ReGrow

Rebuilding Growth in Agriculture in
Post-Conflict Ukraine & Transitioning Georgia

D4.1: ReGrow Virtual Learning Environment Development

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Executive Summary

This deliverable presents the ReGrow Virtual Learning Environment (VLE), developed as a core digital asset of the ReGrow project to support both formal academic education and lifelong learning in the field of Precision Agriculture. The VLE has been fully developed and is operational at the time of submission of this deliverable and is publicly accessible at https://eregrow.eu/.

The ReGrow VLE functions as a web-based learning environment designed to support the implementation of the MSc programme while also extending learning opportunities to a broader audience through online vocational education and training (VET) offerings. In this context, the VLE contributes directly to the project's objectives by facilitating access to structured educational resources, promoting capacity building and supporting professional upskilling for diverse target groups.

This deliverable document the overall design, structure and functionality of the VLE. It describes the hosting approach and technical setup of the platform, the adopted visual identity and user interface principles and the functional architecture of the three core components of the environment: the Educator's Interface, the Student Resource Hub and the Online VET / MOOC component. In addition, the deliverable outlines the multilingual support, accessibility considerations and usability principles applied during development.

Finally, the deliverable confirms that the VLE has undergone testing and review by project partners, with feedback taken into account to ensure a stable, user-friendly and accessible learning environment. The ReGrow VLE is therefore ready to support the project's educational activities and to serve as a sustainable digital infrastructure for the delivery of ReGrow's learning content.

Glossary of terms and abbreviations used

List of Abbreviations and Description	
CBHE	Capacity Building in Higher Education
GA	Grant Agreement
GIS	Geographic Information Systems
HEI	Higher Education Institution
MOOC	Massive Open Online Course
OER	Open Educational Resources
UI / UX	User Interface / User Experience
VET	Vocational Education and Training
VLE	Virtual Learning Environment
WCAG 2.0 AA	Web Content Accessibility Guidelines (Level AA)
WP	Work Package

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1. Introduction

1.1. Purpose of the Deliverable

The purpose of this deliverable is to present and document the ReGrow Virtual Learning Environment (VLE) as a fully developed and operational digital learning platform created within the framework of the ReGrow project. Deliverable 4.1 serves as the formal record of the completion of the VLE development activities and confirms the availability of the platform as a functional website at the time of submission.

Specifically, this deliverable demonstrates that the ReGrow VLE has been successfully implemented as a web-based learning environment capable of supporting the project's educational objectives. It provides an overview of the platform's structure, functionality and design approach, while confirming that the VLE is accessible to its intended user groups and ready for use.

In addition, the deliverable describes the main design, usability and accessibility considerations applied during the development of the VLE, as well as the role of visual identity and multilingual support in ensuring a coherent and inclusive learning experience. Through this approach, the document provides a clear and practical description of how the ReGrow VLE functions as an integrated digital space for learning and training.

The ReGrow VLE is publicly accessible and constitutes a demonstrator of the project's capacity to deliver digital learning activities in support of higher education and vocational training in Precision Agriculture.

Overall, this deliverable serves as a reference point for understanding the structure, functionality and intended use of the ReGrow Virtual Learning Environment, as developed to support the project's academic, vocational and lifelong learning objectives.

1.2. Scope and Objectives of the VLE within the ReGrow Project.

The ReGrow VLE has been developed as a central digital environment supporting the educational, capacity-building and knowledge-transfer objectives of the ReGrow project. Its scope extends beyond the provision of a single learning space, serving instead as an integrated platform that brings together academic education, vocational training and lifelong learning in the field of Precision Agriculture.

A primary objective of the VLE is to support the implementation and delivery of the ReGrow MSc programme. In this context, the VLE provides a structured digital environment where academic content related to the MSc curriculum can be organised, accessed and used by students and teaching staff. Through dedicated sections and clearly structured repositories, the platform supports the availability of course syllabi, learning materials and educational resources required for the effective delivery of the programme. The VLE thus functions as a key enabler for the academic component of the project, facilitating consistency, accessibility and transparency in the provision of learning content.

In parallel, the VLE has been designed to extend learning opportunities beyond the formal academic context through its Online Vocational Education and Training (VET) component. This component addresses the needs of professionals, practitioners and learners from the agricultural sector who seek to enhance their skills and knowledge in Precision Agriculture. By offering flexible, web-based learning opportunities, the VLE supports lifelong learning and professional upskilling, contributing to the wider societal and sectoral impact of the project. The inclusion of this component reflects the project's commitment to openness, inclusivity and the dissemination of knowledge to a broader audience beyond enrolled MSc students.

At a strategic level, the VLE contributes directly to the overall objectives of the ReGrow project, particularly those related to capacity building, modernisation of education and the strengthening of links

between higher education and industry needs. By providing a shared digital space accessible to different user groups, the VLE supports collaboration, knowledge exchange and the sustainable use of project outputs. It also enhances the project's ability to deliver educational activities in a scalable and adaptable manner, aligned with contemporary digital learning practices.

Overall, the scope of the ReGrow VLE encompasses the academic, vocational and lifelong learning dimensions of the project. Its objectives are to support the effective delivery of the MSc programme, to facilitate online VET and professional development opportunities and to act as a unifying digital infrastructure that advances the educational and capacity-building goals of the ReGrow project.

2. VLE Hosting and Technical Infrastructure

2.1. Platform Hosting

The ReGrow VLE is hosted as a dedicated, standalone web-based platform, accessible through the registered domain https://eregrow.eu/. This hosting approach was selected to provide a centralized and independent digital space that remains fully accessible to all project partners, students and external stakeholders throughout the project lifecycle and beyond. By establishing the VLE as a distinct website, the project ensures that the learning environment is decoupled from any single partner university's internal intranet, thereby facilitating seamless cross-border access for users in Georgia, Ukraine and the European Union.

The technical infrastructure supporting the VLE has been configured to prioritize operational stability and high availability. The hosting environment is managed within a professional server infrastructure that ensures robust performance even during periods of high user traffic, which is essential for the effective delivery of both the Joint MSc Programme and the Online VET modules. This setup provides the necessary technical foundations for a reliable learning experience, minimizing downtime and ensuring that educational resources remain available to students and practitioners without technical interruptions.

Sustainability and long-term availability are fundamental considerations of the ReGrow VLE hosting strategy. In alignment with the sustainability goals of the project, the Aristotle University of Thessaloniki (AUTH), as the project coordinator, has formally undertaken the responsibility for the long-term maintenance and hosting of the platform. This institutional commitment ensures that the VLE will remain active and its content accessible for at least five years following the official completion of the project. By securing the technical support of a major academic institution, the ReGrow project guarantees that the digital infrastructure remains a stable resource for the agricultural sector in the target regions, preventing the loss of knowledge and ensuring the continued use of the project's outputs.

While the five-year hosting and maintenance commitment by AUTH constitutes the baseline sustainability guarantee for the ReGrow VLE, the long-term governance model of the platform has been deliberately designed to evolve beyond a single-institution dependency. As the Joint MSc programme matures and becomes fully embedded within the partner universities in Georgia and Ukraine, these institutions will progressively gain full access to co-manage the VLE infrastructure. This distributed co-management approach enables partner universities to share technical responsibilities and operational costs, increasing institutional ownership while reducing long-term financial burden on any single organisation. By transitioning from a centrally maintained model to a shared governance framework, the ReGrow VLE becomes more cost-efficient, resilient and institutionally embedded. This model ensures that the platform remains operational, adaptable and sustainable well beyond the formal project lifecycle.

The hosting approach further ensures that the platform remains adaptable to future technical updates. By maintaining the VLE as an independent web-based environment, the consortium retains full control over the technical configuration, security protocols and data management practices. This independence is critical for maintaining a secure environment for learners while ensuring that the platform can scale in terms of user capacity and content volume as the ReGrow educational offerings continue to expand during the implementation phase of the project.

2.2. Strategic Rationale

The decision to implement a standalone digital environment rather than a sub-page within an existing institutional portal was driven by several strategic considerations central to the project's success. First

and foremost, a dedicated domain ensures a distinct and professional visual identity for the ReGrow project. By establishing a centralized hub at eregrow.eu, the project maximizes its visibility and creates a recognizable digital brand that is essential for effective dissemination and engagement with external stakeholders. This independent presence allows the project to present its educational offerings—specifically the Joint MSc Programme and the Online VET courses—within a coherent environment that is not overshadowed by the administrative or academic structures of a single institution.

Furthermore, the standalone architecture is fundamental to ensuring equitable and streamlined access for all consortium members and target user groups. Institutional portals often present technical barriers, such as complex firewall configurations or restricted authentication protocols, which can hinder seamless cross-border collaboration. By utilizing an independent hosting approach, the ReGrow VLE eliminates these institutional bottlenecks, providing a direct and simplified access point for students, educators and practitioners from Georgia, Ukraine and other international regions. This model is directly aligned with the project's commitment to making its results freely available on the internet, fostering a more inclusive and transparent learning environment that supports the "open access" principles mandated by the Grant Agreement.

The strategic choice of a dedicated platform also addresses the requirement for long-term scalability and technical adaptability. As the project progresses through its implementation phase, the volume of educational materials, multimedia content and interactive resources is expected to grow significantly. A standalone site provides the necessary technical flexibility to expand its storage capacity and functional features without being constrained by the technical limitations of a broader university infrastructure. This ensures that the platform can evolve alongside the needs of its users, maintaining high performance and usability as it transitions from the current operational setup to a fully populated learning repository.

Finally, this architectural approach facilitates the clear separation of the VLE's three core functional areas: the Educator's Interface, the Student Resource Hub and the Online VET component. A dedicated site allows for a customized navigation logic and user interface design that specifically caters to the distinct needs of these diverse user groups—from academic students to industry professionals. This level of customization ensures that each user group can interact with the relevant content through an optimized pathway, enhancing user engagement and ensuring that the platform effectively serves its role as an integrated tool for capacity building and professional upskilling in the field of Precision Agriculture.

2.3. Backend Architecture and Core Platform Functionality

The backend architecture of the ReGrow VLE is designed as a robust and flexible engine that supports the diverse educational and administrative requirements of the project. It provides the essential technical framework for content management, user administration and pedagogical interaction. Rather than serving as a static repository for files, the backend is engineered to function as a dynamic learning system, capable of handling complex structures of core and optional modules, multimedia resources and interactive training tools. This underlying architecture ensures that the digital infrastructure is not only stable but also capable of delivering a high-performance experience to a large and geographically dispersed user base.

A fundamental characteristic of the ReGrow VLE is its nature as a "living platform." The backend has been developed with an inherent capacity for growth and technical adjustment, allowing the environment to evolve in alignment with the different phases of the project. As the ReGrow initiative moves from the current deployment stage into the content population and full-scale implementation phases, the platform's functionalities can be refined and scaled to meet emerging pedagogical needs. This iterative approach ensures that the digital environment remains adaptable, allowing for the integration of new learning materials and the adjustment of features based on real-world usage and ongoing technical requirements.

Central to the platform's functionality is an advanced user management system that facilitates secure, role-based access control. The backend architecture allows for the precise definition of user roles, ensuring a clear functional separation between academic staff, enrolled MSc students and external VET learners. This logic is critical for maintaining the integrity of the three core components: the Educator's Interface, the Student Resource Hub and the Online VET component. By implementing structured access permissions, the platform ensures that each user group interacts with an interface specifically tailored to their objectives, while the backend maintains the overall cohesion and security of the shared digital space.

Finally, the backend architecture prioritizes data integrity and operational security as core functional requirements. The system is built upon standardized security protocols that safeguard the platform against unauthorized access and ensure the protection of user data and project assets. These measures are designed to maintain a safe and reliable environment for cross-border collaboration and digital learning. By integrating these security considerations into the core functionality of the site, the ReGrow VLE provides a professional and secure infrastructure that supports the project's long-term sustainability goals and complies with established standards for digital learning environments.

3. Visual Identity and User Interface (UI)

3.1. Branding and Color Palette

The visual identity of the ReGrow VLE has been deliberately designed to reflect the overall branding of the ReGrow project and to ensure a coherent, professional and recognisable digital presence as well as it is meticulously aligned with the overall branding of the project to ensure a coherent and professional experience for all users. As the VLE functions as a public-facing and long-term digital asset of the project, particular emphasis has been placed on visual consistency, clarity and alignment with the project's established communication materials. The objective of this approach is not aesthetic enhancement alone, but the creation of a stable and trustworthy environment that supports learning, dissemination and engagement across different user groups.

The ReGrow project logo is consistently integrated throughout the VLE interface, serving as a primary visual identifier of the platform. The logo is displayed in a transparent format to ensure seamless integration across different background elements and screen resolutions. This placement reinforces project ownership while maintaining visual balance and avoiding visual clutter.

Figure 1: Transparent ReGrow project logo

In addition to the logo, the official ReGrow project banner is incorporated into key sections of the platform, particularly within landing pages and introductory views. The banner functions as a unifying visual element that connects the VLE to the broader project ecosystem, including dissemination materials and the official project website. Its use ensures immediate recognition of the platform as an official project output and supports continuity across all ReGrow digital and communication channels.

Figure 2: ReGrow VLE banner

The color palette applied across the VLE is directly derived from the official ReGrow branding guidelines, utilizing a selection of colors that reflect the field of Precision Agriculture and the project's professional character. Core project colors are consistently used for primary interface elements such as headers, navigation menus, section titles and call-to-action components. This deliberate limitation to a defined color palette supports visual coherence and enhances usability by helping users intuitively distinguish between different content areas and interface functions. The restrained and consistent use of color also contributes to accessibility, ensuring sufficient contrast and readability across devices and screen sizes. As so, the use of a professional and sober color scheme minimizes visual clutter, allowing the educational content to remain the primary focus while maintaining a polished and institutional appearance that is appropriate for a higher education and vocational training environment.

Uniformity in visual presentation is further reinforced through consistent typography, spacing and layout logic across all sections of the VLE. These design choices contribute to a clean and structured interface that prioritizes content readability and user orientation. The layout has been structured to accommodate the project's multilingual requirements, ensuring that the visual balance of the interface remains intact regardless of whether the content is displayed in English, Georgian, or Ukrainian. The avoidance of excessive decorative elements ensures that the platform remains focused on its educational purpose, supporting both academic and vocational learning without unnecessary visual complexity.

The branding and color palette of the ReGrow VLE serve a functional role in reinforcing project identity, supporting intuitive navigation and establishing a professional learning environment. By aligning the visual design of the platform with the broader ReGrow communication framework, the VLE operates as a coherent and credible digital space that reflects the project's academic orientation, cross-border collaboration and long-term sustainability objectives.

Figure 3: ReGrow VLE banner

Finally, it is important to note that the visual interface of the ReGrow VLE is considered a "living design" that remains open to refinement throughout the project lifecycle. As the platform moves into the active content population phase and undergoes further testing with project partners and target user groups, the UI elements may be adjusted to further optimize usability and visual clarity. This iterative approach allows the consortium to respond to user feedback and to refine the placement of brand assets and navigational tools, ensuring that the visual identity continues to support the project's educational objectives effectively as the VLE matures and its content volume increases.

3.2. UI Design Principles

The user interface (UI) of the ReGrow VLE has been designed with a clear focus on professionalism, structural clarity and ease of use, reflecting the platform's role as a core educational asset of the project. Given the diverse profile of its users—including academic staff, MSc students and external VET learners—the interface needed to support efficient access to content without introducing unnecessary complexity or cognitive load. The design approach therefore prioritises functionality, consistency and intuitive interaction over decorative or experimental elements.

A key principle underpinning the UI design is the establishment of a clean and clearly defined structural layout. Content areas are organised in a logical and predictable manner, allowing users to easily understand where information is located and how different sections of the platform relate to one another. Each major area of the VLE is visually and structurally distinct, supporting orientation and reducing the need for repeated guidance or instructions. This clarity is particularly important in an educational context, where users should be able to focus on learning activities rather than interface navigation.

Navigation within the VLE has been deliberately kept simple and transparent. Core sections are accessible through a limited number of clearly labelled menu items, ensuring that users can reach relevant content with

minimal steps. The navigation logic follows established web usability conventions, allowing users to rely on familiar interaction patterns rather than learning new or complex interface behaviours. This approach supports accessibility for users with varying levels of digital literacy and contributes to a consistent user experience across different devices and screen sizes.

The avoidance of unnecessary complexity is a central design decision across the entire interface. Features and visual elements have been included only where they serve a clear functional purpose. By limiting the number of interactive components and maintaining a restrained visual language, the UI supports efficient content consumption and reduces potential distractions. This design discipline ensures that the platform remains stable, easy to maintain and adaptable as new content is added during subsequent phases of the project.

Overall, the UI design principles applied in the ReGrow VLE aim to create a professional and user-friendly environment that supports the platform's educational objectives. Through a clean structure, straightforward navigation and the deliberate avoidance of superfluous complexity, the interface enables users to engage effectively with the platform's academic and vocational content. This approach aligns with the project's broader goals of accessibility, usability and sustainability, ensuring that the VLE remains a reliable and practical learning environment throughout the project lifecycle and beyond.

3.3. Footer and Compliance

The footer of the ReGrow VLE has been designed as a functional and compliance-oriented element that supports transparency, institutional visibility and alignment with the communication obligations defined in the Grant Agreement. Beyond its navigational role, the footer serves as a formal reference point where essential project, funding and contact information is made consistently available across all sections of the platform.

In accordance with the EU visibility and dissemination requirements, the footer prominently includes the official "Co-funded by the European Union" emblem. This visual element is displayed in a clear and unobtrusive manner, ensuring compliance while maintaining the overall visual coherence of the interface. Its placement in the footer guarantees persistent visibility without interfering with the primary learning content of the platform.

Figure 4: EU "Co-funded by the European Union" logo

Alongside the funding emblem, the footer includes the standard project disclaimer, clearly stating that the views and opinions expressed within the platform's content are those of the authors and do not necessarily reflect the official position of the European Union. The inclusion of this disclaimer fulfils a formal requirement of EU-funded projects and contributes to the platform's transparency and legal clarity. By placing this information in the footer, the platform ensures that it is accessible from every page without disrupting the user experience.

The footer also functions as a central point of reference for project-related communication. Key Project Management and Contact Points are clearly listed, including the Project Coordinator, the Project Manager and the Communication Manager. Each role is accompanied by the corresponding institutional affiliation and official contact email address. This structured presentation supports accountability and facilitates direct

communication with the appropriate project representatives for academic, administrative, or dissemination-related enquiries.

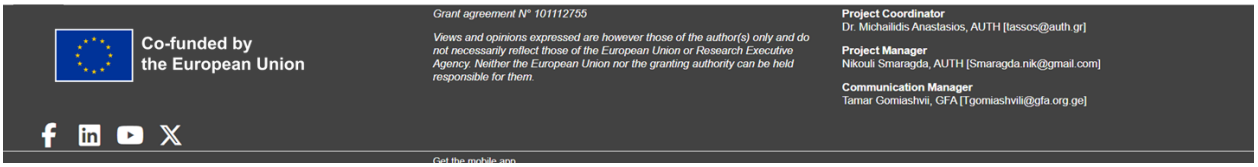

Figure 5: Footer section

From a usability perspective, the footer design follows the same principles of clarity and consistency applied throughout the VLE. Information is presented in a concise and well-organised layout, ensuring that users can quickly identify relevant details without excessive scrolling or visual distraction. This reinforces the platform's professional character and supports its role as a reliable public-facing digital environment.
Overall, the footer of the ReGrow VLE integrates compliance requirements, institutional visibility and contact transparency into a single, coherent interface element. By embedding EU funding acknowledgment, legal disclaimers and project management contacts within the footer, the platform fully aligns with the obligations of the Grant Agreement while enhancing trust, credibility and accessibility for all users.

4. Functional Architecture: The 3 Core Components

The functional architecture of the ReGrow VLE has been designed to translate the project's educational objectives into a clear, structured and user-oriented digital environment. The VLE does not operate as a single, undifferentiated learning space; instead, it is organised around three core components that together form an integrated yet clearly segmented learning ecosystem. This architectural choice ensures that the platform can simultaneously support academic delivery, staff development and lifelong learning, while maintaining clarity, usability and pedagogical coherence.

From the moment a user accesses the VLE through the main domain https://eregrow.eu/, the platform presents a clear and intuitive entry point to its functional structure. The landing page of the VLE is deliberately designed to act as a navigational gateway, visually and structurally introducing the three core components of the environment: the Educator's Interface, the Student Resource Hub and the Online VET / MOOC Component. Each component is represented as a distinct category, supported by clear visual elements and concise labelling, enabling users to immediately identify the area that corresponds to their role and learning objectives.

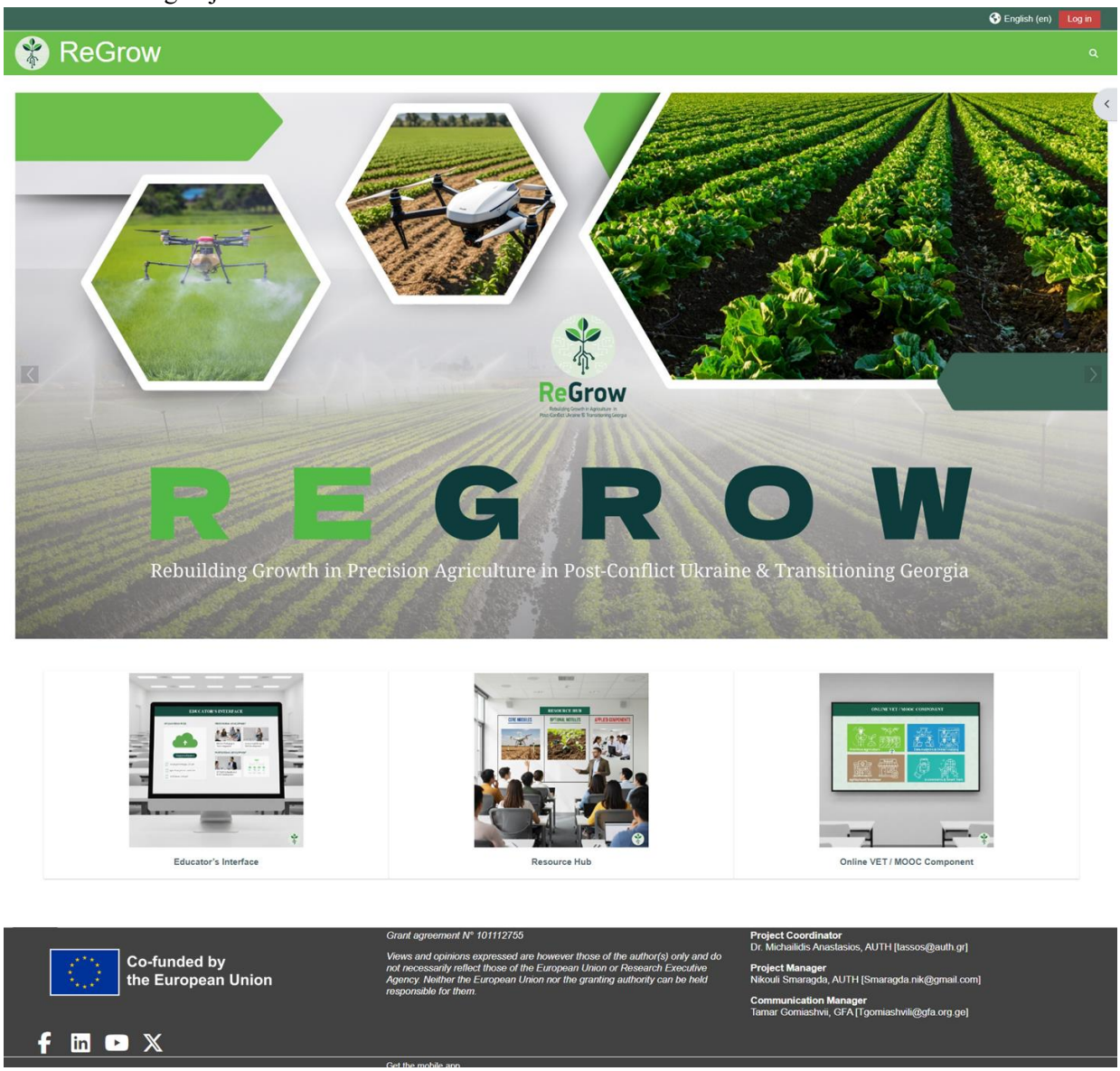

Figure 6: VLE landing page displaying

This design approach ensures that users are not required to navigate through layered menus or generic content pages before reaching relevant material. Instead, upon entry, academic staff, MSc students and external learners are guided directly toward the appropriate section of the platform. This immediate differentiation of learning pathways is a central aspect of the VLE's functional logic and reflects the project's emphasis on clarity, accessibility and user autonomy.

The separation of the VLE into three core components is not merely a visual or navigational choice, but a foundational architectural principle. Each component has been developed to serve a specific pedagogical purpose and target audience, while remaining part of a unified platform governed by a common technical and visual framework. This allows the VLE to support differentiated educational needs without fragmenting the user experience or duplicating infrastructure.

At the same time, the architecture supports flexibility and future development. As a living platform, the ReGrow VLE is designed to evolve throughout the different phases of the project. While the core structure is already fully implemented and operational, the content within each component will be progressively populated, refined and expanded. The clear separation of functional areas enables each component to grow independently in response to pedagogical requirements, partner input and user feedback, without affecting the stability or usability of the overall system.

Collectively, the Educator's Interface, the Student Resource Hub and the Online VET / MOOC Component form a coherent functional framework that supports capacity building, formal education and professional upskilling. The following subsections provide a detailed description of each component, outlining their objectives, intended audiences, pedagogical roles and structural characteristics, supported by screenshots from the live platform to demonstrate their implementation and operational status.

4.1. Educator's Interface

4.1.1. Purpose and Role within the VLE

The Educator's Interface represents a dedicated and clearly defined component of the ReGrow Virtual Learning Environment, specifically designed to support the academic and pedagogical dimension of the project. Its core purpose is to provide a structured digital space where teaching staff can access resources, guidance and reference materials that underpin the effective delivery of the ReGrow educational activities. Within the overall architecture of the VLE, this interface functions as a foundational support mechanism for educators, ensuring that teaching practices are aligned with the project's academic objectives and quality standards.

This component reflects the strategic understanding that high-quality education delivery depends not only on student-facing materials, but also on the availability of appropriate pedagogical support for educators. By embedding this interface within the VLE, the project establishes a stable digital environment that supports teaching preparation, coordination and continuous improvement across partner institutions. It serves as the internal "engine room" for curriculum development, providing the necessary tools to ensure that the complex subjects within Precision Agriculture are taught with consistency and academic rigor.

4.1.2. Target Audience

The Educator's Interface is primarily addressed to academic staff and teaching personnel involved in the implementation of the ReGrow MSc programme, as well as trainers contributing to the project's vocational education activities. This includes lecturers, course coordinators and educators from the consortium institutions in Georgia, Ukraine and the EU, who are responsible for curriculum delivery, assessment and instructional design.

By clearly separating this interface from student-oriented areas of the platform, the VLE ensures that educators have access to content specifically tailored to their professional roles. This separation supports

clarity of use and prevents overlap between pedagogical resources intended for staff and learning materials intended for students or external learners. At the same time, the shared digital environment at eregrow.eu promotes a common reference point for all teaching staff involved in the project, regardless of institutional or national affiliation, fostering a sense of a unified academic community.

4.1.3. Pedagogical Function and Added Value

From a pedagogical perspective, the Educator's Interface serves as a centralised support environment that contributes to teaching quality, consistency and alignment across the ReGrow educational activities. It enables educators to engage with structured pedagogical resources that support course planning, learning outcomes alignment and the coherent delivery of the curriculum. This is particularly relevant in a cross-border and multi-institutional context, where consistency in teaching approaches and academic standards is essential for the eventual recognition of the joint degree.

The interface also contributes significantly to staff development by supporting the enhancement of pedagogical competencies relevant to Precision Agriculture education. Through access to shared resources and guidance materials, educators are supported in adopting modern teaching practices and adapting their instructional approaches to the evolving needs of students and professionals. In this way, the Educator's Interface plays a direct role in the project's capacity-building objectives, strengthening institutional expertise and supporting the modernisation of education in the partner countries through technology-enhanced learning.

4.1.4. Contribution to Capacity Building and Sustainability

Beyond its immediate instructional role, the Educator's Interface contributes to the long-term sustainability of the ReGrow project outcomes. By providing a reusable and expandable repository of pedagogical resources, the platform supports the continued use and adaptation of educational materials beyond the initial implementation phase. Educators can draw upon this shared digital space as the project evolves, ensuring that knowledge, experience and good practices developed within the consortium are retained and disseminated internally as part of the institutional memory of the participating universities.

As part of the VLE's "living platform" approach, the Educator's Interface is designed to evolve throughout the different phases of the project. While its structure is already implemented and operational, its content can be progressively enriched based on teaching experience, internal reviews and feedback from project partners. This ensures that the interface remains relevant, responsive and aligned with both the academic and strategic objectives of the ReGrow project over time, providing a robust digital foundation for future academic growth in the field of Precision Agriculture.

4.2. Student Resource Hub

The Student Resource Hub serves as the central academic pillar of the ReGrow VLE, specifically engineered to house and deliver the comprehensive Joint MSc Programme in Precision Agriculture. Its implementation represents a direct translation of the project's academic objectives into a functional digital repository, ensuring that the high-level curriculum design is accessible, structured and resilient. Within the broader functional architecture of the platform, the Hub operates as the primary interface for formal learning, where the theoretical and technical outputs of the consortium are systematically organized for student engagement. This component is not merely a document storage system but a curated educational environment that reflects the rigorous standards defined in the project's Technical Requirements Specification.

The design of the Student Resource Hub is rooted in the necessity for structural clarity and pedagogical consistency across the participating institutions in Georgia and Ukraine. By centralizing all academic materials—ranging from core theoretical modules to practical internship guidelines—under a unified digital

roof, the project ensures that every student, regardless of their home university, has equitable access to the same high-quality resources. This centralized approach supports the long-term goal of academic harmonization, providing a stable foundation for the Joint MSc degree. The Hub's architecture is deliberately segmented to guide the student through a logical progression of knowledge, moving from fundamental concepts to specialized electives and, finally, to the applied research phase of the thesis.
As a core element of a "living platform," the Student Resource Hub is built to accommodate the progressive growth of the ReGrow curriculum. While the technical framework is fully operational, the Hub is designed to be populated iteratively as new modules are finalized and refined by the academic staff. This ensures that the VLE remains at the forefront of the field, capable of integrating the latest advancements in Precision Agriculture technology and research. By maintaining a clear distinction between the various tracks of the curriculum, the Hub provides a professional and organized space that fosters student autonomy and academic excellence, fulfilling the project's commitment to modernizing higher education through sustainable digital infrastructure.

4.2.1. Purpose and Role within the VLE

The Student Resource Hub is the primary digital environment within the ReGrow VLE dedicated to the formal delivery of the Joint MSc Programme in Precision Agriculture. Its central purpose is to provide a structured and centralized repository where students can access all necessary academic materials, curriculum details and supporting resources required for their studies. As a fundamental component of the platform's functional architecture, the Hub serves as the digital classroom and study center, ensuring that the academic content developed by the consortium is delivered in a coherent, transparent and organized manner. By consolidating these resources under the eregrow.eu domain, the project provides students with a stable and reliable point of reference that supports their progress throughout the duration of the MSc programme.

4.2.2. Target Audience

The Student Resource Hub is specifically designed for students officially enrolled in the ReGrow Joint MSc Programme across the partner universities in Georgia and Ukraine. Given the cross-border nature of the project, the Hub is engineered to accommodate a diverse group of learners who require equitable access to high-quality educational content regardless of their physical location. This component addresses the needs of students who seek a rigorous academic experience in Precision Agriculture, providing them with the necessary documentation, reading materials and instructional guidance to achieve the intended learning outcomes of the degree. By offering a dedicated space for this specific user group, the VLE maintains a clear distinction between formal academic education and the broader vocational offerings available to the general public.

4.2.3. Functional Structure and Repository Character

The Hub functions as a comprehensive repository, systematically organized to reflect the modular structure of the ReGrow curriculum. To ensure clarity and ease of navigation, the entry point of the Hub presents users with a clear visual categorization of the curriculum's three main pillars: Core Modules, Optional Modules and Applied Components. This high-level organization allows students to immediately identify the nature of their coursework and navigate the academic requirements of the Joint MSc with ease.

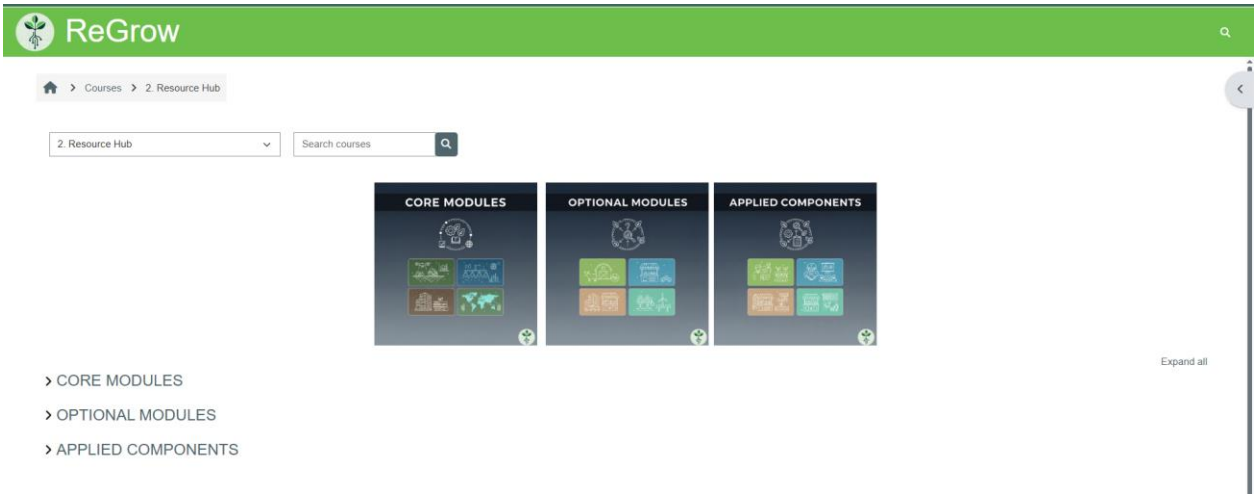

Figure 7: Student Resource Hub entry page

The first functional track is dedicated to the Core Modules, which constitute the fundamental academic pillars of the MSc programme and are mandatory for all students. This section hosts the foundational knowledge base of the degree, including "Fundamentals of Precision Agriculture," "Remote Sensing & Aerial Data Analysis," and "Agricultural Robotics & Automation." Furthermore, it provides essential training in "GIS & Spatial Analysis in Agriculture," "Smart Farming Technologies & IoT Systems," and "Sustainable Agricultural Practices & Climate-Smart Farming." These modules are designed to provide a comprehensive overview of the field, ranging from data collection and UAV operations to GNSS-based autosteering and digital ethics.

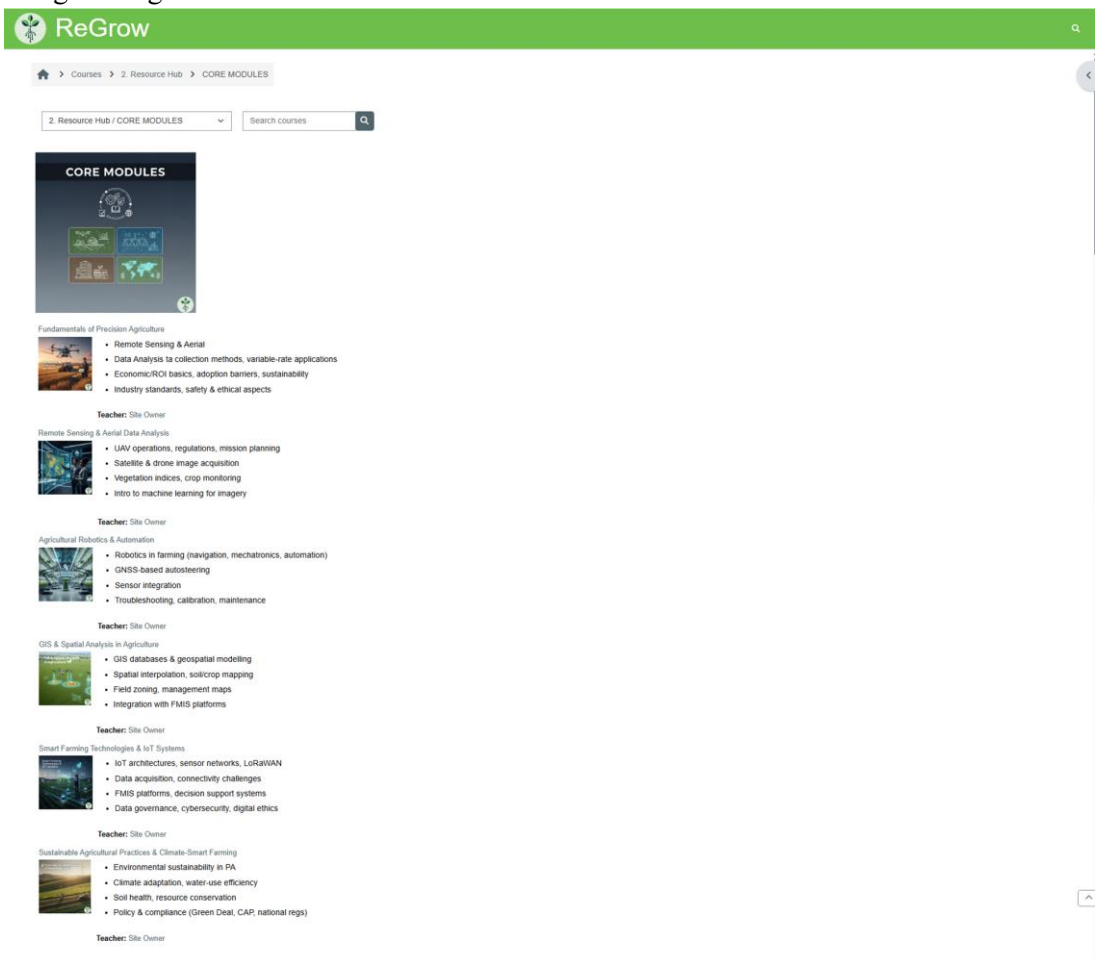

Figure 8: Core Modules

The second track consists of the Optional Modules, providing students with the flexibility to specialize in specific areas of Precision Agriculture according to their professional interests. Within this repository, students can engage with advanced topics such as "Data Analytics in Agriculture," "Agricultural Economics & Agribusiness Management," and "Soil Health & Nutrient Management." Additional specializations include "Modelling and design of technological processes, machinery and equipment for agricultural production" and "Advanced Plant Physiology." This structure ensures that while all students share a common foundational knowledge, they can also tailor their academic journey to meet specific market needs or research interests.

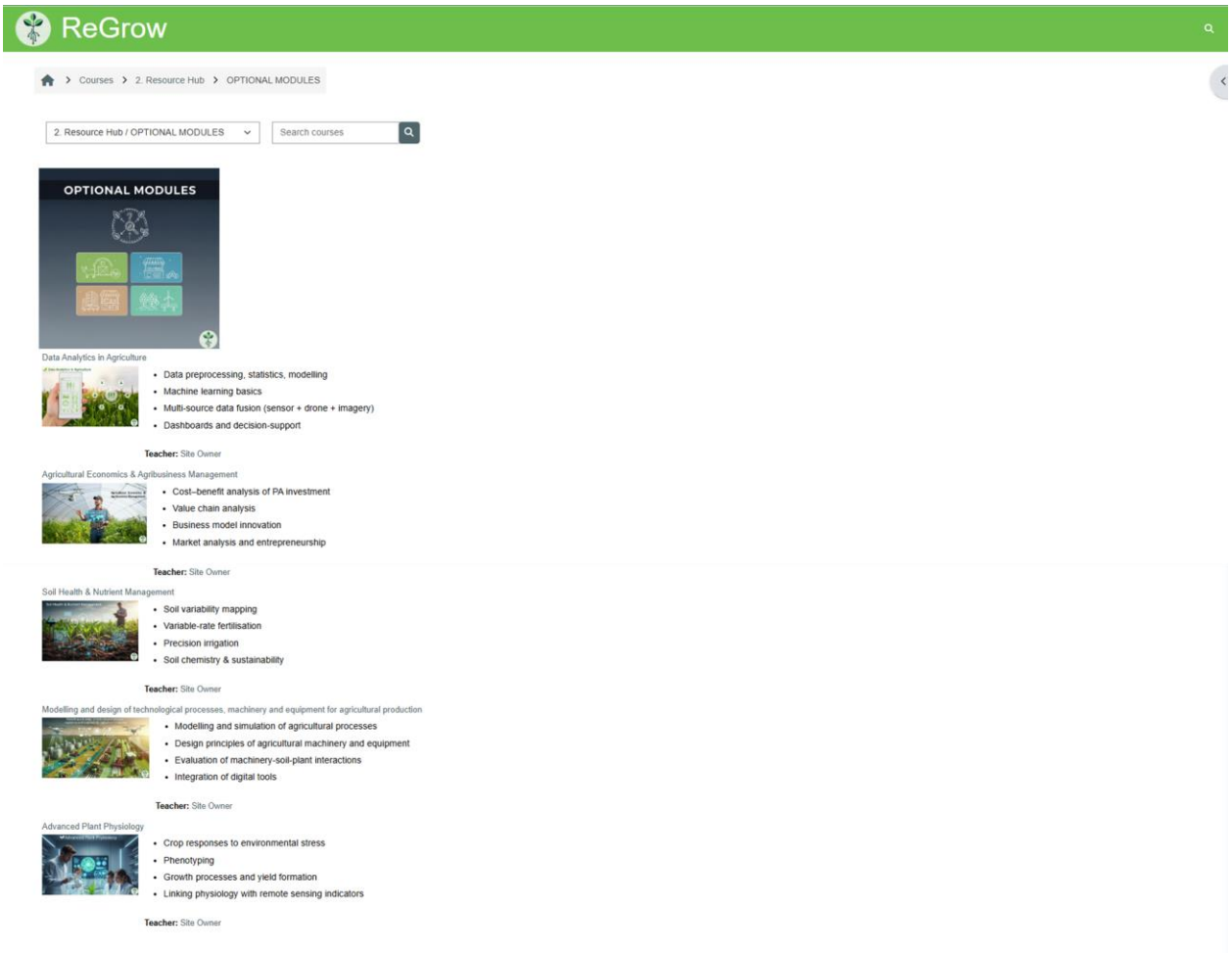

Figure 9: Optional Modules

The third track, designated as Applied Components, provides a specialized space for the practical culmination of the degree. This area hosts the necessary guidelines and administrative support for the "MSc Dissertation" and the "Internship" programs. By separating these practical elements from the taught modules, the VLE provides a dedicated environment where students can focus on the application of their skills and the completion of their research thesis, ensuring that the final stages of the MSc are managed with the same level of structural clarity as the initial coursework.

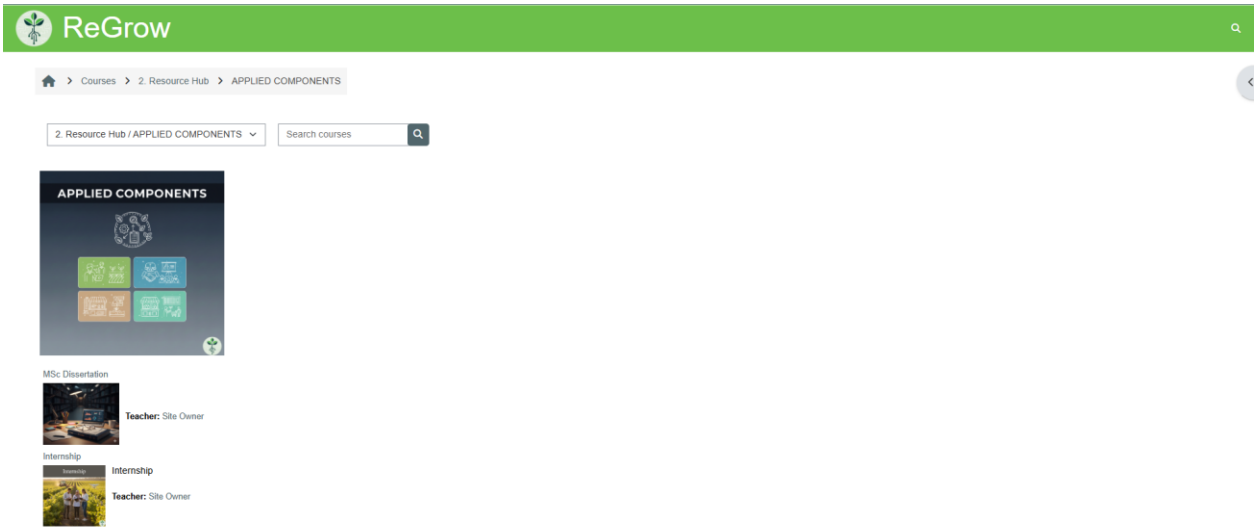

Figure 10: Applied Components

4.2.4. Pedagogical Content and Interactive Learning Tools

Pedagogically, the Student Resource Hub is designed to host a wide variety of educational materials that support a multifaceted learning experience. The repository moves beyond the simple hosting of static files, incorporating interactive learning tools designed to enhance student engagement and knowledge retention. Within each course area, students find a consistent layout that may include search functionalities for specific content, detailed module descriptions and structured learning paths. The integration of interactive knowledge-check components and digital feedback loops allows students to monitor their progress autonomously, aligning the platform with international standards for modern, technology-enhanced higher education. This approach ensures that the learning environment remains dynamic, providing a professional space for academic growth.

4.2.5. Sustainability and the Living Platform Approach

In alignment with the ReGrow project's commitment to providing a "living platform," the Student Resource Hub is designed for continuous expansion and refinement. While the current operational structure is fully implemented and ready to support students, the content within the repository will evolve through a process of progressive population. As teaching materials are refined by the academic staff and new resources are finalized by the consortium, the Hub will be updated to reflect the most current pedagogical developments. This iterative approach ensures that the VLE remains a sustainable and adaptive resource, capable of reflecting the latest advancements in Precision Agriculture. By establishing this robust digital infrastructure, the ReGrow project guarantees that the MSc curriculum remains a long-term asset for higher education in the target regions.

4.3. Online VET / MOOC Component

4.3.1. Purpose and Strategic Role within the VLE

The Online Vocational Education and Training (VET) and Massive Open Online Course (MOOC) component represents the outward-facing pillar of the ReGrow VLE. While other sections of the platform cater to internal academic and staff needs, this component is specifically designed to facilitate lifelong learning and knowledge transfer to the broader agricultural sector. Its primary purpose is to bridge the gap between higher education and industry practice, translating the complex scientific advancements in

Precision Agriculture into actionable, vocational knowledge. By hosting this component on the eregrow.eu domain, the project fulfills a core strategic objective of the Grant Agreement: to modernize education while strengthening the links between academic institutions and the professional agricultural community in Georgia, Ukraine and the European Union.

4.3.2. Target Audience and Accessibility

This component is addressed to a diverse group of stakeholders, including industry practitioners, professional farmers, agronomists and technology providers who seek to enhance their skills without committing to a full academic degree. The MOOC-style architecture of this section ensures that learning is flexible and accessible, accommodating the demanding schedules of professionals in the agricultural field. By providing open-access vocational training, the ReGrow VLE acts as a catalyst for regional development, ensuring that the project's expertise in smart farming reaches those who are directly responsible for the operational management of agricultural resources. This inclusive approach reinforces the project's commitment to dissemination and wide-scale impact beyond traditional university boundaries.

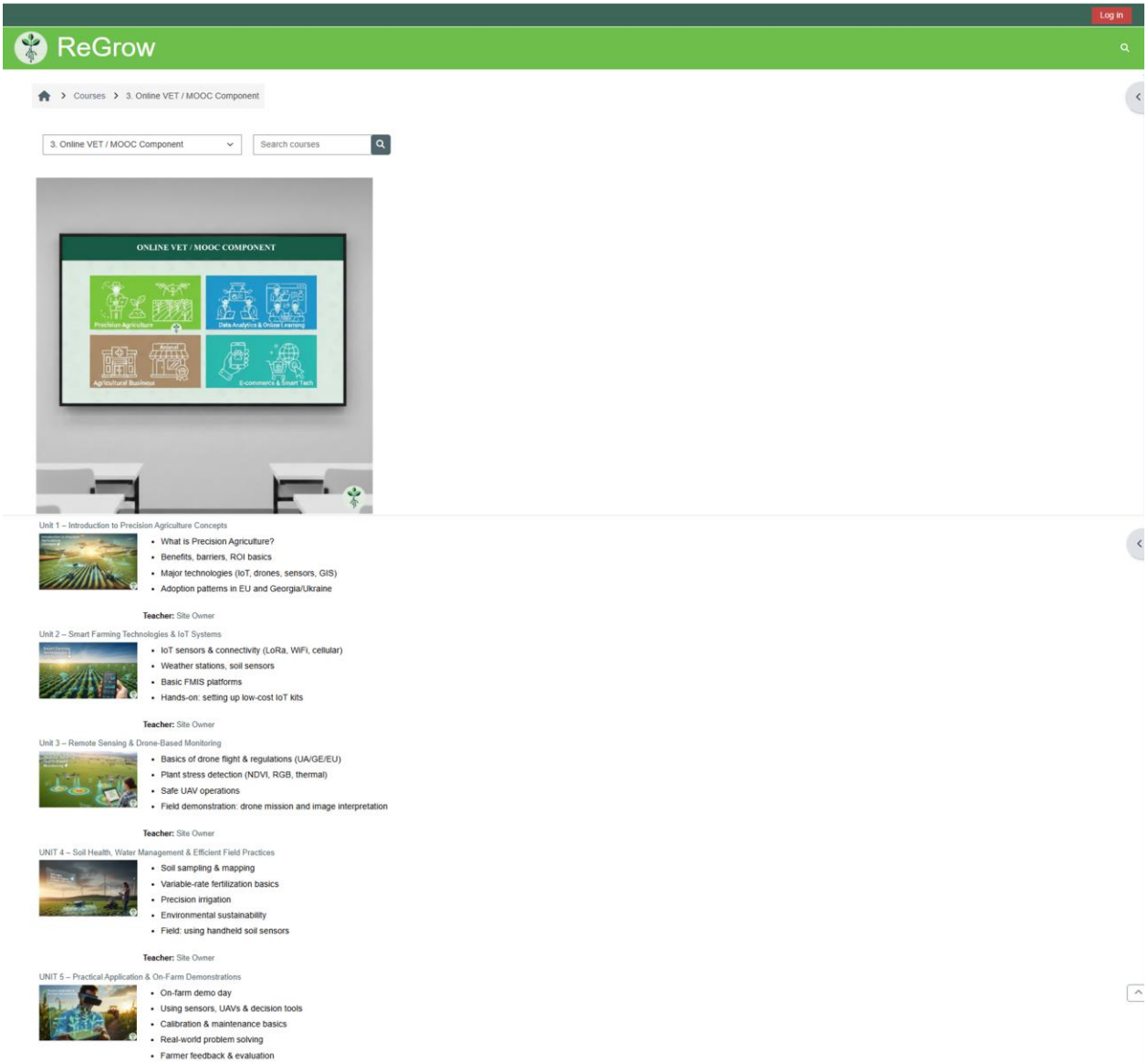

Figure 11:VLE Online VET / MOOC entry page

4.3.3. Lifelong Learning, Upskilling and Content Structure

The pedagogical structure of the Online VET / MOOC component is organized into five specialized units, each focusing on a critical aspect of modern agricultural management. The curriculum begins with Unit 1 – Introduction to Precision Agriculture Concepts, providing a foundation in ROI basics and adoption patterns. It progresses to Unit 2 – Smart Farming Technologies & IoT Systems, where learners engage with IoT architectures and FMIS platforms. Unit 3 – Remote Sensing & Drone-Based Monitoring covers essential flight regulations and plant stress detection, while Unit 4 – Soil Health, Water Management & Efficient Field Practices focuses on variable-rate applications and environmental sustainability. Finally, Unit 5 – Practical Application & On-Farm Demonstrations provides the necessary transition from theory to practice. This comprehensive suite of units ensures a holistic upskilling experience that covers the entire technological spectrum of Precision Agriculture.

4.3.4. Flexibility and Practical Orientation

A defining characteristic of the VET component is its strong practical orientation and inherent flexibility. Unlike the more formal Student Resource Hub, this area prioritizes "hands-on" knowledge, such as setting up low-cost IoT kits, UAV mission planning and field demonstrations using handheld soil sensors. The inclusion of on-farm demonstration modules and real-world problem-solving scenarios ensures that the training is directly applicable to the daily challenges faced by farmers. This practical focus is not static; as a "living platform," the VET component is designed to be adjusted based on farmer feedback and evolving industry standards. This ensures that the training materials remain relevant and that the ReGrow project continues to provide high-value vocational support long after the initial implementation phase.

4.3.5. Sustainability and Institutional Commitment

The Online VET / MOOC component is a central element of the ReGrow sustainability strategy. By establishing a reusable digital infrastructure for vocational training, the consortium ensures that the knowledge generated during the project remains accessible to the industry for years to come. The technical requirements specification for this component prioritizes ease of maintenance and scalability, allowing partner institutions to update units as new technologies emerge. This long-term availability ensures that eregrow.eu remains a premier digital destination for professional development in Precision Agriculture, supporting the continuous modernization of the agricultural sector in the target regions and fulfilling the project's promise of lasting educational impact.

5. User Experience (UX) and Accessibility

5.1. Multilingual Support

The User Experience (UX) of the ReGrow VLE is fundamentally defined by the principle of linguistic inclusivity, recognizing that the success of a Capacity Building in Higher Education (CBHE) project depends on its ability to transcend language barriers. To this end, the platform incorporates a robust multilingual framework that supports English, Georgian and Ukrainian. This trilingual approach is not merely a technical feature but a strategic necessity aligned with the project's dual mission of achieving international academic excellence while ensuring deep local vocational impact. By providing a platform that communicates in the native languages of the partner countries while maintaining English as the primary language of global Precision Agriculture research, the VLE ensures that its resources are accessible to a wide spectrum of users—ranging from internationally-oriented MSc students to local industry practitioners and regional stakeholders.

In the context of the Erasmus+ programme and the specific mandates of the Grant Agreement, multilingualism serves as a critical bridge for institutional capacity building and the modernization of educational infrastructures in Georgia and Ukraine. The inclusion of Georgian and Ukrainian is vital for ensuring the long-term sustainability and local ownership of the platform within the partner universities. It allows for a more profound integration of the VLE into the daily academic and professional life of the target regions, mitigating the risk of linguistic alienation that can often occur with purely English-language digital repositories. Furthermore, for the Online VET / MOOC component, localized content is essential for effectively reaching farmers and agricultural professionals who are the primary beneficiaries of the project's technological knowledge transfer but may not possess the advanced English proficiency required for academic study. This linguistic flexibility demonstrates a sophisticated understanding of the user journey, prioritizing ease of access and cognitive ease for all participants.

From a functional and technical perspective, as outlined in the Technical Requirements Specification, the multilingual support is implemented systematically across the platform's interface and navigational logic. The User Interface (UI) elements—including primary navigation menus, section headers, instructional labels and call-to-action buttons—are designed to be intuitive, with the language-switching mechanism clearly visible and accessible from every page. This ensures that users can orient themselves and interact with the platform's administrative and structural features in their language of choice. While the advanced academic materials within the Student Resource Hub may prioritize English to maintain international standards and facilitate cross-border scientific collaboration, the foundational elements of the VLE are built to support local language integration. This balanced approach ensures that the ReGrow VLE remains a compliant, professional and highly usable digital asset that respects the cultural and linguistic context of its partners while advancing the project's global strategic objectives.

Beyond interface-level multilingualism, particular attention is given to the linguistic integrity of academic and technical content hosted within the VLE. While the platform may technically support automated translation mechanisms for navigation elements, the ReGrow consortium explicitly recognises that scientific accuracy and terminological precision cannot be guaranteed through automated tools alone. For this reason, academic and pedagogical materials developed under WP5 will be prepared and shared in editable formats with partner institutions, enabling professional, human-led translation into Georgian and Ukrainian by subject-matter experts when needed. This approach ensures that complex scientific terminology, domain-specific concepts and methodological nuances in Precision Agriculture are preserved without semantic loss. It also guarantees that learning materials—particularly videos, instructional content and training modules—remain fully reliable and pedagogically sound across all three languages. By prioritising expert translation over automated solutions for academic content, the ReGrow project

safeguards the quality, credibility and usability of its educational outputs for local learners, while maintaining English as the reference language for cross-border academic alignment.

5.2. Accessibility Standards

The technical development of the ReGrow VLE is underpinned by a commitment to digital equity, ensuring that the platform's resources are accessible to all users, regardless of their physical or cognitive abilities. In alignment with international best practices and the specific quality standards required for European capacity-building initiatives, the VLE has been designed to meet the Web Content Accessibility Guidelines (WCAG) 2.0 at Level AA. This compliance ensures that the interface is perceivable, operable, understandable and robust. By adhering to these standards, the project guarantees that students and practitioners with visual, auditory, or motor impairments can interact with the educational content through assistive technologies, such as screen readers or keyboard-only navigation. This focus on accessibility is a critical component of the platform's professionalism, reflecting the project's adherence to the principles of social inclusion and equal opportunity in higher education.

Beyond technical compliance, the accessibility of the ReGrow VLE is further reinforced by its character as an Open Educational Resource (OER) environment. The project's strategic objective is not merely to host content online, but to remove the barriers that traditionally limit the dissemination of advanced agricultural knowledge. By adopting an OER philosophy, the VLE ensures that the outputs of the ReGrow curriculum are available in formats that are easy to access, download and reuse, supporting the long-term sustainability of the project's pedagogical impact. This open nature is particularly relevant for the partner institutions in Georgia and Ukraine, where the availability of high-quality, localized and accessible digital materials in Precision Agriculture can significantly accelerate the modernization of the local agricultural sector. The OER framework ensures that the knowledge remains a public asset, fostering a culture of collaborative learning and continuous improvement within the academic and professional communities.

5.3. Usability and Navigation Logic

The usability of the ReGrow VLE is built upon a purpose-built navigation logic that prioritizes user orientation and minimizes cognitive friction. Recognizing that the platform serves as a complex intersection of academic, vocational and administrative functions, the navigation system has been designed to provide a predictable and consistent experience across all sections. The primary navigation logic is centered on the three-pillar architecture—the Educator's Interface, the Student Resource Hub and the Online VET Component—ensuring that users can identify their specific learning pathway from the moment they enter the eregrow.eu domain. This structural clarity is maintained through a persistent header and footer system, allowing users to move between modules or access contact points without losing their sense of location within the digital environment.

A key element of this navigation logic is the "shallow" hierarchical structure of the site, which ensures that essential resources are rarely more than two clicks away from the homepage. By organizing the MSc curriculum into clearly labeled tracks—Core, Optional and Applied—the VLE reduces the time spent on administrative navigation, allowing students to focus more of their attention on the educational content itself. This intuitive approach is particularly beneficial for the Online VET component, where practitioners may require quick and direct access to specific units on their mobile devices while in the field. The consistency of visual cues, icons and call-to-action buttons across the entire platform creates a cohesive user journey, reinforcing the VLE's role as a professional and reliable digital infrastructure.

Furthermore, the navigation logic incorporates "breadcrumb" trails and clear section headings to support the user's movement through layered content. This ensures that even as the repository grows in volume during the progressive population of the curriculum, the interface remains manageable and organized. The usability of the VLE is not a static achievement but an ongoing design priority; the navigation logic is

subject to continuous review based on user interaction patterns observed during the initial phases of the project. By maintaining a disciplined and user-centric approach to navigation, the ReGrow VLE ensures that the technology remains a transparent vehicle for the delivery of high-quality education, supporting the project's objectives of academic excellence and vocational upskilling.

Adittionally, recognising that not all target users—particularly farmers and industry practitioners—possess the same level of digital literacy, the ReGrow VLE design is complemented by a planned set of onboarding and support materials to be developed during WP5. These materials will include concise user guides such as step-by-step handbooks, short video tutorials designed to assist users in navigating the platform and accessing learning resources with confidence. These onboarding resources will be made available in English, Georgian and Ukrainian to ensure accessibility for all target groups and to reduce barriers to participation in online learning. By combining a simplified navigation logic with practical guidance materials, the VLE aims to remain accessible even to users with limited prior exposure to digital learning environments. This approach reinforces the platform's inclusive character and ensures that technological complexity does not hinder engagement with the educational content.

6. Testing, Review and Partner Feedback

The development of a cross-border Virtual Learning Environment within a Capacity Building in Higher Education (CBHE) framework requires a rigorous and structured approach to testing, review and iterative refinement. Unlike institutionally isolated learning platforms, the ReGrow VLE is designed to operate across multiple countries, academic systems and user profiles, serving higher education students, academic staff and external professional learners. Within this context, testing is not treated as a purely technical verification exercise, but as a critical quality assurance mechanism that ensures functional reliability, pedagogical coherence and usability across diverse institutional and cultural settings.

In line with the Grant Agreement requirements and established best practices for CBHE digital infrastructures, the testing and review of the ReGrow VLE was conceived as a multi-layered process. This process combined internal technical and functional validation with structured partner-level review, ensuring that the platform meets both the project's internal quality standards and the expectations of the wider consortium. The objective of this approach was to confirm that the VLE operates as a stable, user-friendly and academically appropriate environment prior to its large-scale population with educational content under WP5.

Given the role of the VLE as a long-term digital asset of the ReGrow project, particular emphasis was placed on verifying the integrity of its core functional architecture. Testing activities focused on ensuring the correct operation and internal consistency of the three core components—the Educator's Interface, the Student Resource Hub and the Online VET / MOOC component—as well as the coherence of the overall navigation logic and multilingual behavior. This was essential to confirm that users with different roles and levels of digital literacy can interact with the platform intuitively and without unnecessary barriers.

At the same time, the testing process explicitly acknowledged the VLE's character as a "living platform." Rather than aiming for a static or finalised system, the review phase was designed to support iterative improvement, informed by real partner interaction with the live platform. For this reason, the VLE was made accessible to all relevant project governance and advisory bodies in parallel with the circulation of Deliverable 4.1, allowing reviewers to assess the platform's functionality in direct relation to its documented design and objectives.

The following subsections describe in detail the partner review process and the mechanisms through which feedback was collected, assessed and integrated. Together, they demonstrate that the ReGrow VLE has undergone a controlled and meaningful testing phase, resulting in a mature, stable and implementation-ready digital environment that is fully prepared to support the transition from infrastructure development (WP4) to large-scale content population and educational deployment (WP5).

6.1. Partner Review Process

The partner review process constituted a central pillar of the quality assurance framework applied during the development of the ReGrow Virtual Learning Environment. In a CBHE project of this scale and complexity, where the digital platform must function across different institutional cultures, regulatory environments and user expectations, partner-level testing is essential to validate not only technical performance but also functional clarity and pedagogical alignment. For this reason, the review of the VLE was designed as a controlled and participatory process, engaging the full governance and advisory structure of the project.

Prior to the initiation of the partner-wide review, the platform underwent internal testing coordinated by AUTH, acting as project coordinator and technical lead for the VLE. This internal phase focused on verifying the operational stability of the platform, the correct deployment of its core components and the consistency of its visual and navigational logic. Particular attention was given to cross-browser functionality, responsiveness across devices and the internal coherence of the three-component architecture.

These internal feedback cycles allowed for early identification and resolution of layout issues, navigational inconsistencies and minor interoperability concerns, ensuring that the platform reached a stable baseline before being shared more broadly.

Following the completion of internal validation, the VLE was made accessible to all project partners through controlled access to the live platform at https://eregrow.eu/. This access was accompanied by the circulation of D4.1, enabling reviewers to assess the platform not only as end users but also in direct relation to its documented design rationale, functional architecture and technical specifications. This dual approach ensured that feedback was grounded in both practical interaction with the platform and a shared understanding of its intended role within the project.

The partner review phase actively involved representatives from all key project bodies, including Work Package Leaders, the Steering Committee, the External Scientific Committee and the Quality Assurance Board. Each of these bodies contributed a complementary perspective to the evaluation process. Work Package Leaders focused on the alignment of the VLE with pedagogical workflows and upcoming WP5 activities, particularly in relation to content population and instructional use. The Steering Committee assessed the platform's strategic coherence with the Grant Agreement and its readiness to support cross-border implementation. The External Scientific Committee provided input on academic credibility, clarity of structure and suitability for higher education and professional audiences.

During this controlled testing phase, partners were invited to explore all three core components of the VLE in depth. The Educator's Interface was reviewed with regard to its clarity of purpose and suitability as a staff-oriented support environment. The Student Resource Hub was examined in terms of curriculum structure, navigation logic and consistency with the Joint MSc design. The Online VET / MOOC component was assessed for accessibility, practical orientation and ease of use by non-academic audiences. Across all components, particular emphasis was placed on usability, intuitive navigation and the behaviour of multilingual interface elements, ensuring that language switching and core UI labels functioned predictably and consistently.

This partner review process confirmed that the ReGrow VLE operates as a coherent and functional digital environment that reflects the project's academic and vocational objectives. At the same time, it generated targeted and constructive feedback aimed at fine-tuning the user experience rather than redefining the platform's structural foundations. The systematic nature of this review ensured that feedback was comprehensive, balanced and representative of the project's diverse stakeholder landscape, providing a solid basis for the subsequent feedback integration phase described in Section 6.2.

6.2. Feedback Integration

The feedback integration phase represents the closing step of the quality assurance cycle applied during the development of the ReGrow Virtual Learning Environment and serves to confirm the platform's maturity and readiness for use. In line with the Grant Agreement's reference to rigorous testing and validation, all comments and observations collected during the partner review process were systematically analysed and addressed within the scope of WP4. This phase did not aim to introduce new functionalities or alter the conceptual architecture of the VLE, but rather to consolidate the platform by refining details that directly affect usability, clarity and overall user confidence.

Feedback gathered from partners across the different project bodies was reviewed in a structured manner, with particular attention given to recurring themes and cross-cutting observations. The majority of inputs related to user experience aspects, such as the clarity of labels, minor navigation refinements, visual balance in specific views and the consistency of multilingual interface elements. These comments were indicative of an engaged and informed review process, confirming that partners interacted with the platform in depth and evaluated it against real usage scenarios rather than abstract criteria.

All feasible improvements identified through this process were implemented as targeted, low-risk adjustments. These included minor interface refinements, improved alignment of visual elements, small enhancements to navigation cues and the fine-tuning of language-switching behaviour at the level of core interface components. Importantly, none of the feedback required changes to the underlying technical infrastructure, data model or functional separation of the three core components. This confirms that the foundational design choices made during the development of the VLE were sound and robust and that the platform had already reached a high level of stability prior to partner review.

The integration of feedback was carried out in a way that preserved the structural integrity of the platform. No changes were introduced that could compromise interoperability, long-term maintainability or alignment with the Technical Requirements Specification. Instead, the feedback integration phase served to polish the existing implementation, reinforcing its professional character and ensuring that the user experience remains consistent across different user groups and access contexts. This approach reflects a disciplined development process in which quality assurance strengthens, rather than destabilizes, the final output.

Crucially, this phase also formalizes the understanding of the ReGrow VLE as a living platform. While the completion of WP4 confirms that the VLE is fully developed, operational and fit for purpose, the project recognizes that continuous improvement is essential for a digital environment intended for long-term use and public dissemination. The partner review conducted during WP4 establishes the baseline for this iterative process. As the platform transitions into WP5 and begins to host increasing volumes of pedagogical content, additional feedback cycles will be conducted to ensure that usability, accessibility and navigation logic continue to respond to real-world usage patterns.

Through the successful completion of the feedback integration phase, the ReGrow VLE can be considered mature, stable and ready to support the next phase of the project. The platform fully meets the objectives defined for this deliverable, aligns with the Grant Agreement's expectations regarding testing and validation and provides a reliable digital infrastructure for content population, teaching delivery and lifelong learning activities.

7. Conclusions and Next Steps

The ReGrow Virtual Learning Environment represents a fully developed, operational and strategically aligned digital infrastructure that successfully fulfils the objectives defined for this phase of the project. As documented throughout this deliverable, the VLE is not a conceptual framework or a partial implementation, but a functional web-based learning environment that is publicly accessible at https://eregrow.eu/ and ready to support the educational activities of the ReGrow project. At the technical and functional level, the VLE provides a stable and coherent digital space that integrates formal academic education, vocational training and lifelong learning within a single platform. Its hosting as a standalone website, its structured backend architecture and its clearly defined functional components ensure reliability, scalability and long-term availability. The platform is institutionally supported by the Aristotle University of Thessaloniki, securing its sustainability beyond the formal duration of the project, in line with the requirements of the Grant Agreement.

From an educational perspective, the VLE fully supports the core objectives of ReGrow by providing the necessary digital "containers" for the project's complex pedagogical outputs. It enables the structured delivery of the Joint MSc programme through the Student Resource Hub, supports staff development and pedagogical coordination through the Educator's Interface and extends the project's impact beyond higher education by offering practical, accessible learning opportunities through the Online VET / MOOC component. This integrated architecture reflects the project's capacity-building mission and strengthens the links between academic education, industry needs and professional upskilling in the field of Precision Agriculture. The design and implementation of the VLE are closely aligned with the principles of accessibility, inclusivity and openness that underpin CBHE projects. Multilingual support, compliance with accessibility standards and a clear usability and navigation logic ensure that the platform can be effectively used by diverse audiences across different countries and institutional contexts.

Crucially, the VLE has been conceived and implemented as a living platform. While the ReGrow Virtual Learning Environment is fully developed and operational at the infrastructure level, it is important to explicitly clarify that during this step the design, development and deployment of the VLE as a stable and functional digital infrastructure is taking place as this was the ultimate goal of the WP4, while the systematic development and population of high-quality educational materials—including syllabi, lecture notes, assessment tools and interactive learning resources—constitutes the core objective of WP5.

In preparation for this transition, coordination activities have already been initiated between AUTH and NGOED to evaluate advanced digital tools that will support the transformation of traditional academic materials into engaging, modern learning assets. These discussions focus on the responsible use of technologies such as AI-assisted video generation tools, interactive presentation platforms and multimedia authoring environments that can support the conversion of structured documents into high-quality instructional videos and interactive modules. This preparatory work ensures that, from the very beginning of WP5, the ReGrow VLE will not merely host static documents, but will progressively deliver pedagogical content in formats that enhance learner engagement while remaining academically rigorous. Importantly, these tools are viewed as supportive instruments for content delivery and not as substitutes for academic expertise, which remains fully anchored in the consortium's teaching staff and subject-matter experts.

As so, while its structural, technical and functional foundations are fully in place and operational, the environment is designed to be progressively enriched and refined throughout the subsequent phases of the project. This approach ensures that the platform can respond to pedagogical feedback, evolving curriculum needs and the gradual expansion of learning content without requiring fundamental redesign or restructuring. The completion of D4.1 marks a clear transition point within the ReGrow project, moving from the establishment of infrastructure to the intensive phase of content creation and capacity building.

The VLE is now positioned to serve as the primary vehicle for the activities of WP5, led by HSWT. The infrastructure is ready to receive the full suite of educational materials developed under Task 5.1, including syllabi, lecture notes and specialized assessment tools. Furthermore, the platform's advanced multimedia capabilities will host the interactive eLearning modules, instructional videos and simulations designed to provide alternative learning pathways for diverse learning styles. The Online VET / MOOC component will specifically house the professional learning modules, integrating scenario-based activities and interactive exercises that mirror real-life agricultural challenges. This ensures that the digital environment remains practice-oriented and aligned with professional standards in Precision Agriculture.

The next phase will also leverage the VLE's multilingual framework for Task 5.3, facilitating the integration of adapted and translated curricula in Georgian and Ukrainian to ensure broad national reach and relevance to local labor markets. The Educator's Interface will play a pivotal role in Task 5.4, providing the digital venue for online workshop series aimed at upskilling HEI staff in contemporary teaching methodologies and the delivery of the new curriculum. Finally, the "Applied Components" section of the VLE will host the internship programme framework developed in Task 5.5, facilitating the coordination between students and industry partners. With this stable, accessible and professionally designed digital environment in place, the ReGrow project is perfectly positioned to maximise the impact of its educational outputs and ensure the long-term use and sustainability of its results.