together with the development methodology adopted throughout the implementation process. The chapter further analyses the three successive phases of the project—Analysis, Design and Development—highlighting how educational requirements were translated into a fully operational digital learning environment through iterative planning, consortium feedback and continuous platform refinement.

Chapter 3 provides a comprehensive overview of the WARP Virtual Learning Space from the perspective of the end user. It presents the platform's main interface and navigation structure, including the Landing Page, user registration and authentication process, personalised account features and the organisation of the educational content. The chapter also describes the modular architecture of the learning programme, the different learning components incorporated into the Open Educational Resources, the four learner pathways based on the project's target groups, the structure of the sixteen WARP Learning Units, the integrated assessment framework and the accessibility features that ensure an inclusive learning experience across all partner countries.

Finally, Chapter 4 summarises the outcomes of the platform development and reflects on the contribution of the Virtual Learning Space to the implementation of the WARP Capacity Building Programme. It highlights the platform's role as a sustainable digital environment that supports professional development, collaborative learning and the long-term exploitation of the educational resources developed throughout the project.

Overall, this deliverable demonstrates how the WARP Virtual Learning Space transforms the project's pedagogical framework into a solid and user-centred digital ecosystem, capable of supporting high-quality vocational education and fostering collaboration among VET educators beyond the lifetime of the project.



Table 1 Table of Abbreviations

Abbreviation	Definition
AL	Albanian
API	Application Programming Interface
AJAX	Asynchronous JavaScript and XML
CC BY-NC 4.0	Creative Commons Attribution-NonCommercial 4.0 International License
CSS	Cascading Style Sheets
EL	Greek
ES	Spanish
EU	European Union
GDPR	General Data Protection Regulation
HTML	HyperText Markup Language
LMS	Learning Management System
OER(s)	Open Educational Resource(s)
PHP	Hypertext Preprocessor
QA	Quality Assurance
REST API	Representational State Transfer Application Programming Interface
VET	Vocational Education and Training
VLS	Virtual Learning Space
WARP	Waste and Recycling Practices for Dual Transition in Vocational Education
WP	Work Package

1. Introduction

The WARP Virtual Learning Space (VLS) has been developed within the framework of Task 2.1 – Design and Delivery of the Virtual Collaboration and Training Space as the project's central digital environment for learning, collaboration and professional development. The platform has been designed to support the implementation of the WARP educational methodology by providing VET educators and trainers with a modern, accessible and interactive online environment where they can access the project's educational resources, participate in collaborative activities and enhance their professional competences. The Virtual Learning Space constitutes one of the project's core digital outputs, supporting the delivery of the WARP curriculum through a structured and user-friendly learning experience.

Developed on the Moodle Learning Management System (LMS), the platform integrates the 16 WARP learning units together with a wide range of digital learning resources, including interactive learning materials, multimedia content, discussion forums and assessment activities. The learning environment has been designed to facilitate both individual self-paced learning and collaborative knowledge exchange, while supporting multilingual delivery in English and all partner languages (AL, EL, and ES), in accordance with the project's requirements.

Beyond serving as a repository of educational content, the Virtual Learning Space has been developed as an integrated digital ecosystem that encourages active participation, communication and continuous professional development. Its architecture combines intuitive navigation, learner-centred instructional design and collaborative learning functionalities, enabling participants to engage with the educational material while exchanging experiences and best practices with fellow educators across the partnership.

This deliverable presents the design principles, technical architecture and educational structure of the WARP Virtual Learning Space. It describes the development methodology followed throughout the project, the core platform functionalities and the organization of the learning content, providing a comprehensive overview of the digital environment developed to support the implementation of the WARP Capacity Building Programme.

2. Technical Specifications

The WARP Virtual Learning Space is linked to the project website <https://warp-project.eu/> and is accessible at the subdomain <https://vle.warp-project.eu/>. The VLS is built upon the Moodle Learning Management System (LMS), an open-source platform widely adopted for the delivery of online education and collaborative learning. Moodle provides a stable and extensible digital environment that enables the creation, management and delivery of structured educational programmes while supporting communication, assessment and learner engagement.

The platform follows Moodle's modular architecture, allowing the integration of a wide range of educational functionalities through configurable plugins and system extensions. This approach provides the flexibility required to accommodate the WARP learning programme, including course management, multilingual content delivery, interactive learning activities, discussion forums and learner assessment.

From a technical perspective, Moodle is built on a modular architecture that enables flexible customisation and seamless integration with external systems. Moodle is developed primarily using PHP, while its user interface relies on HTML, CSS and JavaScript technologies. Responsive design is achieved through the Bootstrap framework, ensuring that the platform remains fully accessible across desktop and mobile devices. Interactive elements are supported through JavaScript technologies, providing a dynamic and user-friendly learning experience.

The WARP platform utilises MariaDB as its database management system, providing reliable storage for user accounts, educational resources, enrolment information, assessment results and activity records. This architecture ensures secure data management while supporting the scalability required for the project's multilingual implementation. In addition, Moodle provides comprehensive monitoring and reporting capabilities that allow administrators to track learner participation and platform usage. User activities—including authentication, course access, learning progress, assessment attempts and interaction with educational resources—are securely recorded and can be analysed through Moodle's native reporting functionalities. These features support both project monitoring and quality assurance activities throughout the implementation of the WARP learning programme.

Finally, the platform benefits from Moodle's extensive interoperability and integration capabilities. Through its plugin ecosystem and REST API architecture, the Virtual Learning Space can be extended with additional functionalities and external services whenever required, ensuring long-term flexibility and supporting the future evolution of the WARP digital learning environment.

2.1 Methodology

The development of the WARP Virtual Learning Space followed a structured, iterative and user-centred methodology, ensuring that both the technical implementation and the educational design remained aligned with the objectives of the project and the needs of its target groups. Rather than adopting a purely technical development approach, the platform was created through successive design, validation and refinement cycles, involving both the consortium partners and future end users. This collaborative process ensured that pedagogical requirements, technical functionality and usability considerations evolved simultaneously throughout the implementation of Task 2.1.

The overall methodology combined instructional design principles with agile software development practices. Platform requirements were first identified based on the objectives of the WARP curriculum and the needs of VET educators and trainers. These requirements guided the preparation of the platform architecture, the selection of the technological infrastructure and the definition of the user experience before any implementation activities commenced. Initial interface mock-ups were then developed and presented to the consortium by ReadLab, allowing partners to validate the proposed structure and provide feedback prior to the development phase.

Following the approval of the initial design, the English version of the Virtual Learning Space was developed using the RISE Articulate platform and Moodle as the underlying Learning Management System. During this stage, the platform structure, navigation, learning environment and visual identity were progressively implemented while maintaining continuous communication with the consortium to ensure alignment with the project's educational objectives. As educational resources became available, they were gradually integrated into the platform, allowing both technical functionality and learning content to evolve in parallel.

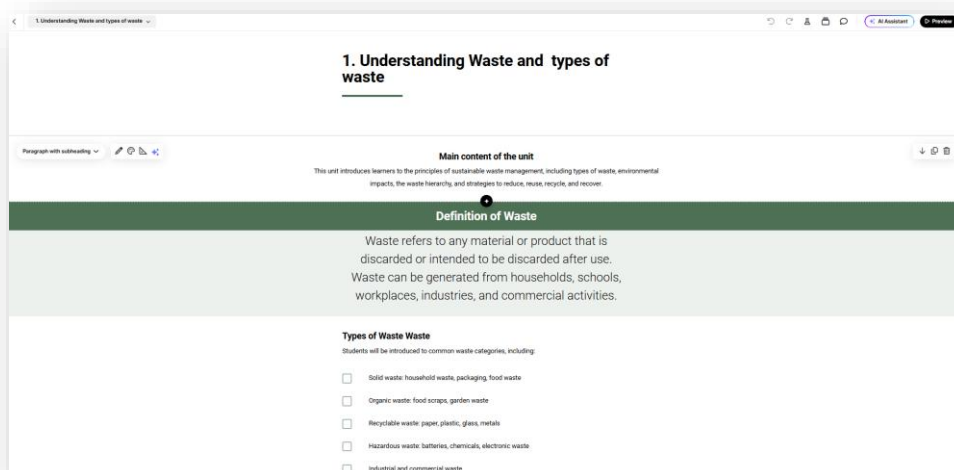


Figure 1 Example of a WARP Module development in RISE Articulate

An iterative quality assurance process accompanied the platform development, following the procedural framework described in the WARP Quality Assurance Plan (D4.2). Consortium partners participated in multiple review cycles throughout the development process. Feedback was collected through dedicated online consortium meetings, email communication and demonstrations of successive platform versions, during which partners evaluated the platform's structure, navigation, usability and overall learning experience. The observations and recommendations received during these review stages were systematically incorporated into subsequent revisions before proceeding with multilingual deployment.

Following the implementation of the English version, the platform content underwent automatic translation into all partner languages (AL, EL and ES). Native-speaking consortium partners subsequently reviewed and validated the translated content, verifying linguistic accuracy, terminology consistency, navigation and the correct display of multilingual learning materials before final publication.

The final stage of the development process focused on platform refinement and deployment. Following the successful deployment of the WARP Virtual Learning Space, a structured piloting phase, as foreseen within the project implementation, will be conducted with the participation of consortium partners and representative end users. The piloting activities will include functional testing of the platform's core services, evaluation of usability and navigation, verification of multilingual content delivery and assessment of the overall learning experience. The feedback collected during this phase, through the use of dedicated questionnaires, will inform the final optimisation of the platform, ensuring its readiness to support the delivery of the WARP educational resources and future capacity-building activities.

As the technical coordinator of the WARP Virtual Learning Space, ReadLab adopted the core principles of the ADDIE instructional design model to structure the platform development process. This approach supported the effective allocation of responsibilities among consortium partners, enabled parallel implementation activities and ensured a systematic progression through the analysis, design, development, implementation and evaluation phases. The main stages of the adopted methodology are presented in the following figure.



Figure 2 ADDIE instructional design model

2.2 Analysis

The analysis phase established the foundations for the development of the WARP Virtual Learning Space by translating the pedagogical objectives of the project into a coherent set of functional and technical requirements. Based on the specifications of Task 2.1, the primary objective was to create a digital environment capable of supporting collaborative learning, knowledge exchange and the delivery of the WARP educational programme while remaining intuitive, accessible and scalable for all consortium partners.

During this stage, ReadLab worked closely with the consortium to identify the platform's functional requirements, expected user experience and technical capabilities. Particular attention was given to the organisation of the learning environment, multilingual support, accessibility requirements, user management, assessment mechanisms and collaborative functionalities such as discussion forums and learner interaction tools. These requirements were continuously validated through consortium meetings and discussions

before being translated into the platform architecture.

In parallel, different technological solutions were evaluated in relation to the project's educational and technical requirements. Moodle was selected as the most appropriate Learning Management System due to its flexibility, open-source architecture, extensive customisation capabilities and mature ecosystem for delivering multilingual online edu-

cation. Its compatibility with interactive educational content, user management, assessment activities and reporting functionalities made it particularly suitable for supporting the implementation of the WARP curriculum.

The analysis phase also included the definition of the platform's information architecture. The overall structure, course hierarchy and learning pathways were designed around the educational framework established in the WARP project proposal, which organises the learning programme into four target groups: New VET Trainers, Seasoned VET Trainers, VET Educational Designers and Professionals in Continuous Development. The corresponding learning pathways and thematic learning units were subsequently validated through the needs analysis conducted under WP1, confirming their relevance to the identified training needs of the target audiences. Based on these findings, the proposed educational structure was maintained and incorporated into the architecture of the Virtual Learning Space, ensuring a coherent learning experience across all partner languages (AL, EL, and ES) while supporting the implementation of the WARP Open Educational Resources.

2.3 Design

Building upon the outcomes of the analysis phase, the design stage focused on translating the identified requirements into a coherent and user-centred digital learning environment. Before any technical implementation commenced, detailed platform mock-ups were prepared to visualise the overall structure, navigation logic and user interface of the Virtual Learning Space. These mock-ups enabled the consortium to evaluate the proposed architecture and ensure that the educational objectives of the project were accurately reflected in the platform design.

The design process followed an iterative approach based on continuous collaboration between ReadLab and the project partners. Mock-ups were presented during consortium meetings, where partners reviewed the proposed layouts, learning structure and navigation flow. The feedback received was systematically incorporated into successive revisions, allowing the platform design to mature before entering the development stage. This collaborative validation process ensured that both pedagogical and technical considerations were addressed early in the implementation process.

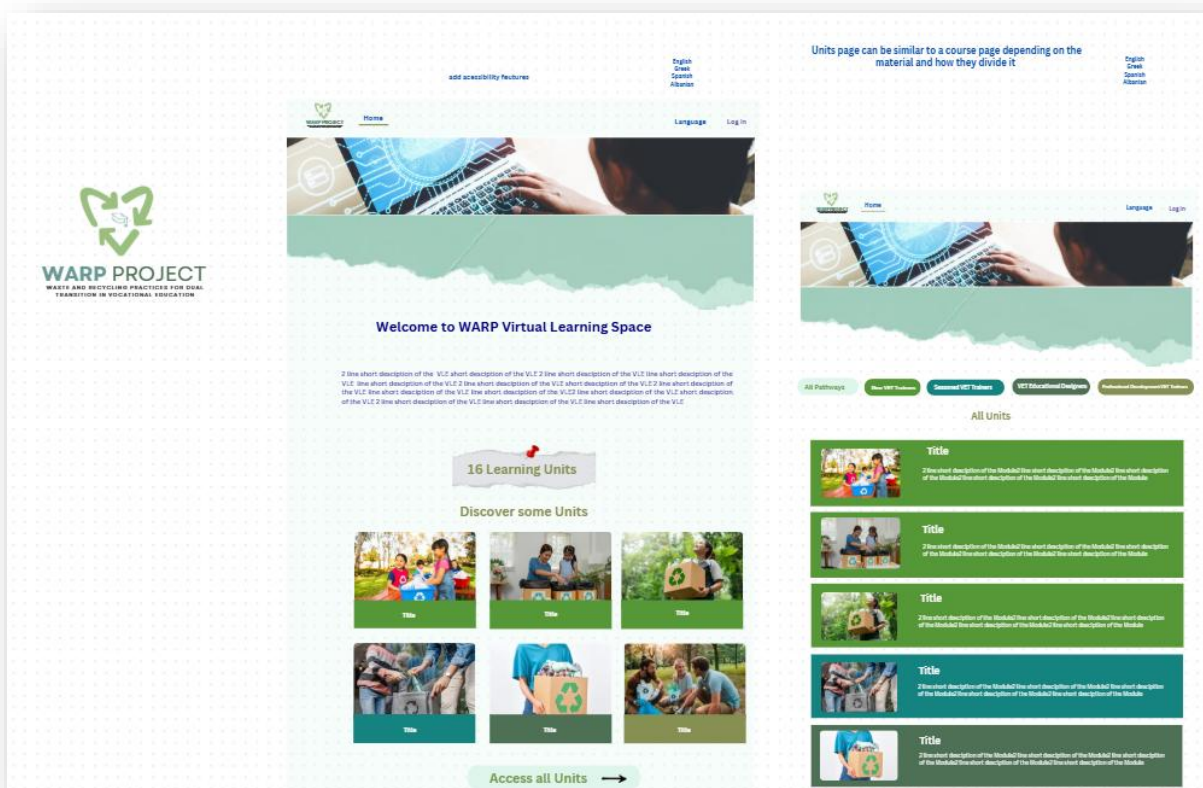


Figure 3 WARP VLS Mockup 1 - Landing Page and Modules List

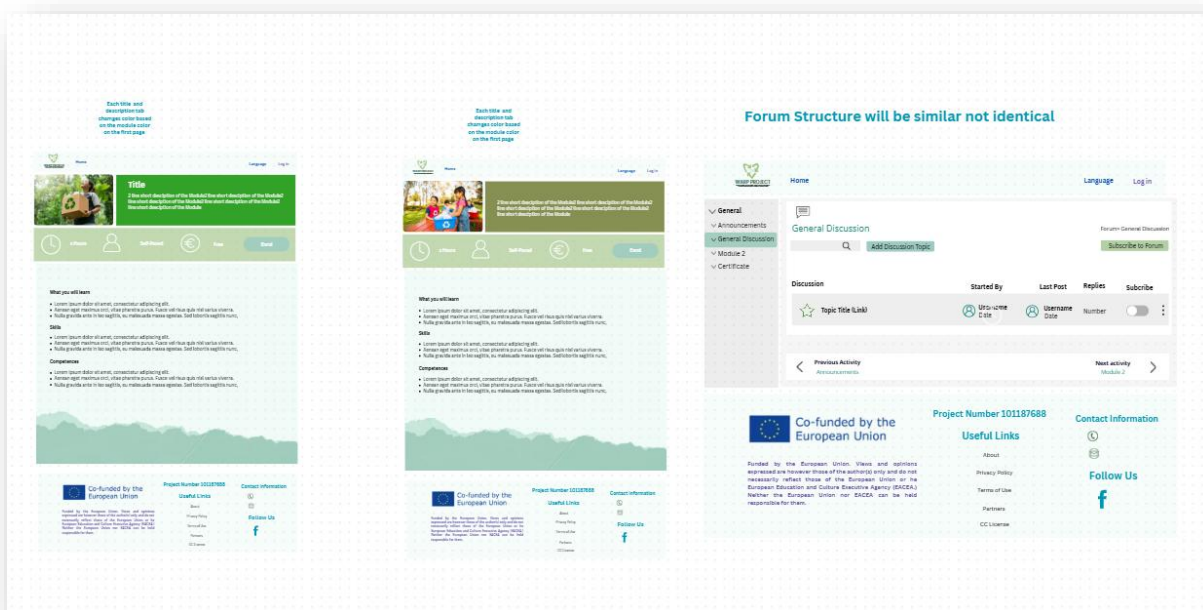


Figure 4 WARP VLS Mockup 2 - Module screen and Forum

Special emphasis was placed on usability, intuitive navigation and visual consistency. The interface was designed to minimise cognitive load, allowing users to access learning materials efficiently while maintaining a clear overview of their progress within each course. The platform layout also supports responsive access across multiple devices, ensuring that learners can participate regardless of their preferred device or location.

2.4 Development

The development phase transformed the validated platform design into a fully operational Virtual Learning Space using the Moodle Learning Management System. Development activities initially focused on establishing the platform infrastructure, configuring user management functionalities, implementing the course architecture and adapting the visual identity to reflect the WARP project branding.

Once the core platform structure had been established, the integration of the educational content proceeded progressively alongside the development of the Open Educational Resources under Task 2.2. Rather than waiting for the completion of all learning materials, platform implementation and content integration evolved in parallel, allowing continuous testing of navigation, course organisation and learning workflows throughout the development process.

Following the completion of the English version, the platform entered a multilingual deployment phase. Automatic translation was performed for all partner languages (AL, EL, and ES) and subsequently reviewed by native-speaking consortium members to verify linguistic quality, terminology consistency and the overall user experience. This collaborative review process ensured that the educational content remained accurate and culturally appropriate across all language versions before the platform reached its final release stage.



Figure 5 WARP Landing Page - AL



Figure 6 WARP Landing Page - EL



Figure 7 WARP Landing Page - ES

Throughout development, successive platform review cycles were organised to evaluate functionality, usability and overall performance. Feedback gathered during these reviews informed further refinements until the Virtual Learning Space reached its final configuration. The completed platform now provides a stable digital environment supporting the delivery of the WARP educational programme, collaborative interaction among VET professionals and the long-term availability of the project's Open Educational Resources.

2.5 Open Educational Resources Licensing

All educational resources developed within the WARP Virtual Learning Space are released under the Creative Commons Attribution–NonCommercial 4.0 International (CC BY-NC 4.0) licence [<https://creativecommons.org/licenses/by-nc/4.0/deed.en>]. This licensing model reflects the project's commitment to openness, knowledge sharing and the long-term sustainability of its educational outputs by enabling educators, trainers and institutions to access, use, adapt and redistribute the learning materials for non-commercial purposes, provided that appropriate attribution is given to the original source.

Accordingly, users are permitted to:

- share the educational resources by copying and redistributing the material in any medium or format for non-commercial purposes;
- adapt the materials by remixing, transforming and building upon them for non-commercial purposes;
- provide appropriate attribution to the original source, include a reference to the CC BY-NC 4.0 licence and clearly indicate whether any modifications have been

made.

The licence does not permit the use of the educational resources for commercial purposes without obtaining additional permission from the copyright holder.

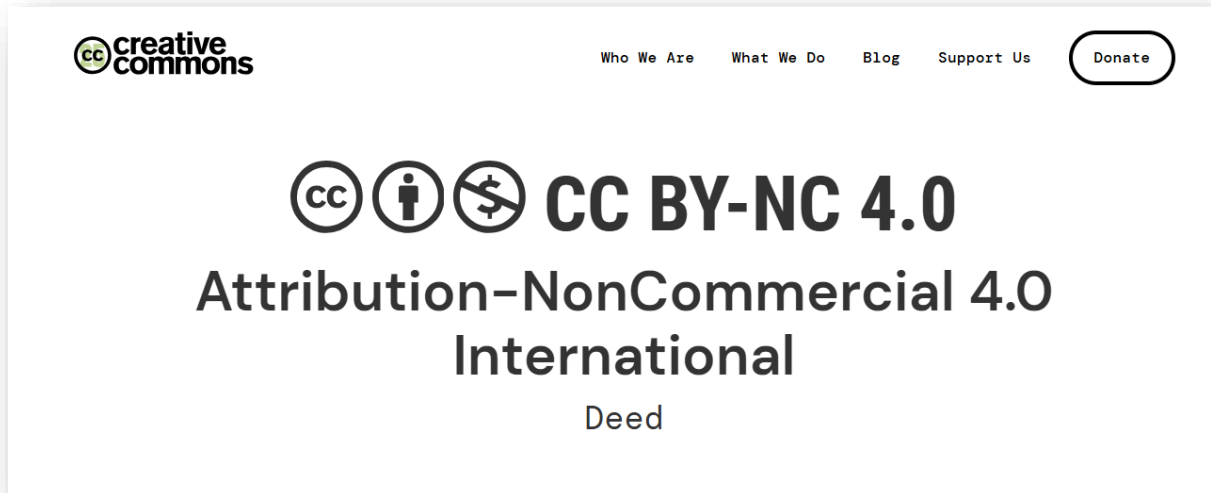


Figure 8 WARP VLS Licensing

By adopting this licensing approach, the WARP project ensures that its educational resources remain openly available for teaching, learning and capacity-building activities, encouraging their reuse, localisation and further development while protecting them from unauthorised commercial exploitation.

2.6 Platform Availability and Maintenance

The WARP Virtual Learning Space has been designed to provide a stable and reliable online learning environment throughout the project's implementation and exploitation period. The platform is intended to remain continuously available to users, ensuring uninterrupted access to the educational resources, learning activities and collaborative services.

To guarantee service reliability, regular maintenance activities, security updates and system improvements are scheduled periodically. Whenever possible, maintenance operations are performed during periods of low user activity in order to minimise disruption to learners and educators while maintaining the platform's security, stability and overall performance.

3. The WARP Virtual Learning Space

The WARP Virtual Learning Space has been developed as the project's central digital environment, supporting the delivery of the WARP educational programme and facilitating collaboration among VET educators, trainers and other stakeholders. Designed around the principles of accessibility, usability and learner-centred instruction, the platform combines educational content, collaborative tools and assessment mechanisms within a unified online learning environment. The VLS can be directly accessed through the link: <https://vle.warp-project.eu/>.

Built on the Moodle Learning Management System, the platform hosts the 16 WARP learning units together with their associated Open Educational Resources (OERs), providing users with a structured and intuitive learning experience. Through multilingual support, interactive learning components, discussion forums and progress monitoring features, the Virtual Learning Space enables participants to engage with the learning material, exchange knowledge and develop their professional competences at their own pace. The following sections present the main functionalities of the platform from the perspective of the end user. They describe the registration and authentication process, user account features, course organisation and navigation, the structure of the learning modules, assessment mechanisms and the accessibility features that collectively contribute to an effective and inclusive digital learning experience.

3.1 Landing Page

The Landing Page serves as the primary entry point to the WARP Virtual Learning Space, providing users with immediate access to the project's digital learning ecosystem. Designed with a clean and intuitive interface, it introduces visitors to the objectives of the platform while offering straightforward navigation to the available educational resources and collaborative features.

At the top of the page, users are presented with the project's visual identity alongside the main navigation menu and authentication options. A welcoming introductory section provides a concise overview of the Virtual Learning Space and its role in supporting capacity building, professional development and collaborative learning among VET educators and trainers.

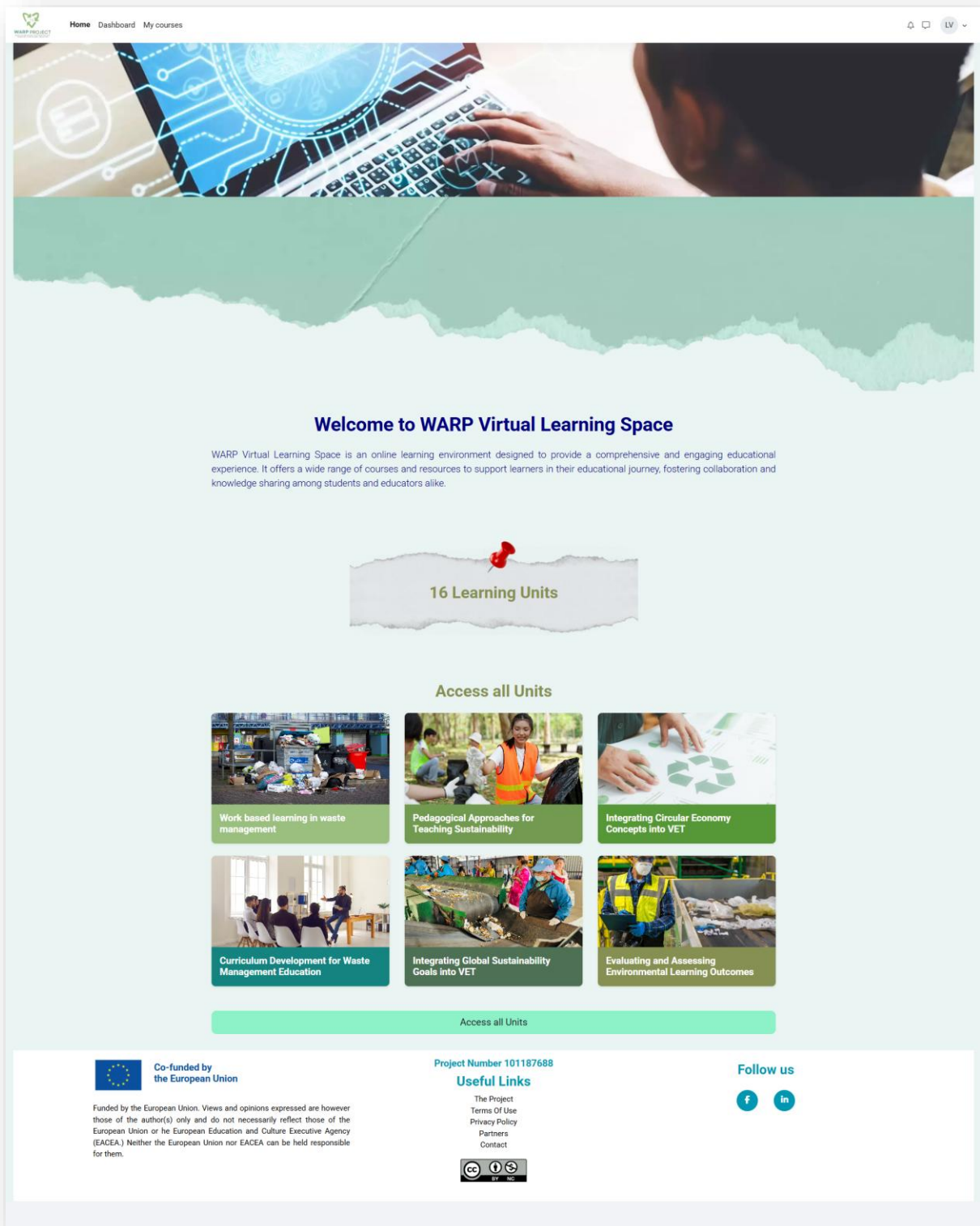


Figure 9 WARP Landing Page - EN

The core of the Landing Page provides direct access to the WARP learning programme.

The educational content is currently organised by individual learning units, allowing participants to directly access the topics that best correspond to their professional interests and learning needs. This structure enables learners to selectively engage with the educational resources most relevant to their desired training objectives, while maintaining straightforward navigation across the complete WARP learning programme. Each learning unit provides access to its corresponding educational materials, supporting a flexible and self-paced learning experience.

The platform's Landing Page also provides direct access to the project's supporting information, including useful links, legal documentation, language selection options and project information, ensuring that users can easily navigate the platform while accessing both educational and administrative resources.

3.2 Registration/Login

Access to the WARP Virtual Learning Space is available through a secure user authentication system designed to provide both ease of access and data protection. Registered users can log into the platform using their personal credentials, while new users may create an account through a simple registration process.

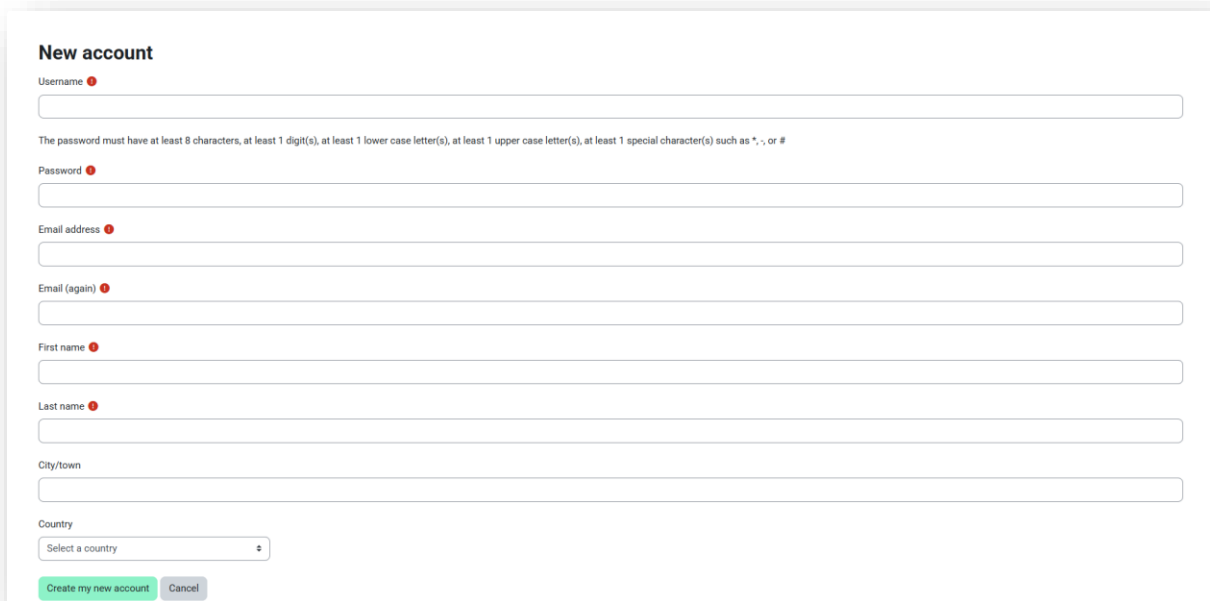


The login screen features a large green logo at the top, consisting of three arrows forming a triangle with a graduation cap in the center. Below the logo, the text "WARP PROJECT" is displayed in a large, bold, green font, followed by the subtitle "WASTE AND RECYCLING PRACTICES FOR DUAL TRANSITION IN VOCATIONAL EDUCATION" in a smaller, black font. The login form includes two input fields: "Username" and "Password". Below these fields is a prominent green "Log in" button. Underneath the button, there are links for "Lost password?", "Don't have an account? Create new account", and "Access as a guest". At the bottom left, there is a language selector showing "English (en)" with a dropdown arrow. At the bottom right, there is a link for "Cookies notice".

Figure 10 WARP VLS log in screen

The registration procedure consists of two consecutive steps. Initially, users complete the registration form by providing the required information, including a username, password, email address and full name, together with optional account details that specify the Country and City the user is being registered from. Upon submission, the platform automatically generates an activation email containing a verification link.

Account activation is required only once and enables users to securely access the platform and its educational resources. Once activated, users can log in, recover or update their credentials, and manage their personal account settings at any time.



New account

Username 

The password must have at least 8 characters, at least 1 digit(s), at least 1 lower case letter(s), at least 1 upper case letter(s), at least 1 special character(s) such as *, -, or #

Password 

Email address 

Email (again) 

First name 

Last name 

City/town

Country
Select a country 

Create my new account Cancel

Figure 11 WARP VLS user registration form

The authentication mechanism has been designed to ensure secure access while maintaining a straightforward user experience. Upon successful login, learners are directed to their personalised dashboard, where they can access their enrolled learning units, monitor their learning progress and participate in the user forums available within the Virtual Learning Space.

The registration and authentication process complies with the project's data protection requirements and follows the General Data Protection Regulation (GDPR). Personal information is processed exclusively for the purposes of user management, course participation and platform administration, while the Privacy Policy and Terms of Service are permanently accessible through the footer of the platform.

3.3 Footer



Figure 12 WARP VLS Footer

The footer of the WARP Virtual Learning Space provides users with essential project information, legal notices and additional navigation links that remain accessible throughout the platform. It includes the European Union funding acknowledgement and the mandatory project disclaimer, together with the project number, links to the Project page, Partners, Contact, Terms of Use and Privacy Policy. The footer also displays the Creative Commons CC BY-NC 4.0 licence under which the project's Open Educational Resources are distributed, promoting their lawful reuse for non-commercial purposes. Finally, direct links to the project's official social media channels further support dissemination activities and facilitate communication with the wider stakeholder community.

3.4 Account Features

Once authenticated, users gain access to a personalised workspace that serves as the central point for managing their learning activities within the WARP Virtual Learning Space. The account dashboard has been designed to provide immediate access to educational resources, learning progress and platform functionalities, allowing users to efficiently navigate the different areas of the learning environment.

The **My Courses** page displays all learning units in which the user is enrolled, organised in a modular way and corresponding each to one of the 4 distinct target groups of the educational content. From this area, learners can access their courses, continue their learning journey from the last completed activity and monitor their progress throughout each learning unit.

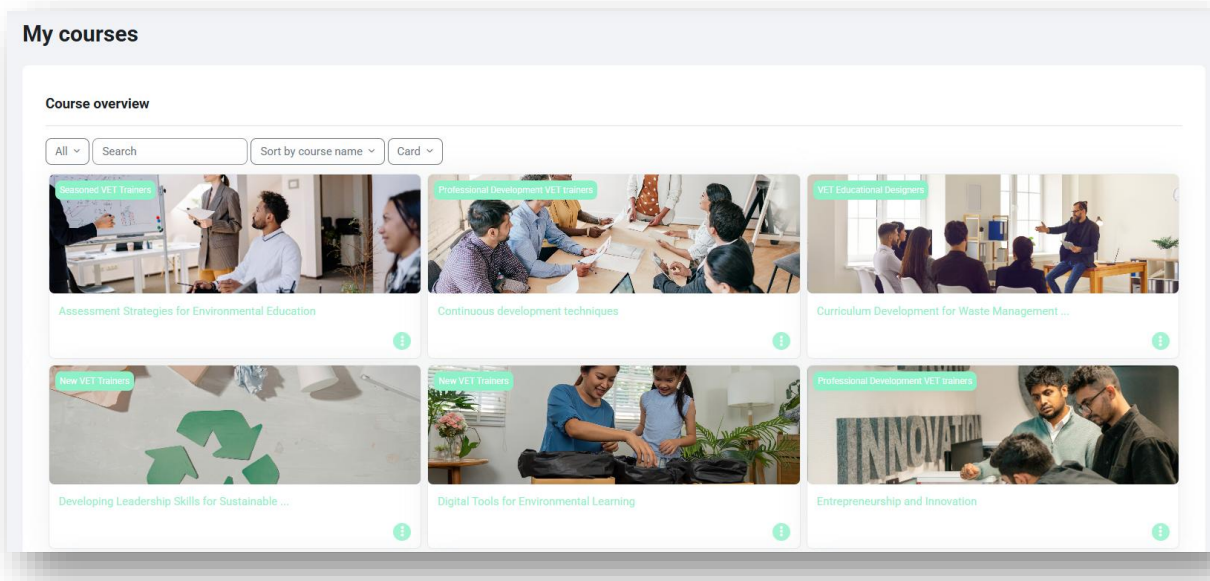


Figure 13 WARP VLS My courses page

The **Profile** page allows users to manage their personal information, including their name, email address and profile picture, while also providing an overview of their activity within the platform. Users can review their enrolled courses, monitor completed learning activities, access assessment results and retrieve certificates issued upon successful completion of the relevant learning units. Profile preferences and notification settings can also be customised according to individual user needs.

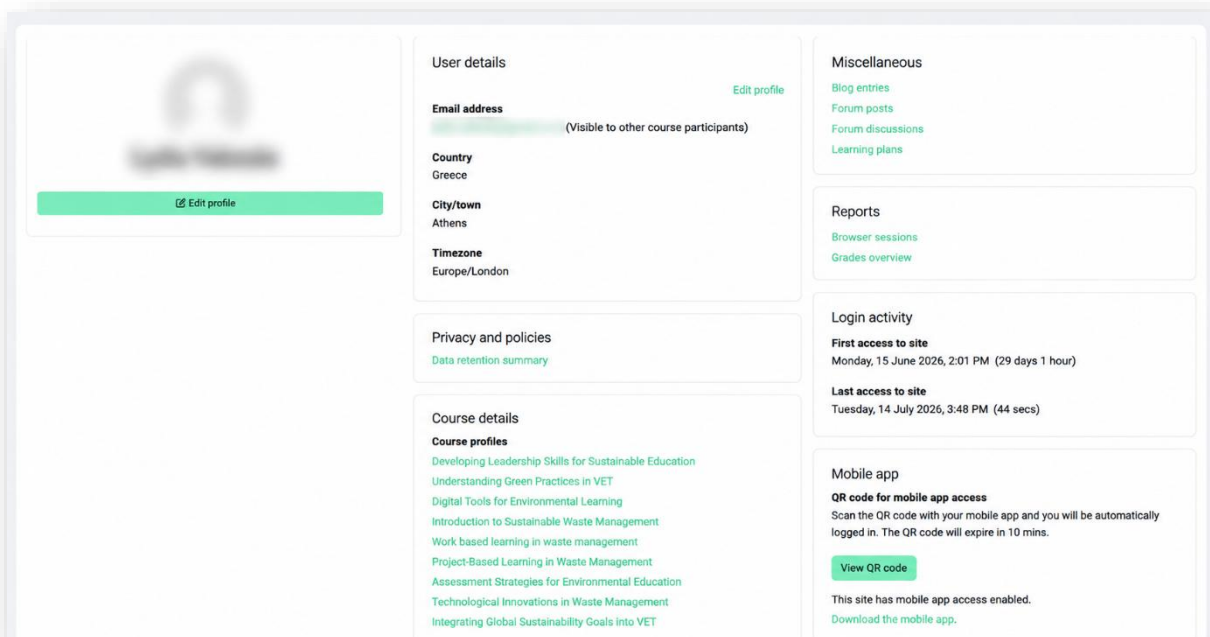


Figure 14 WARP VLS user profile page

All personal information is processed in accordance with the General Data Protection Regulation (GDPR) and the project's Privacy Policy. The platform includes dedicated Privacy Policy and Terms of Service pages, accessible at all times through the footer of the Virtual Learning Space, providing transparent information regarding data processing, user rights, data retention and platform usage.

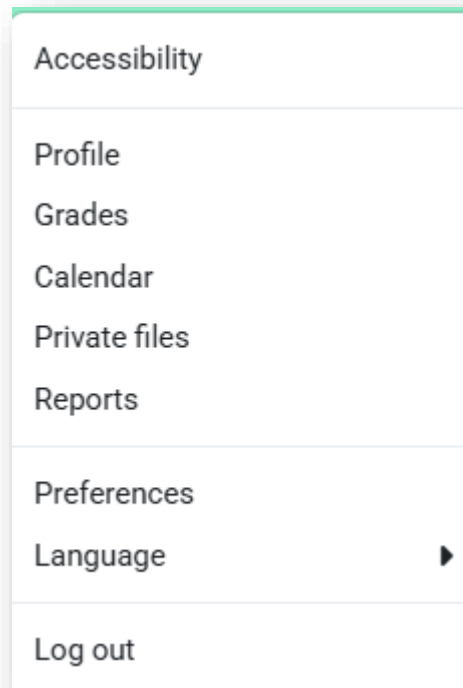


Figure 15 WARP VLS Menu

In addition to the core account pages, users can access several supporting functionalities through the personal account menu, available from the platform header. These include:

- **Notifications**, informing users about new announcements, course updates and assessment activities.
- **Messages**, enabling communication between learners, trainers and project participants.
- **Calendar**, providing an overview of scheduled activities and important learning milestones.
- **Language Preferences**, allowing users to switch between English and the partner language versions of the platform interface.
- **Accessibility Options**, supporting an inclusive learning experience through interface customisation and compatibility with assistive technologies.

Together, these account features create a personalised and collaborative learning environment that supports both individual learning pathways and continuous interaction among members of the WARP professional community.

3.5 Module Content and Navigation

The WARP Virtual Learning Space has been designed to provide a structured, intuitive and learner-centred educational experience, enabling users to navigate the learning programme efficiently while maintaining a clear overview of their progress. The platform follows a modular organisation that supports self-paced learning and accommodates the different educational needs of VET professionals participating in the project.

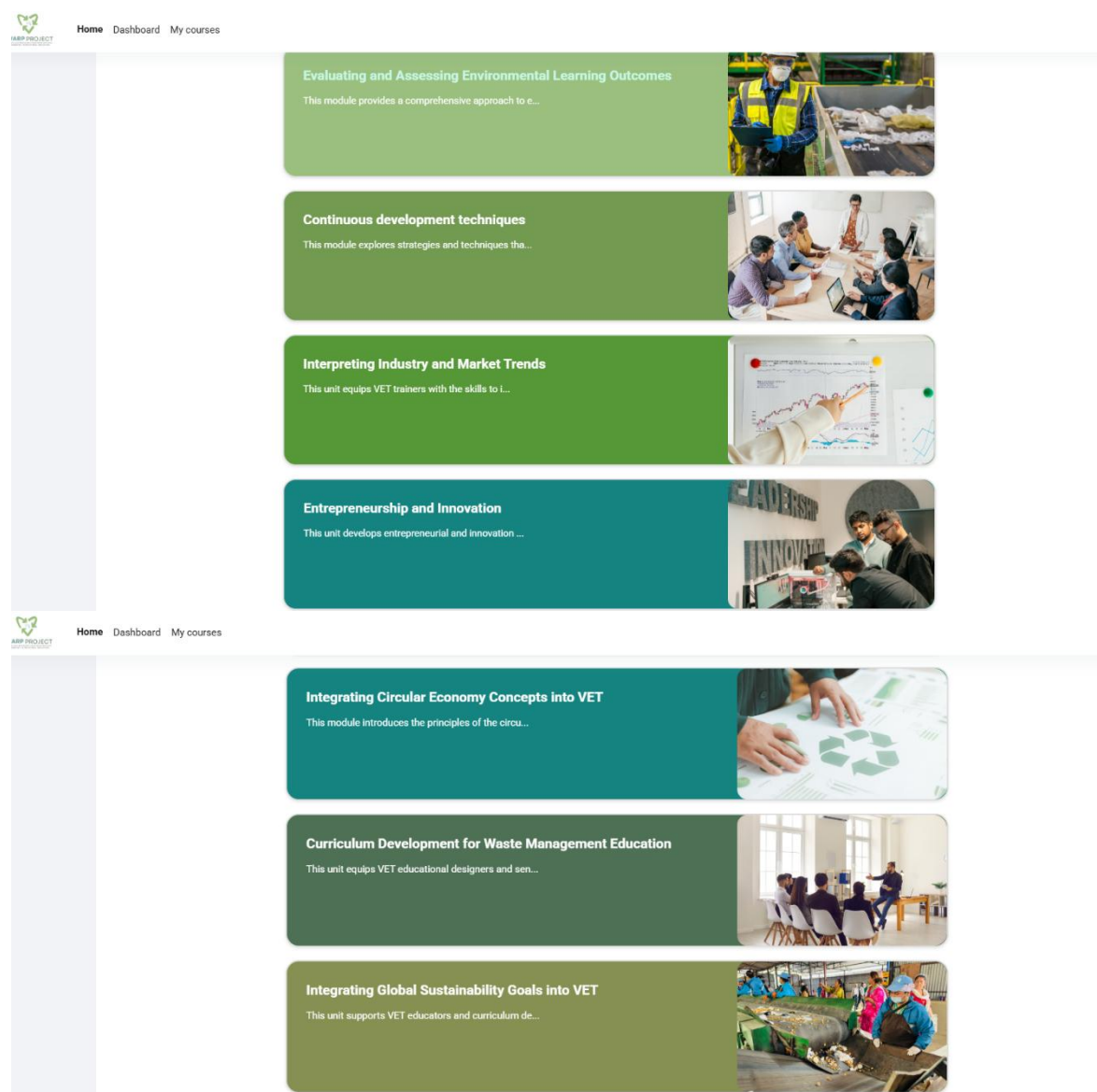


Figure 16 WARP VLS Modular organisation - example

The overall navigation logic has been developed to minimise complexity while allowing learners to quickly locate relevant educational resources, revisit previously completed activities and monitor their progression throughout the programme. Each learning unit follows a consistent structure and interface, ensuring a familiar user experience across the entire learning environment.

The following sections present the organisation of the learning programme, the different educational components incorporated within the modules, and the learning pathways available through the WARP Virtual Learning Space.

3.5.1 Learning Structure

The educational content of the WARP Virtual Learning Space is organised around the project's 16 learning units, which collectively form the WARP Capacity Building Programme. The corresponding Open Educational Resources (OERs), described in Deliverable D2.2, are structured according to the four target learner groups defined by the project methodology:

- New VET Trainers (Modules 1–4)
- Seasoned VET Trainers (Modules 5–10)
- VET Educational Designers (Modules 11–13)
- Professional Development VET Trainers (Modules 14–16)

Within the Virtual Learning Space, these learning pathways provide the organisational framework through which users access the educational content, enabling participants to quickly identify the modules most relevant to their professional profile while retaining access to the complete curriculum.

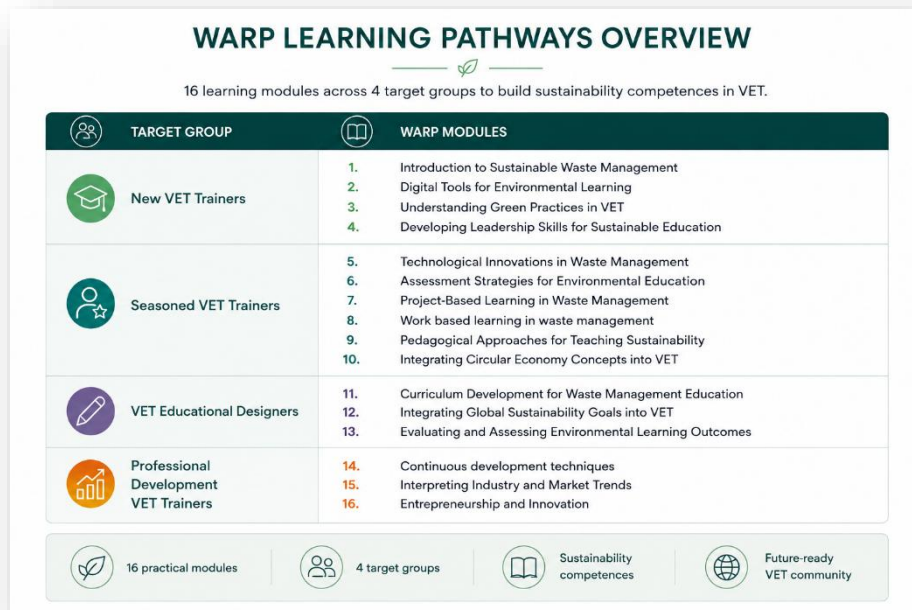


Figure 17 WARP Learning pathways overview

Within each target group, learning units are presented in a consistent format and organised into thematic sections containing smaller learning components. This hierarchical structure supports logical progression through the educational material while allowing learners to navigate directly to individual topics or revisit previously completed sections.

Each learning unit follows a consistent structure, combining educational content, multimedia resources, interactive activities and assessment elements within a unified learning environment. The modules support self-paced learning, allowing participants to progress according to their own schedules while the platform automatically records their progress. As Open Educational Resources (OERs), all learning units are available in English and the partner languages (AL, EL and ES), supporting their accessibility, localisation and long-term reuse..

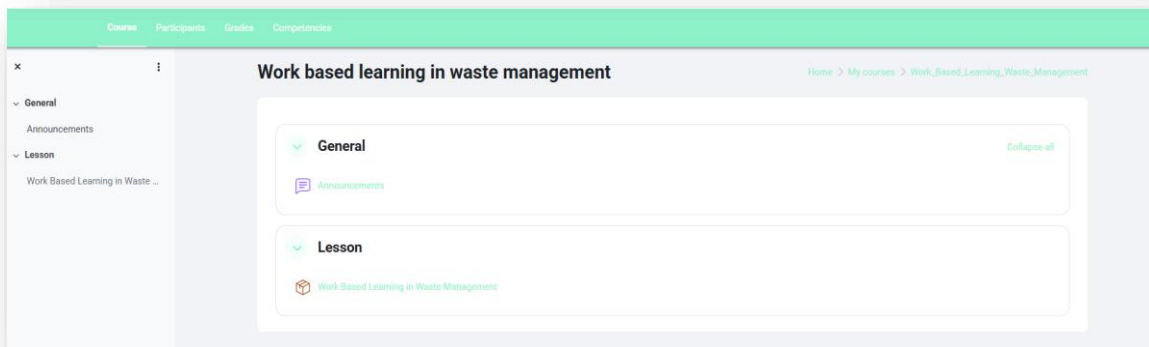


Figure 18 WARP VLS Modules - starting screen

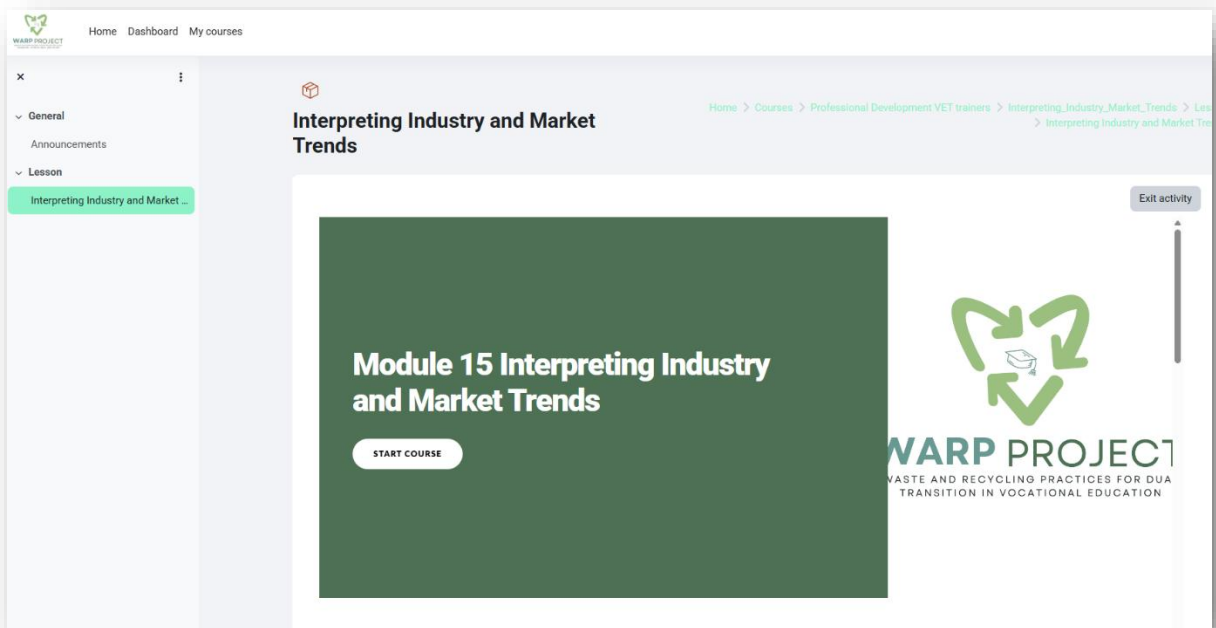


Figure 19 WARP VLS - Module structure

Each learning unit within the WARP Virtual Learning Space follows a consistent internal structure designed to facilitate navigation and learner engagement. The left-hand navigation panel provides direct access to the main sections of the module, allowing users to easily locate and switch between the available learning components. Specifically, the Announcements section is used to communicate module-related updates and important information. The Lesson section contains the complete educational content of the module, integrating all learning materials, multimedia resources and interactive activities into a single, structured learning environment. This organisation allows learners to seamlessly access both the educational content and the collaborative features associated with each individual module, supporting an intuitive and coherent learning experience.



Figure 20 WARP VLS Module progress indication

The WARP Virtual Learning Space incorporates integrated progress monitoring features that enable learners to track their advancement throughout each learning unit. At the side of every module, a completion indicator displays the overall progress achieved within the course (e.g., *0% Complete*), providing learners with an immediate overview of their current status. In addition, individual learning activities are accompanied by completion tracking indicators, allowing participants to identify completed and pending sections as they progress through the educational material. This visual monitoring system supports self-paced learning by helping users organise their study, resume learning from previously completed points and monitor their progression towards successful completion of each learning unit. It also enables trainers and platform administrators to monitor learner engagement through Moodle's built-in completion tracking and reporting functionalities.

3.5.2 Delivery and interface

The Lesson section in each Module presented contains the complete educational content of each WARP learning unit. All learning materials are presented within a single, structured learning sequence, allowing participants to progress through the module in a clear and consistent manner.

Depending on the objectives of the individual learning unit, the lesson may incorporate theoretical content, multimedia resources, interactive learning activities and assessment

elements, providing learners with access to all educational components from a single location within the Virtual Learning Space.

3.5.2.1 Theoretical Content

Core theoretical concepts are presented through structured textual material enriched with illustrations, diagrams and downloadable reference documents. This content provides the conceptual foundation required to understand the principles of sustainable waste management, circular economy practices, digital transformation and innovative vocational education methodologies.

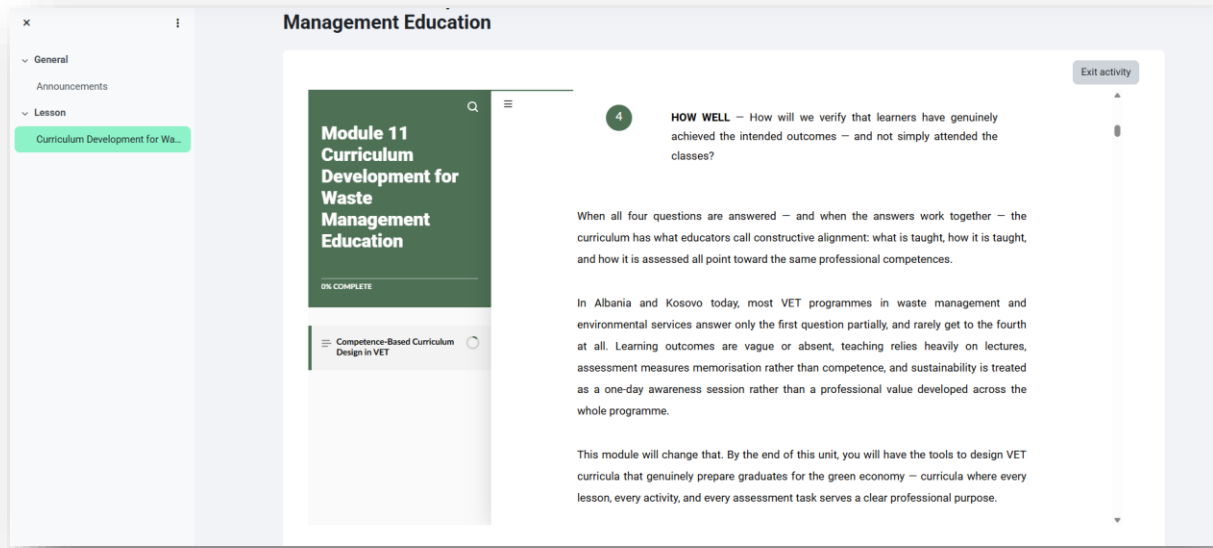


Figure 21 WARP VLS Module - Theoretical content example

3.5.2.2 Multimedia Resources

To enhance learner engagement, the modules incorporate multimedia elements such as instructional videos, visual presentations and practical demonstrations. These resources complement the written material and support different learning styles by presenting information through both visual and auditory formats.

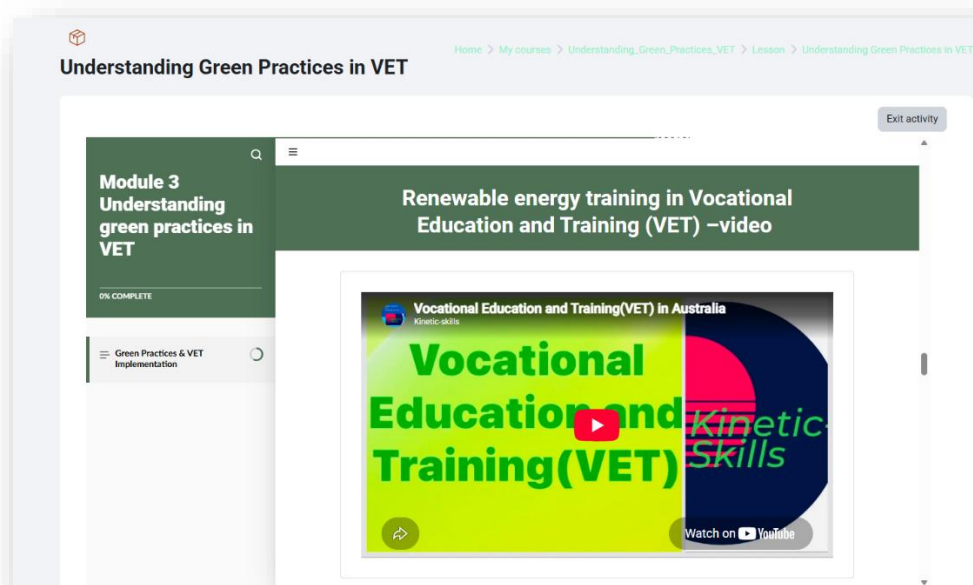


Figure WARP VLS Modules - multimedia content – video

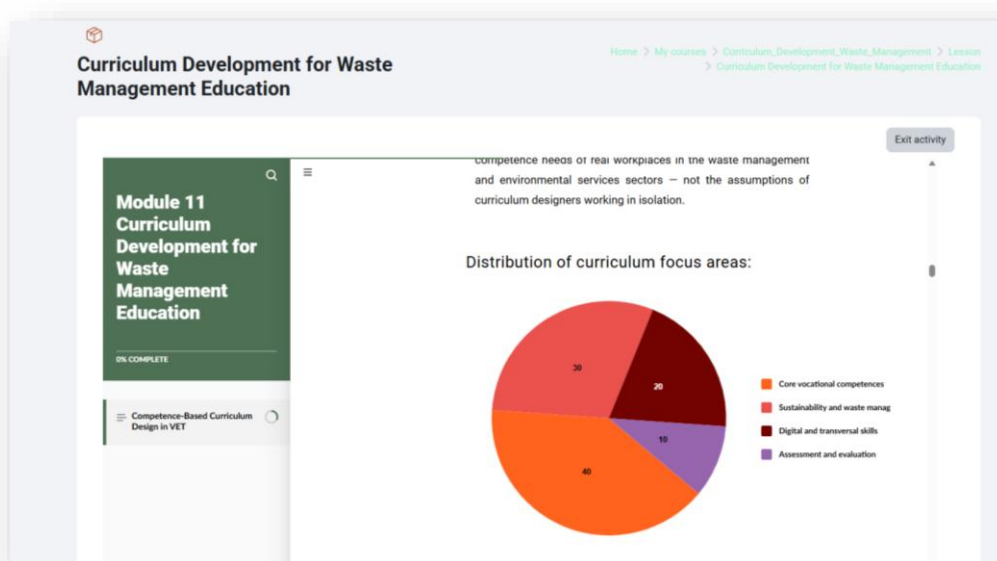


Figure 22 WARP VLS Modules - multimedia content – pie chart



Figure 23 WARP VLS Modules - multimedia content – graphics

3.5.2.3 Interactive Activities

Interactive learning activities are embedded throughout the modules to encourage active participation and continuous learner engagement. These activities promote reflection, knowledge application and self-directed exploration while transforming theoretical concepts into practical learning experiences.

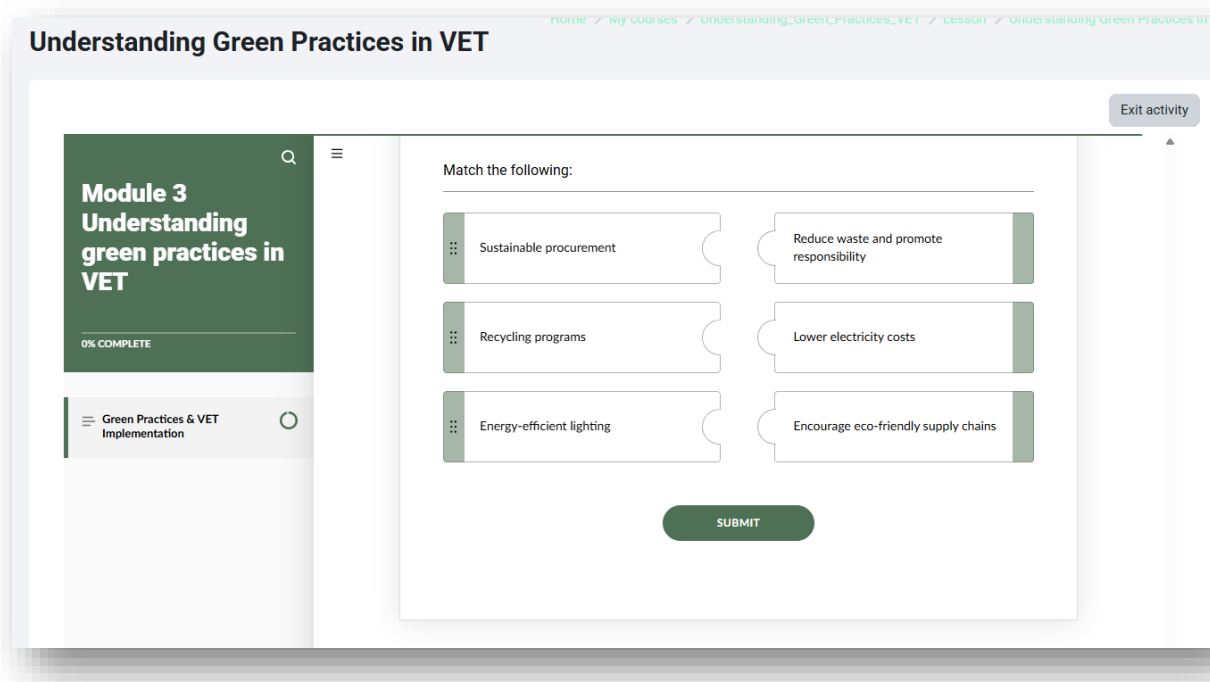


Figure 24 WARP VLS Modules - concept matching activities

Download the file and keep it as a reference.

The EU Circular Economy Action Plan (2020)

Is the key European policy document shaping waste management, recycling, and sustainability standards across EU member states and candidate countries including Albania and Kosovo. As a VET curriculum designer, this document is an essential reference for aligning your curriculum learning outcomes with European sustainability priorities.



cellar_9903b325-6388-11ea-b735-01aa75ed71a1.0017.02_DOC_2.pdf

415.2 KB



Figure 25 WARP VLS Modules - downloadable content

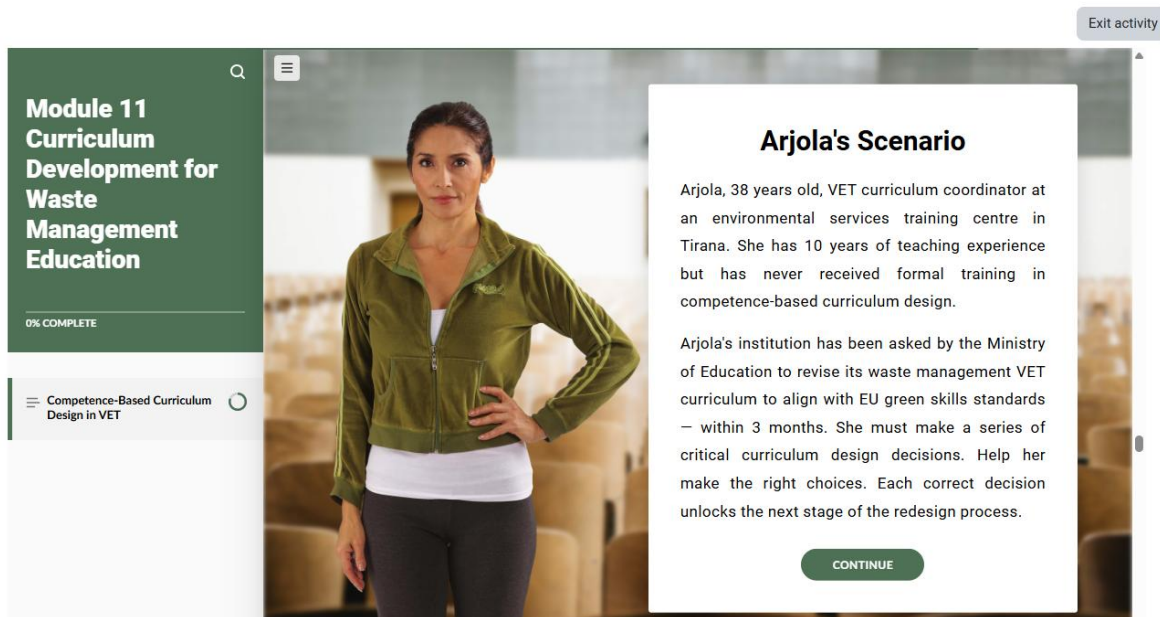


Figure 26 WARP VLS Modules - Case studies

3.5.2.4 Self-assessment

Each learning unit includes assessment activities that enable learners to evaluate their understanding of the presented material. Self-assessment quizzes provide immediate feedback, allowing participants to identify areas requiring additional study before progressing to subsequent learning units.

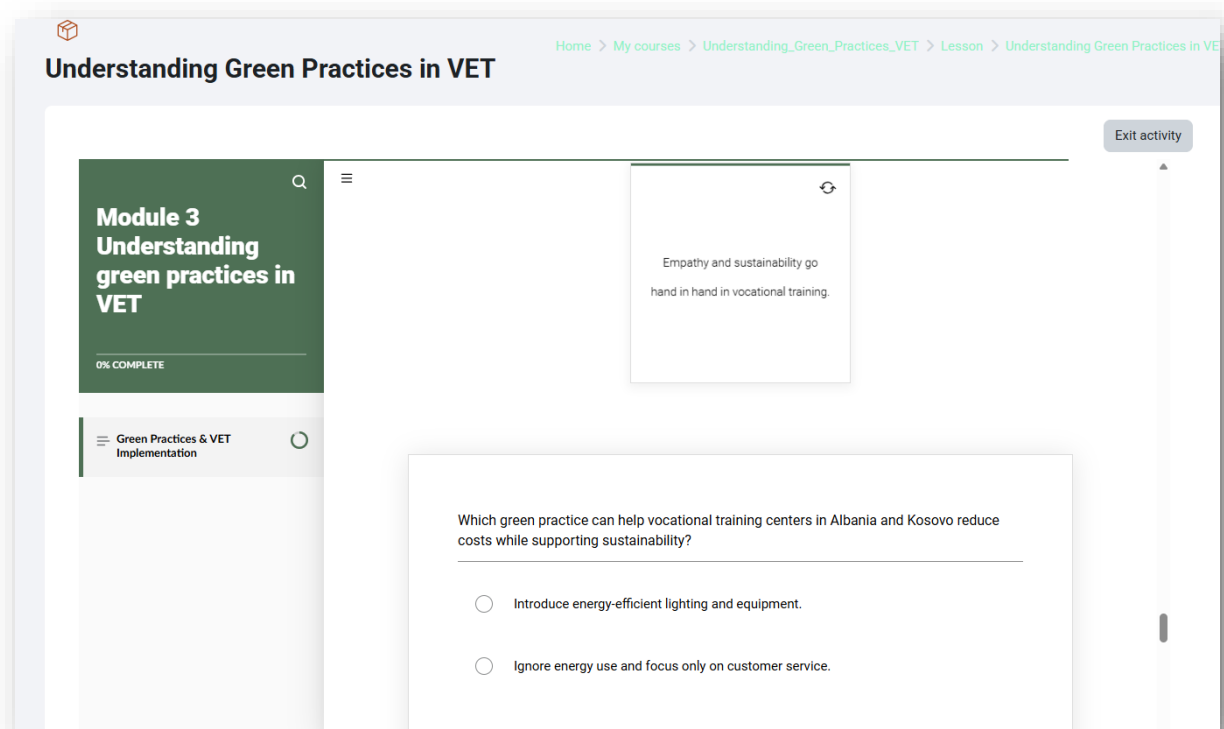


Figure 27 WARP VLS – Modules - flashcards and multiple-choice quizzes

3.5.2.5 Discussion Forums

A dedicated discussion forum is planned to be integrated into the WARP Virtual Learning Space by the end of M19 (July 2026). Accessible through each OER module, this collaborative feature will provide learners and educators with a dedicated space to exchange experiences, discuss educational practices and share ideas related to sustainable waste management, vocational education and innovative teaching approaches. Once implemented, the discussion forums will strengthen peer learning, encourage knowledge exchange and contribute to the establishment of an active professional learning community across the WARP partnership.

3.5.3 Customisable learning experience

The modular architecture of the WARP Virtual Learning Space allows participants to follow personalised learning pathways while maintaining the flexibility to explore additional educational content beyond their primary target group. Learners may complete the programme sequentially within their designated category or access individual learning units according to their professional interests and development needs.

The consistent structure adopted across all learning units ensures a seamless navigation experience, enabling users to transition smoothly between modules while monitoring their learning progress through the platform's integrated tracking mechanisms. This learner-centred approach supports continuous professional development and facilitates the long-term use of the educational resources developed within the WARP project.

3.6 Assessments

Assessment constitutes an integral component of the WARP Virtual Learning Space, supporting both the learning process and the evaluation of participants' understanding throughout the educational programme. Rather than functioning solely as a mechanism for measuring achievement, assessment activities have been designed to reinforce learning, encourage reflection and provide learners with timely feedback on their progress.

Each learning unit incorporates assessment activities that are directly aligned with its intended learning outcomes and educational objectives. These activities enable participants to verify their understanding of the presented concepts before progressing to subsequent topics, promoting gradual knowledge acquisition and continuous skills development. This approach reflects the pedagogical framework of the WARP Capacity Building Programme, where assessment serves as an integral element of the learning experience rather than a standalone evaluation exercise.

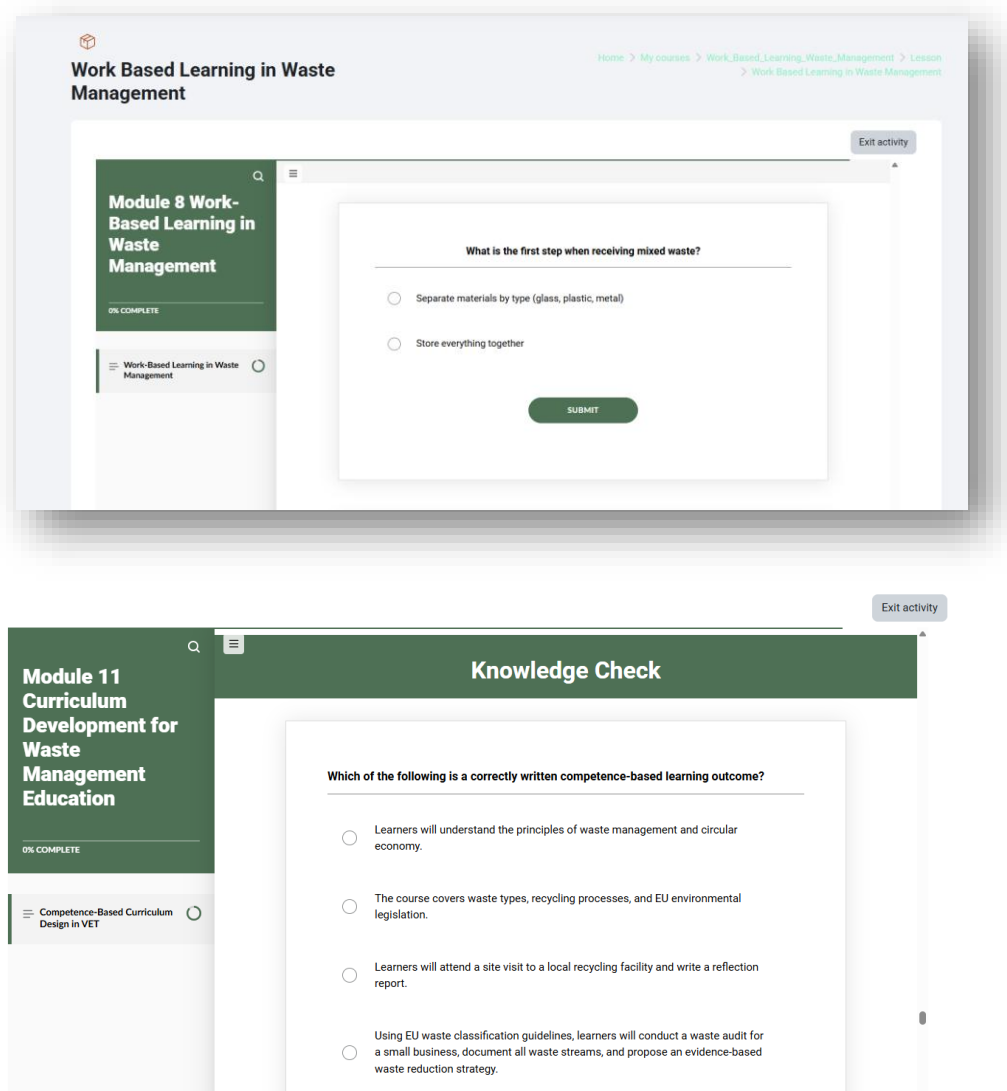


Figure 28 WARP VLS Module-integrated assessment quiz example

Assessment activities are delivered through the Moodle Learning Management System using interactive quizzes and other digital assessment tools integrated within the learning environment. Learners receive immediate feedback upon completion, allowing them to identify areas requiring further study while monitoring their overall progression throughout the programme.

The platform automatically records assessment attempts and learner progress, enabling participants to resume their studies at any time and allowing trainers and administrators to monitor engagement and course completion through Moodle's reporting functionalities. These monitoring capabilities also support the project's quality assurance procedures and facilitate the evaluation of the effectiveness of the educational programme.

Where applicable, successful completion of the learning activities and assessment requirements contributes to the recognition of learner participation within the WARP Vir

tual Learning Space. Together with the platform's progress tracking mechanisms, the assessment framework promotes active engagement, continuous improvement and learner autonomy throughout the educational journey.

3.7 Accessibility

Accessibility has been a fundamental consideration throughout the design and development of the WARP Virtual Learning Space. The platform has been developed to provide an inclusive digital learning environment that accommodates users with diverse educational backgrounds, digital skills and accessibility needs, ensuring that all participants can effectively engage with the project's educational resources.

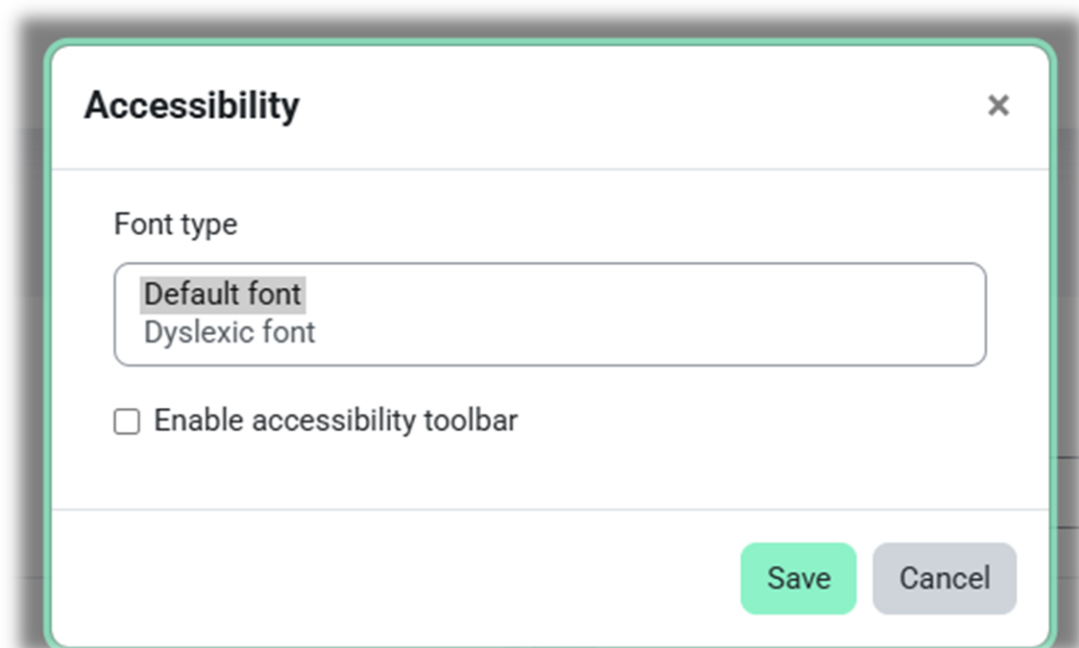


Figure 29 WARP VLS Accessibility options screen

The platform has been built upon the Moodle Learning Management System, which incorporates a wide range of accessibility features aligned with internationally recognised web accessibility practices. Responsive design principles allow learners to access the platform seamlessly across desktop computers, tablets and mobile devices, while maintaining a consistent user experience regardless of screen size.

Accessibility has also been considered in the design of the educational content, through templates specifically designed for that purpose by ReadLab. Learning units follow a clear and consistent layout, using logical content hierarchy, readable typography and intuitive navigation to reduce cognitive load and facilitate orientation throughout the learning process. Educational resources have been developed using multiple content formats—including text, images, videos and interactive activities—to accommodate different learning preferences and promote inclusive participation.

The platform further supports accessibility through customisable user settings available within the Moodle environment, including language preferences, notification management and compatibility with assistive technologies such as screen readers and keyboard navigation. These features allow learners to personalise their learning experience according to their individual requirements.

Finally, multilingual support constitutes an integral component of the platform's accessibility strategy. The Virtual Learning Space is available in English and all partner languages (AL, EL, and ES), enabling participants to access both the platform interface and the educational resources in their native language. This multilingual implementation contributes to equal access to learning opportunities and supports the project's objective of fostering inclusive and collaborative professional development across all participating countries.

3.7.1 WAVE Report

The accessibility of the WARP Virtual Learning Space was further evaluated using the WAVE Web Accessibility Evaluation Tool (<https://wave.webaim.org/>), providing an overview of the platform's implementation of recognised web accessibility practices. The evaluation confirmed that the platform incorporates several accessibility features that enhance usability for a broad range of users and improve compatibility with assistive technologies.

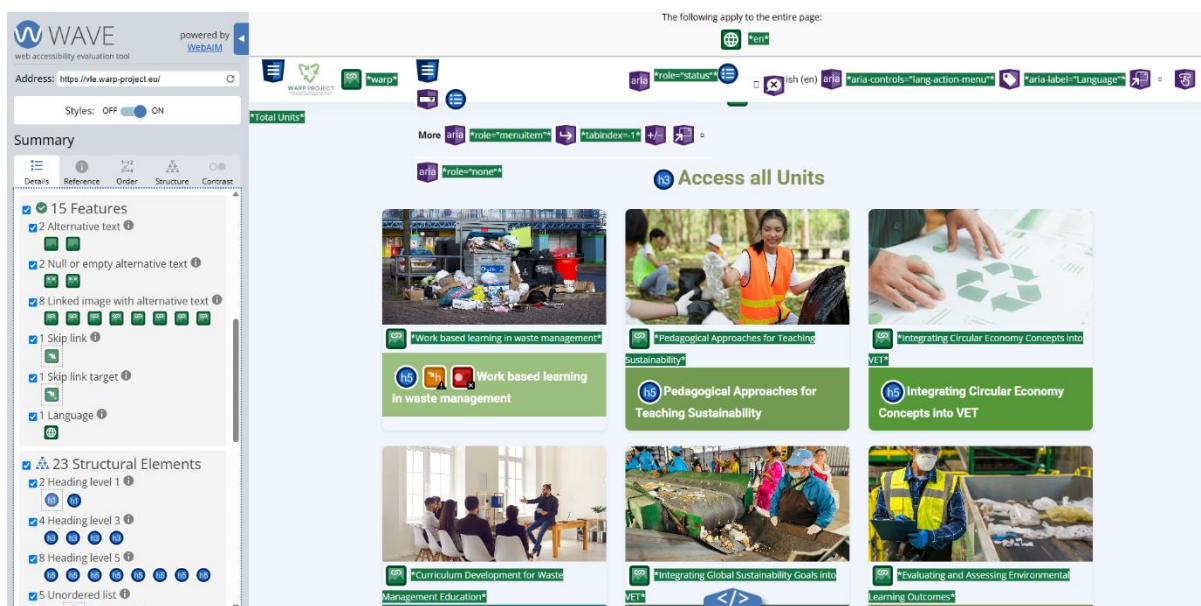


Figure 30 WARP VLS WAVE accessibility evaluation

The assessment identified the successful implementation of key accessibility elements, including:

- Alternative text for informative images and linked images.
- Appropriate use of decorative (null) alternative text where required.
- Skip links and skip link targets to facilitate keyboard navigation.

- Language identification for assistive technologies.
- A structured semantic heading hierarchy.
- ARIA labels, roles and navigation attributes supporting screen readers and accessible interaction.
- Semantic structural elements that improve page organisation and navigation.

Overall, the WAVE evaluation indicates that the WARP Virtual Learning Space has been developed with accessibility as a core design consideration and in alignment with Web Content Accessibility Guidelines WCAG 2.0 (Level AA). The implementation of semantic HTML structures, descriptive alternative text, keyboard navigation support and ARIA attributes contributes to a more inclusive and user-friendly learning environment, facilitating access to the platform's educational resources for users with diverse accessibility needs while supporting the project's objective of providing an accessible digital learning ecosystem.

4. Future Development and Validation

Although the WARP Virtual Learning Space has been successfully developed and deployed, its validation and optimisation constitute the next phase of the implementation process. During this stage, a structured quality assurance procedure will be carried out to evaluate the platform's technical functionality, usability, accessibility and overall user experience. Consortium partners will systematically review the platform's core components, including user registration and authentication, navigation, multilingual functionality, learning pathways, educational resources, assessment activities and collaborative features, ensuring that the Virtual Learning Space provides a reliable and consistent learning environment for all target groups.

Following the internal quality assurance activities, the platform will enter its piloting phase with the participation of representatives from the four target groups addressed by the WARP educational programme. The piloting activities will enable participants to use the platform under authentic learning conditions while evaluating its functionality, navigation, content organisation and overall learning experience. Feedback will be collected through structured evaluation questionnaires, consortium meetings and user observations, allowing the partnership to identify technical improvements, usability enhancements and pedagogical refinements where required.

As Deliverable D2.1 – Virtual Learning Space, the completed platform will subsequently undergo the project's formal quality review process by the designated deliverable reviewers, NTUA and Albacademy. In addition, the platform will be presented to the project's External Advisory Group, whose independent expert feedback will provide further validation of its technical implementation, usability and overall suitability for the project's educational objectives. The combined outcomes of the internal quality assurance activities, the formal deliverable review and the External Advisory Group's recommendations will inform the final optimisation of the platform, ensuring its alignment with the project's quality standards and readiness for the implementation of the subsequent capacity-building activities.

Upon completion of the validation process, the WARP Virtual Learning Space will support the implementation of the project's capacity-building activities under Work Package 3. The platform will host the delivery of the WARP Open Educational Resources, support the Virtual Train-the-Trainers workshops and facilitate the implementation of the Twinning and Mentoring programmes, providing a collaborative digital environment for educators and learners. Through this iterative validation and continuous improvement process, the Virtual Learning Space will evolve into a sustainable educational ecosystem capable of supporting the long-term exploitation and impact of the WARP project.

5. Conclusion

The WARP Virtual Learning Space represents a key digital outcome of the project, translating the WARP pedagogical framework into an accessible, multilingual and learner-centred online environment for Vocational Education and Training (VET) professionals. By integrating the project's educational resources, structured learning pathways, interactive activities, assessment mechanisms and accessibility features within a single platform, the Virtual Learning Space establishes a coherent and engaging ecosystem that supports both individual learning and collaborative knowledge exchange.

Beyond providing access to the WARP Open Educational Resources, the platform has been designed to facilitate continuous professional development, encourage transnational collaboration and promote the adoption of innovative teaching practices in sustainable waste management and recycling education. Its modular architecture and intuitive navigation ensure a consistent learning experience across all target groups while allowing flexibility for future expansion and adaptation.

As the educational programme progresses, the Virtual Learning Space will continue to serve as the central digital infrastructure supporting the delivery, dissemination and long-term sustainability of the WARP project results. By combining sound instructional design with robust technical implementation, the platform contributes to strengthening the digital capacity of VET providers and supports the wider objectives of the green and digital transition across the European vocational education ecosystem.