Deliverable 3.3

INGENIUM Platforms

Work package 3 – Digital INGENIUM

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Document information

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Description of the deliverable (3-5 lines)	The document pertains to the creation of the internal network platform "Intra-Alliance" on the INGENIUM website, the Front Portal and the development of the INGENIUM Education Platform.
Key words	Intranet, Website, Intra-Alliance site, Front Portal, Learning Management System, joint e-learning platform

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Definitions & Acronyms

Acronym (in alphabetical order)	Definition
CMS	Content Management System
LMS	Learning Management System
SSO	Single Sign-On

EXECUTIVE SUMMARY

This document outlines the deliverable D3.3 INGENIUM Platforms as part of Work Package 3 (WP3) of the INGENIUM Alliance project. It highlights the development and implementation of three key digital platforms that support the alliance's educational and collaborative goals: the e-Learning Platform, the Intra-Alliance Site, and the Front Portal. These platforms are integral to achieve INGENIUM's vision of fostering innovation, inclusivity, and connectivity across the participating European universities.

The **e-Learning Platform** leverages Moodle as its Learning Management System (LMS), providing a user-friendly, flexible, and accessible solution for hosting academic activities. The platform supports various pedagogical approaches, including instructor-led, self-paced, and blended learning. Developed collaboratively by alliance members, the platform features integration with partner university accounts for authentication (via SAML2) and offers tools for accessibility, customizable grade management, and content reuse.

The **Intra-Alliance Site**, developed using WordPress, serves as a secure intranet for members to facilitate communication, collaboration, and resource sharing. Features include an events calendar, forums, document management, and Single Sign-On (SSO) for secure access. The design emphasizes usability, scalability, and cost-effectiveness to meet the needs of diverse users across partner institutions.

The **Front Portal**, also built with WordPress, functions as the public-facing website for the alliance. It promotes outreach and engagement by showcasing INGENIUM's activities through news posts, announcements, and newsletters. Advanced tools such as the Elementor Pro plugin enable customization, while plugins for security, SEO, and performance ensure reliability and efficiency.

The document details the rigorous methodology employed in platform development, including platform selection based on technical requirements, collaborative decision-making, and systematic installation and configuration. Despite challenges, such as integrating SAML2 authentication for all partners, the platforms are fully operational and aligned with INGENIUM's strategic goals. These platforms will play a crucial role in enhancing collaboration, supporting educational innovation, and fostering engagement within and beyond the alliance.

DESCRIPTION, METHODOLOGY AND DISCUSSION OF THE FINAL OUTCOME

1. Joint e-Learning Platform (Development of the INGENIUM Educational Platform)

1.1. Description

A crucial part of the INGENIUM University is an e-Learning Platform which will be able to host all academic activities, facilitating the conduct of face-to-face as well as distant courses.

Main characteristics of this platform should be the following:

- Support of multiple pedagogical approaches. Classes can be instructor-led, self-paced, blended or entirely online.

- Access to courses can vary, from totally open to all visitors to strictly restricted to specific participants, according to each program's needs.

- User authentication through the participating Universities accounts.

- Encouragement of collaboration and teamwork and creation of communities through courses.

- Customizable grade management

- Integration with external resources and learning tools if needed, integration with Open Badge Factory. (in collaboration with University of Skövde))

- User friendly environment. Ideally, the platform should be already familiar to the users of the Partners.

- Whenever applicable, already existing educational content could be reused in the INGENIUM e-Learning Platform.

- Accessibility options.

- Security, backup and privacy policies applied.

1.2 Methodology applied

1.2.1 Choosing a platform to use

Taking into account the requirements above, it was decided that the Moodle Learning Management System (LMS) - https://moodle.org - best fits the project's needs.

Moodle is a versatile and widely used open-source learning management system. It empowers educators to create dynamic online learning environments, fostering collaboration and engagement among students. Moodle offers a wealth of features, including course creation, content management, discussion forums, quizzes, assignments, and gradebooks. Its

flexibility allows customization to suit various educational contexts, from K-12 classrooms to corporate training programs. Moodle's global community provides extensive support and resources, ensuring continuous improvement and innovation in online learning.

Moreover, it should be mentioned that a questionnaire was created and distributed to all partners, regarding the IT infrastructure and services in each University. The results of this questionnaire are presented in Deliverable 3.2 - "Digital Framework: Alliance digital state analysis".

Through the analysis of this questionnaire, it was concluded that most of the partners use the Moodle LMS for their e-courses. This comes to reinforce the choice of Moodle as the LMS to use as the INGENIUM e-learning platform.

1.2.2 Outcomes of the WP3 meeting on May 21st-23rd in IASI - Questionnaire about the INGENIUM Educational Platform

During the WP3 meeting in Iasi, 21-22 of May 2024, the WP3 group discussed the INGENIUM Educational Platform. The University of Crete team presented Moodle as the proposed LMS to implement and it was agreed that this would be the solution to follow. Also, the University of Crete team presented the SAML2 authentication process as the solution chosen for authenticating to the platform.

After the IASI meeting, a questionnaire (Annex 1) was distributed among partners regarding the needs of each one as far as the INGENIUM Educational Platform is concerned. Everyone apart from MTU and TUIASI answered the questions. The main outcomes are:

- Partners are going to create multiple kinds of e-content: modules, courses or programs.

- The total number of courses is roughly estimated to be somewhere between 50 and 150.

- In most cases there will be a few decades of participants on each course, but also courses with more than 100 participants are expected. The courses can be targeted at students, staff, with free enrollment or with a restricted set of participants. Moreover, open courses will be developed (not enrolled users, only guests).

- Courses will be either totally asynchronous, or both asynchronous and synchronous (with live meetings).

- Some partners argue that there is a need for a default set of tags and identify certain sets.

- The categorization of courses should be according to the relevant subject area, while we can explore other options.

- All partners will create new courses on the INGENIUM Educational Platform, but also there will be courses transferred from other existing platforms.

- The first page of the INGENIUM Educational Platform should provide information on available courses, events and activities that have a learning outcome, and all available educational opportunities offered within the INGENIUM.

- Technical support for the creation of courses will be needed in some cases.

1.2.3 Moodle installation and configuration

The Moodle platform has been successfully installed and customized to meet partners' specific needs. Through careful configuration, we have tailored the LMS to provide a user-friendly and effective learning environment.

Key customizations include:

- The implementation of the "New Learning" theme to enhance the overall user experience and create a visually appealing and engaging learning environment. We configured this theme to align with INGENIUM's media guidelines in order to promote a distinctive and modern look and feel. Also, it should be noted that the specific theme offers multiple accessibility tools, covering many types of difficulties.

- Use of SAML2 authentication. Most of the partners are now connected to the INGENIUM eLearning platform through SAML2 authentication and this means that each user uses their university account to log in. In the case of MTU and HKA, SAML2 authentication is not yet possible, users will be added with user lists when needed.

1.3 Constraints faced

The challenges faced during the process of developing the INGENIUM e-learning platform were the following:

- Authentication: After the IASI meeting, and in accordance to the authentication solution in other cases such as the INGENIUM Repository (https://repo.ingenium-university.eu), it was decided to implement the SAML2 authentication. In this way, any member of the academic communities of each partner university will be able to register to the platform. This was not yet possible for two partners, MTU and HKA, as configuration is needed from their side. In this case, the users will be registered through lists that the platform admins will receive by the University secretariats. It should be noted that user registration to the platform is not open to everyone.

- User support: In order to facilitate as much as possible, the use of the platform, especially for those users that have not used Moodle before, the following tools are available:

  o Online help on almost every page of the platform (the user clicks on the question mark '?'). This option is inherent in the Moodle LMS.

- o Basic guidelines for students on how to register on the platform and enroll and participate at a course. This will be available on the front page.

- o FAQ on the front page, with information on how students can participate to INGENIUM courses. This will evolve according to the kinds of courses that will be offered through the platform.

- o Helpdesk. Each user that has a question or a difficulty with the platform can send an email to user support (helpdesk@ingenium-university.eu).

1.4 Final Outcome

The INGENIUM e-learning platform is now fully operational and can be found at https://elearn.ingenium-university.eu/.
The alliance's Education Platform already hosts an INGENIUM course (Digital Wellbeing) with approximately 70users across the INGENIUM alliance, well before the due date for the official launch of the platform.
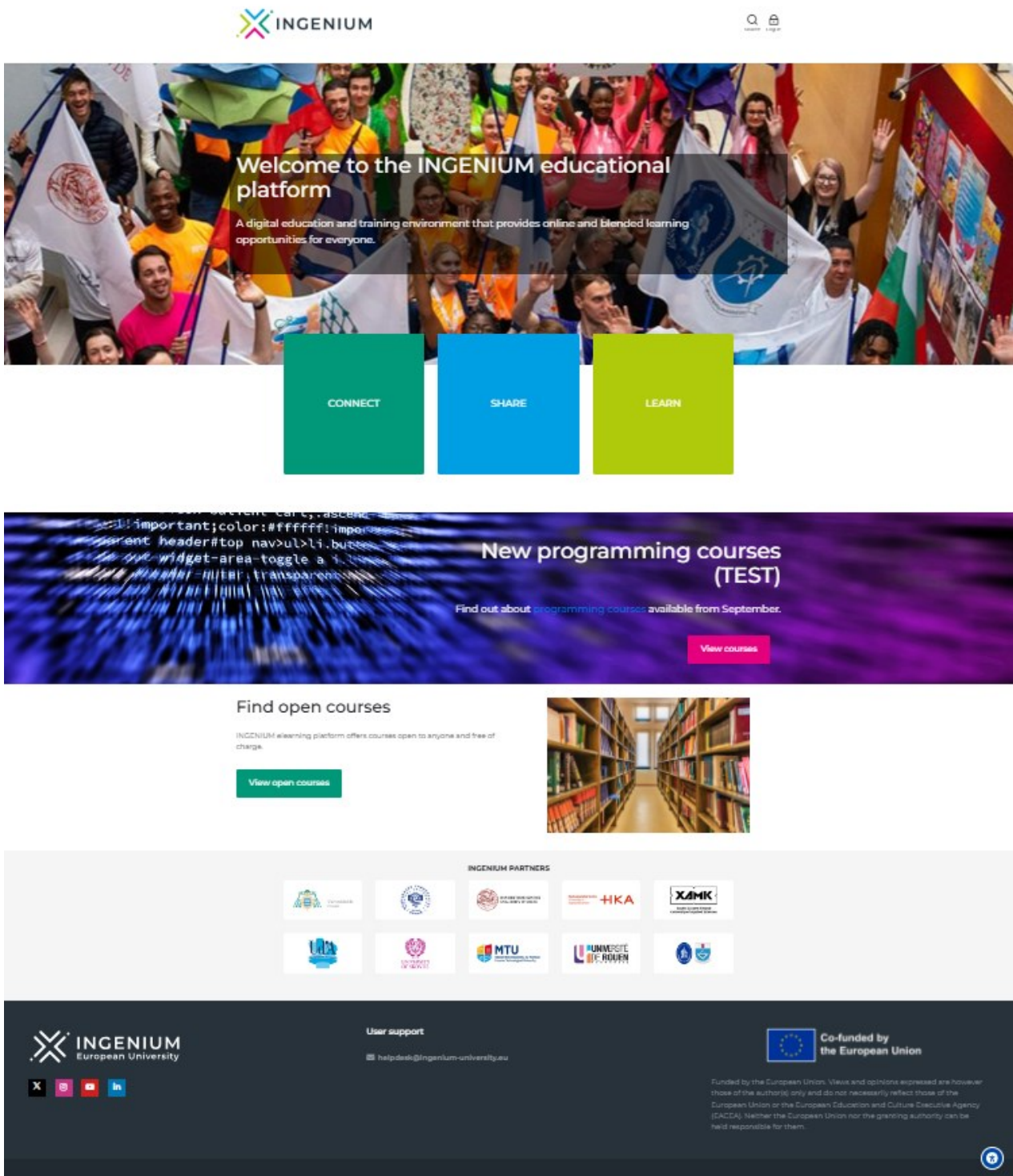
Figure 1: *Front page*
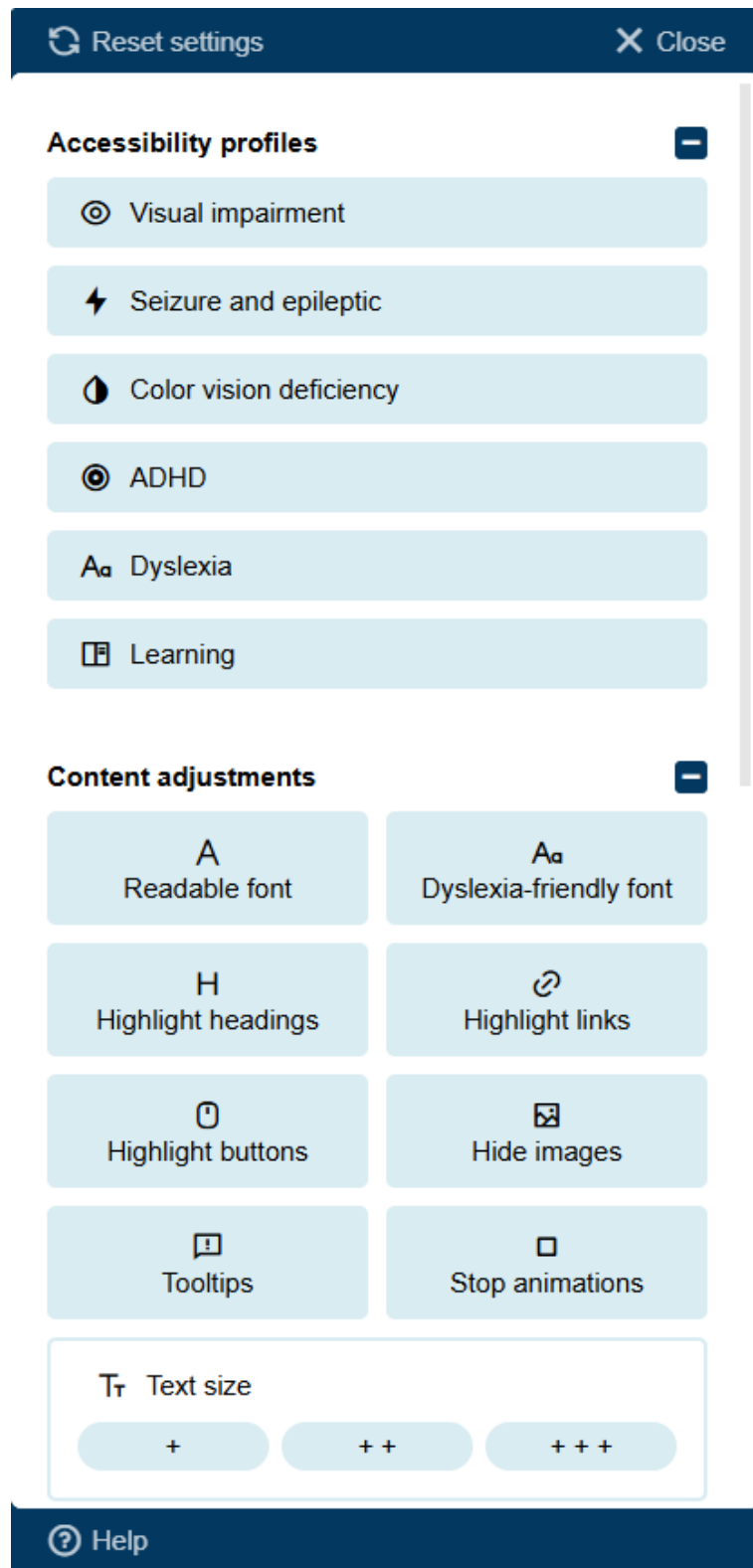
Figure 2: *A course page*

Figure 3: *Accessibility tools*

2. Intra-Alliance Site

2.1. Description

The existence of an internal web platform (Intranet) is highly significant, as it enables members to communicate directly while ensuring that the communication remains confidential.

The features such an internal platform may offer include:
Access via credentials
1. Online applications, such as:
    (a) Forum,
    (b) Events calendar
    (c) Webmail,
    (d) Repository,
    (e) Helpdesk, etc
2. Personal messaging system
3. Document management system

2.2 Methodology applied

2.2.1 Choosing a platform to use

For the development of the intranet site, WordPress has been selected as the platform of choice. WordPress, widely recognized for its flexibility and functionality, is well-suited for building a secure and user-friendly intranet environment. The decision to use WordPress for this purpose is based on the following factors:

1. **Ease of Content Management** - WordPress excels as a content management system (CMS), making it easy to manage and organize internal documents, announcements, and resources. The platform's straightforward dashboard allows administrators to quickly upload, edit, and share content with team members.
2. **Customization for Intranet Needs** - With an extensive library of plugins and themes, WordPress can be tailored to meet the specific requirements of an intranet site. Features such as user authentication, document sharing, and team collaboration tools can be implemented seamlessly.
3. **User Roles and Permissions** - WordPress provides robust support for managing user roles and permissions. This ensures that sensitive information is accessible only to authorized personnel while maintaining ease of use for all employees.
4. **Integration with Existing Systems** - The platform's ability to integrate with tools like Microsoft Office 365, Slack, and Google Workspace makes it an excellent choice for intranet development. These integrations enhance productivity by creating a centralized hub for communication and resources.
5. **Scalability and Maintenance** - As the organization grows, the intranet can be expanded to accommodate additional users and functionalities. WordPress's modular architecture ensures that new features can be implemented without disrupting existing workflows.
6. **Cost-Effectiveness** - WordPress is a cost-efficient solution, especially when compared to custom-built intranet platforms. Its open-source nature, coupled with a wide range of free and premium plugins, reduces development costs while maintaining high quality. Sustainability and human resource costs are always critical considerations for

open-source products. WordPress addresses these challenges in two keyways: (a) by offering ease of consistent and secure updates / upgrades, and (b) through its vast and active community, which includes companies, institutions, and independent developers. Today, at least half of all websites are powered by WordPress.

By choosing WordPress for the intranet, the organization benefits from a reliable, scalable, and customizable solution that meets both current and future needs. This platform ensures seamless collaboration, streamlined communication, and centralized resource management, fostering a more connected and efficient workplace.

2.2.2 Installation and configuration

After downloading the installation files for the management system, they were uploaded to the server designated for the implementation of the Intranet. The database was then created, and using the installation wizard, the database was successfully integrated with the content management system.

Next, the theme for the website, designed to serve the specific purpose of the project, was downloaded, installed, and activated within the system. Additionally, some extra plugins were required to complete the theme's setup.

Key considerations for the theme selection included:

1. **Clarity and usability:** Ensuring that users could easily navigate the site, find the information they need, and avoid complex menus.
2. **Forum functionality:** Enabling members to communicate directly with one another.
3. **Shared calendar:** Allowing each work package to be informed of upcoming events and participate as needed. The calendar was also equipped with an event export feature.
4. **Quick access to essential applications:** Including Email, Helpdesk, and Repository tools.
5. **CRM integration:** Providing detailed information about the members of each work package.
6. **SSO integration:** Implementing Single Sign-On to ensure restricted and secure access to the Intranet.

2.3 Final Outcome

The Intra Alliance site is functional, and the access is through the INGENIUM official Website (Digital INGENIUM Services and Platforms). INGENIUM members from partner institutions will be able to log in through SSO. For partners whose SAML2 authentication is not yet possible, members will be added with local accounts.
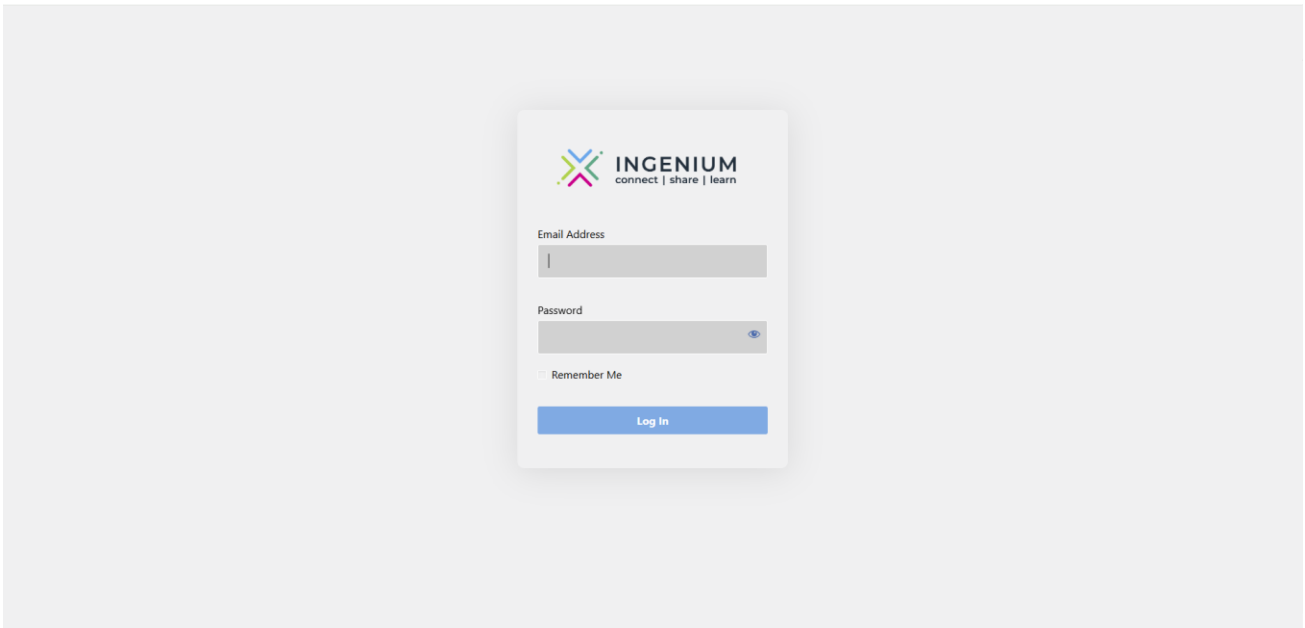
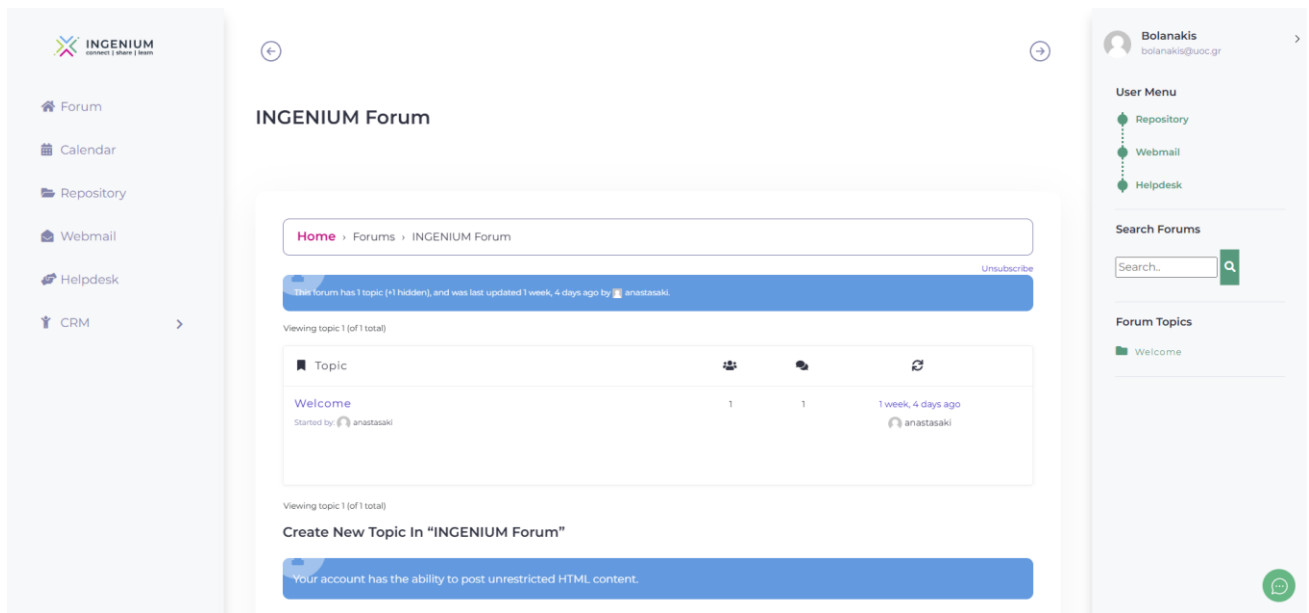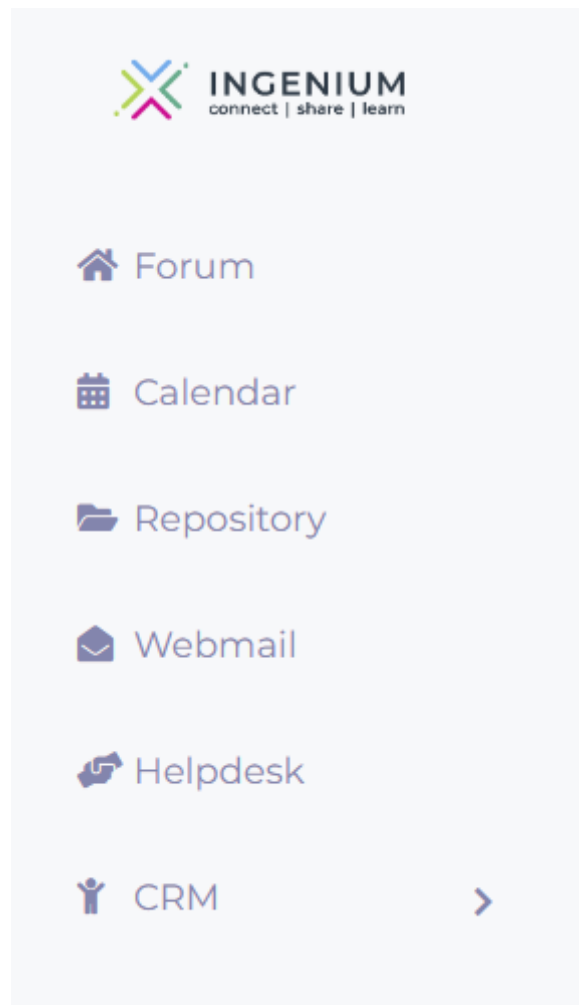**Figure 4:** *Login Page of Intra-Alliance Website*

Figure 5: *Forum Page*

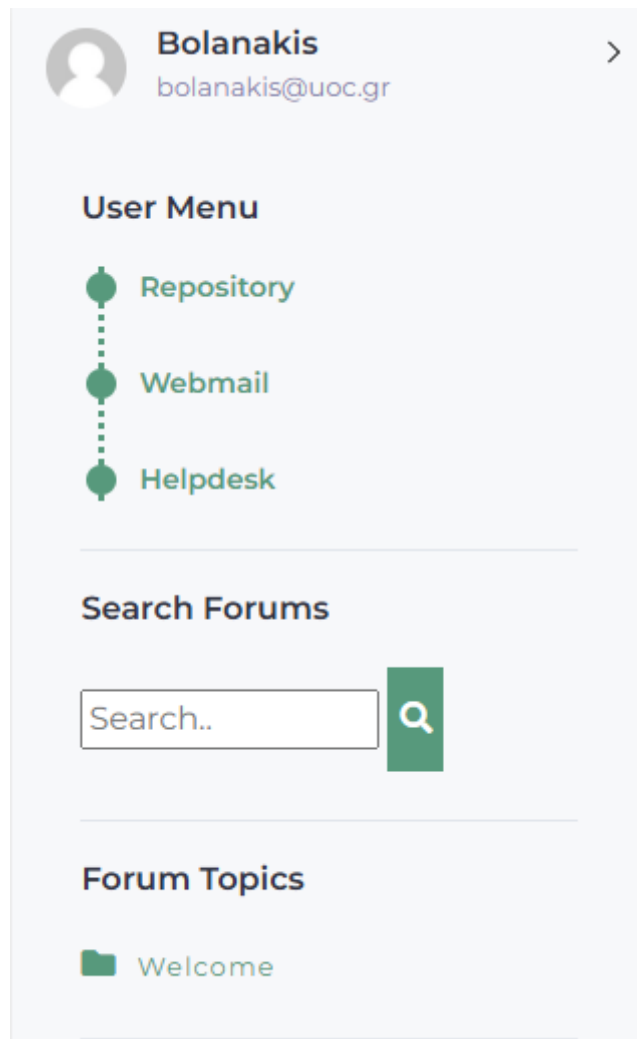**Figure 6:** *Main Menu of Intra-Alliance*
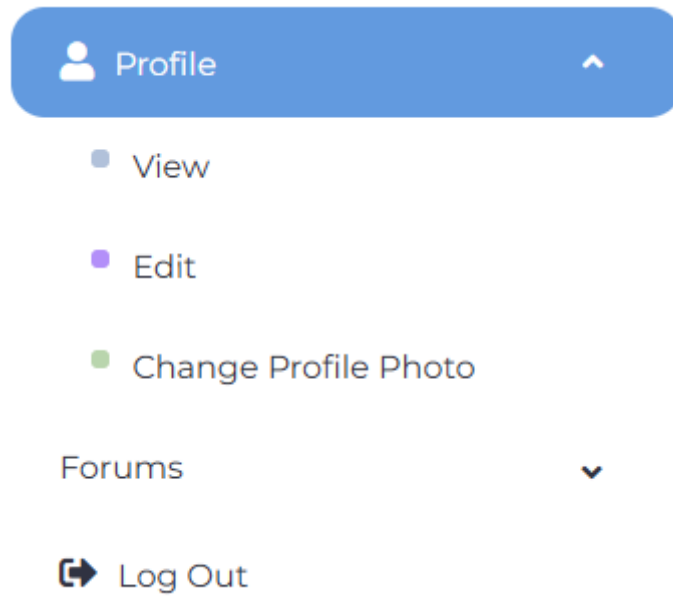
Figure 7: *User Menu*
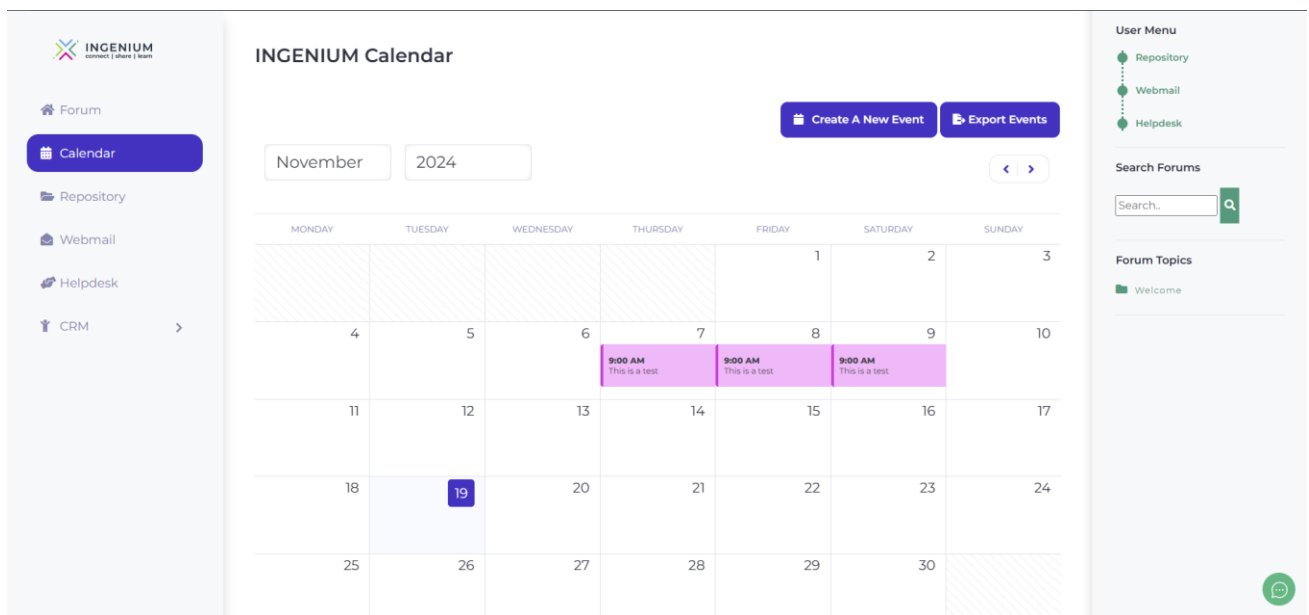
Figure 8: *User Profile Menu*

Figure 9: *Calendar View*

3. Front Portal

3.1 Description

The official INGENIUM website promotes the activities of the Alliance and enables stakeholders to stay informed about the initiatives, opportunities and events of the INGENIUM. It promotes the outreach of the project and through the use of the subscription to the newsletter and the publication of posts under sections such as "News" and "Announcements", abroad dissemination and publication of INGENIUM is achieved.

3.2 Methodology applied

3.2.1 Choosing a platform to use

Selecting the right platform for the Official website is a critical decision that impacts the functionality, usability, and scalability of INGENIUM's digital presence. For this project, WordPress has been chosen as the platform to develop the front portal. WordPress stands out for several reasons:

1. **Ease of Use** - WordPress is renowned for its user-friendly interface, which allows both technical and non-technical users to create and manage websites efficiently. The platform's intuitive dashboard makes content creation, editing, and updating straightforward.
2. **Flexibility and Customization** - WordPress offers thousands of themes and plugins, enabling a high degree of customization. This flexibility ensures that the website can meet specific design and functionality requirements, such as interactive elements, multimedia integration, and advanced search features.
3. **Scalability** - As the project evolves, WordPress provides scalability to accommodate increasing traffic and additional features. Its modular nature allows new functionalities to be added seamlessly, ensuring that the platform grows alongside user needs.
4. **Community and Support** - With a vast community of developers and users, WordPress provides access to extensive documentation, forums, and support networks. This ensures that challenges can be quickly addressed, and the development process remains efficient.
5. **Integration Capabilities** - WordPress can integrate with various tools and platforms, including CRM systems, e-commerce solutions, and analytics tools. This capability aligns with the project's goal of creating a dynamic and interconnected digital ecosystem.

By leveraging WordPress, the project benefits from a robust, versatile, and well-supported platform, ensuring a professional and engaging front portal for users. This choice also aligns with the broader objectives of accessibility and long-term maintainability.

3.2.2 Installation and configuration

The installation and configuration of WordPress for the front portal followed a systematic and structured approach to ensure a stable and functional platform. This process was divided into distinct stages, each designed to align with best practices and meet the specific needs of the project.

1. Environment Setup
- A suitable hosting environment was selected, offering robust performance, security, and scalability.
- A domain name was registered, and DNS settings were configured to point to the hosting server.
- Necessary server requirements for WordPress, including PHP, MySQL/MariaDB, and Apache/Nginx, were verified and set up.

2. WordPress Installation
- The latest version of WordPress was downloaded from the official website and uploaded to the server.
- A database was created using the hosting provider's control panel or a database management tool like phpMyAdmin.
- The WordPress installation wizard was run, during which the database connection details, site name, and administrative credentials were configured.

3. Theme Selection and Customization
- A suitable theme was selected to align with the portal's design requirements, focusing on responsiveness and user experience.
- Customizations were applied using the WordPress Customizer and, where necessary, by modifying the theme's code (e.g., CSS and PHP files).
- The elementor Pro plugin was integrated to provide advanced drag-and-drop design capabilities.

4. Plugin Installation and Configuration
- Essential plugins were installed to enhance functionality, including:
- Security plugins to protect the site from threats (e.g., Wordfence, Sucuri).
- SEO tools to optimize content for search engines (e.g., Yoast SEO, Rank Math).
- Caching and performance plugins to improve loading speed (e.g., WP Rocket, LiteSpeed Cache).
- Each plugin was configured to align with the specific requirements of the portal.

5. Content Structure and Navigation
- A logical content hierarchy was created, including main pages, subpages, and categories.
- The navigation menu was structured to provide intuitive access to the site's content.
- A homepage layout was designed to serve as an engaging entry point for visitors.

6. Testing and Optimization
- The site was thoroughly tested for functionality, compatibility, and responsiveness across multiple devices and browsers.
- Adjustments were made based on testing results to enhance user experience and ensure reliability.

7. Deployment
- After final adjustments, the site was deployed to the production server.
- A backup and maintenance schedule were established to safeguard the site and ensure its long-term stability.
- This structured methodology ensured the creation of a well-configured and robust WordPress-based front portal, ready to deliver engaging and efficient user experience.

3.3 Final Outcome

The official INGENIUM Website (https://ingenium-university.eu/) is the main tool for the dissemination of INGENIUM Alliance, its activities, outcomes and communication of its news and events. As the INGENIUM Alliance continues to grow and progress, the website will evolute to effectively meet INGENIUM's needs.
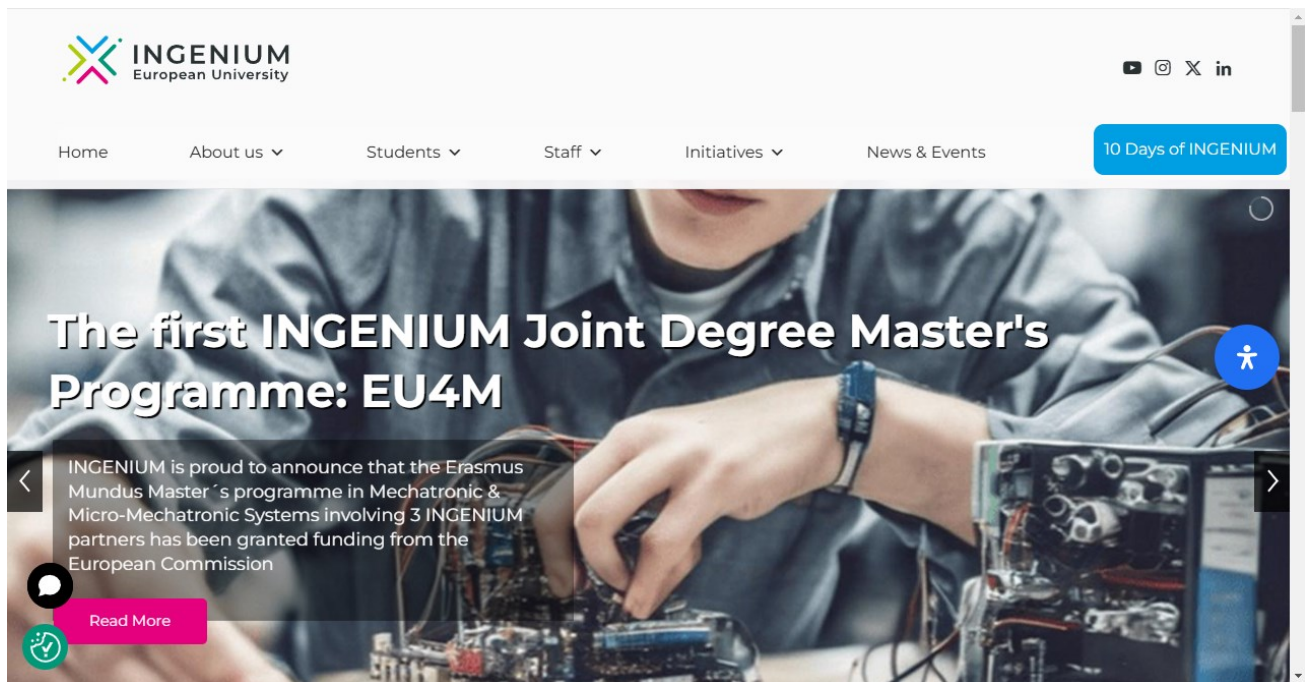
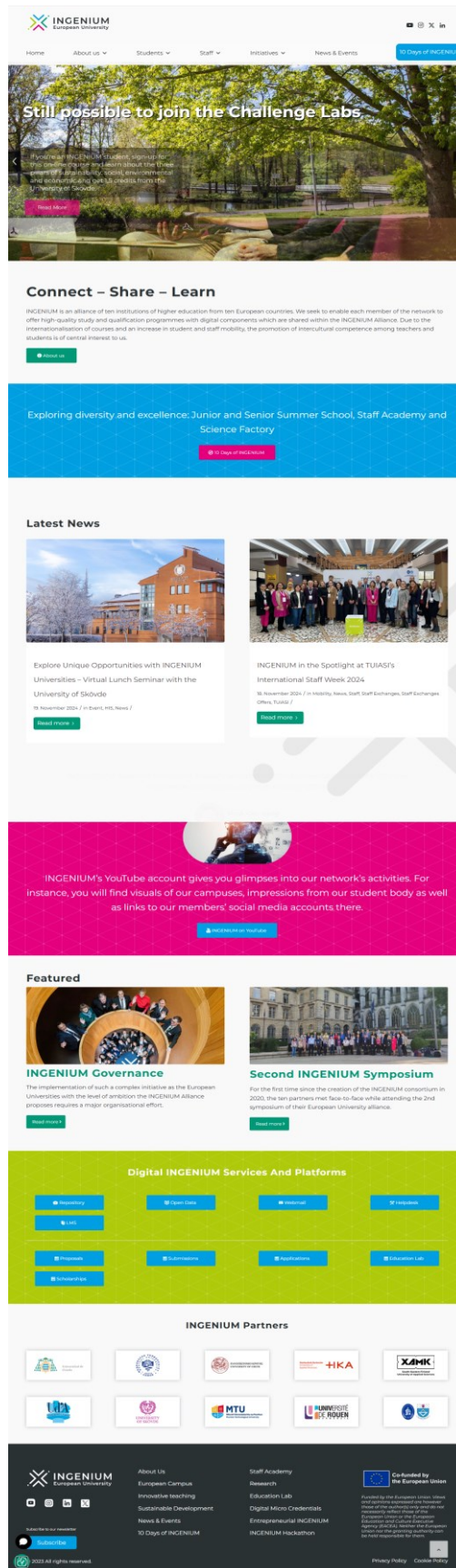**Figure 10:** *Main Website*

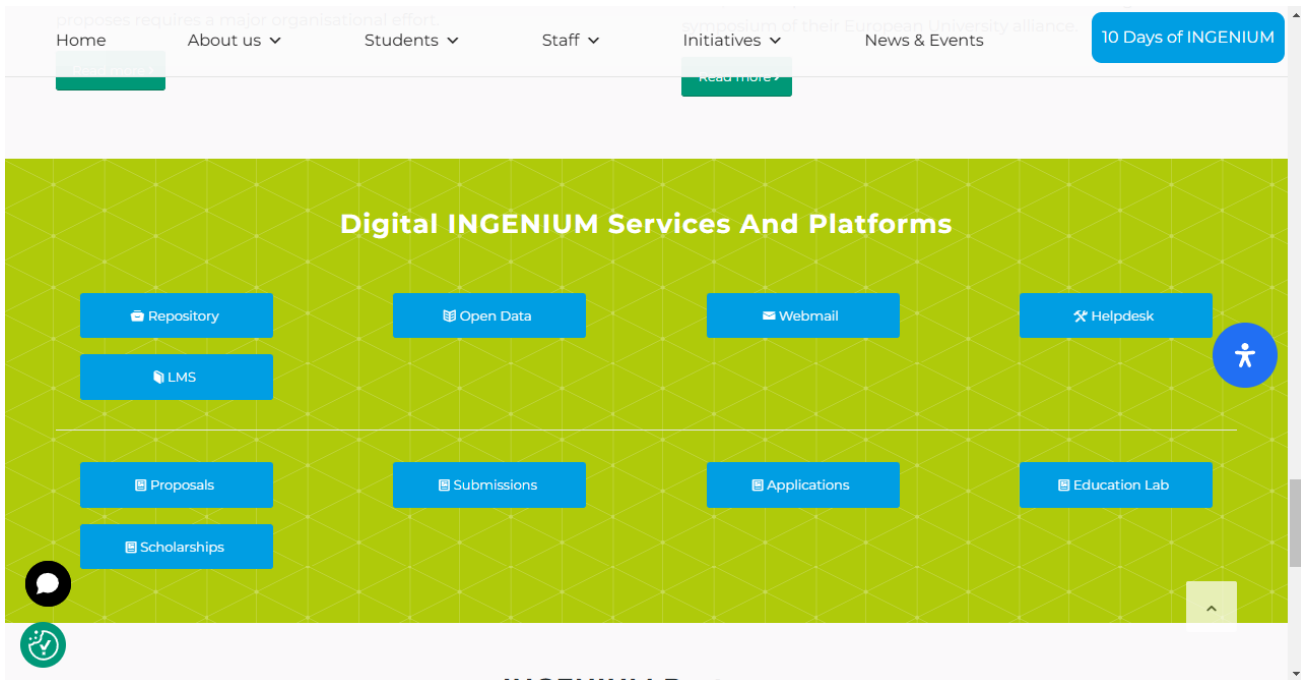**Figure 11:** *Full View of Website*

Figure 12: *Digital INGENIUM Services & Platforms (Main Site Section)*
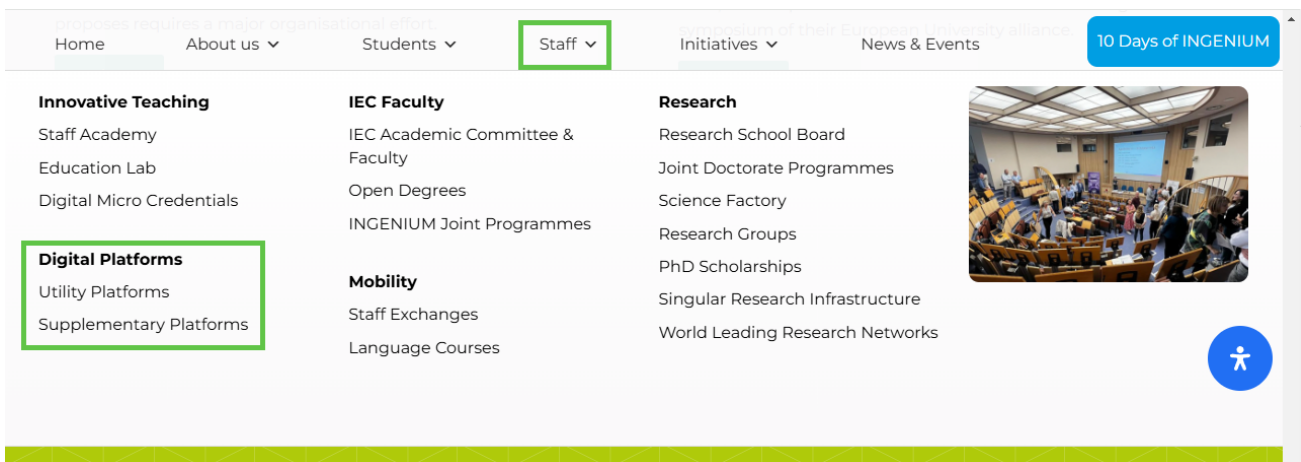

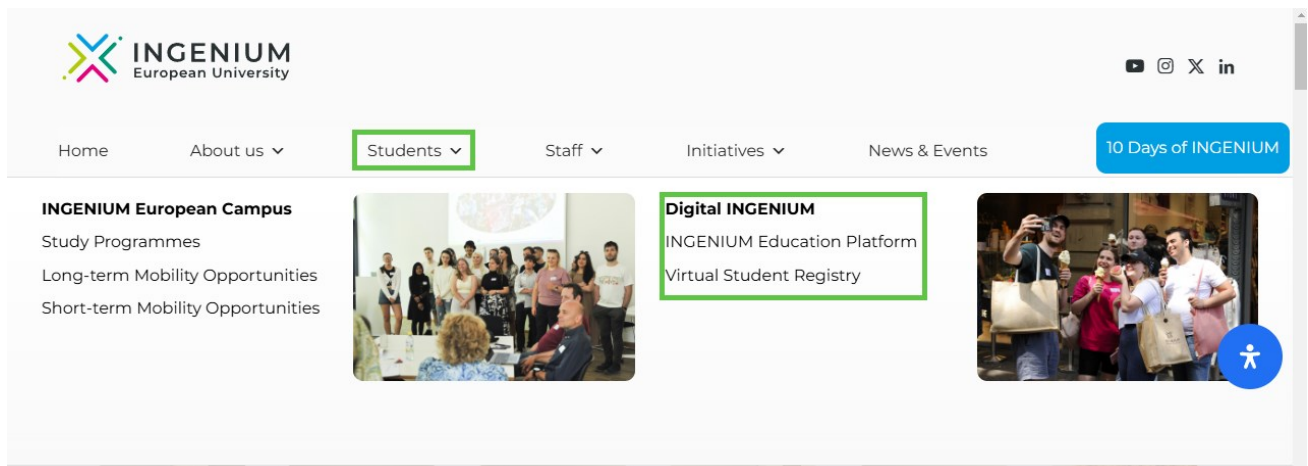**Figure 13:** *Digital Platforms into Staff Menu*

Figure 14: *Digital Platforms into Students Menu*

CONCLUSION

The successful development and implementation of the three core platforms —e-Learning Platform, Intra-Alliance Site, and Front Portal— mark a significant milestone in the INGENIUM Alliance's mission to enhance digital collaboration, learning, and outreach across its member universities. These platforms provide a robust digital infrastructure to support the alliance's strategic objectives, fostering innovation and inclusivity in higher education.

The e-Learning Platform, powered by Moodle, offers a comprehensive and accessible environment for hosting a wide range of academic activities. Its integration with existing university authentication systems and customizable features ensures it meets the diverse needs of the INGENIUM partners while promoting collaboration and resource sharing.

The Intra-Alliance Site, designed as a secure and user-friendly intranet, enhances internal communication and resource management, strengthening partnerships and enabling seamless coordination among alliance members. Similarly, the Front Portal serves as a vital outreach tool, enhancing visibility and engagement with stakeholders through its intuitive design and dynamic content.

While challenges such as authentication integration and user support presented obstacles, the collaborative efforts of the alliance's members ensured these were effectively addressed. Moving forward, these platforms are expected to play a pivotal role in supporting INGENIUM's educational and collaborative activities, facilitating the exchange of knowledge, and strengthening ties within the alliance and the broader academic community.

The deliverable demonstrates the power of collaborative innovation in addressing complex institutional challenges and sets a strong foundation for the future growth and success of the INGENIUM Alliance.

Annex [1]. Questionnaire: INGENIUM Education Platform (IEP)

Questionnaire: INGENIUM Education Platform (IEP)

Section: General Information

1. First Name
2. Last Name
3. University
4. Position in the institution

Section: Prerequisites / Needs for my Institution

5. My Institution will produce/upload in the IEP:
   (multiple choice)
   *A **module** is a single component, it can be a document, PDF, Powerpoint, SCORM presentation, Video, or Assessment you create, and it can be distributed alone or as part of a course.
   *A **course** is made of one or more modules packed together
   *A **program** is consisted of several courses.
   a.modules* / single activities
   b.courses**
   c.Program***
6. Estimation of number of modules/courses to upload until December of 2025
7. Estimation of participants per classroom for your module/course
8. It will need to be (per course):
   (multiple choice)
   a.Asynchronous (activities without videoconference)
   b.Synchronous (using video/ videoconference)
   c.Both
9. If Yes please write your proposal
10. Do you think there is a need for a default set of tags?
    a.Yes
    b.No
    c.Other
11. If Yes please write your proposal
    a.Yes
    b.No
12. If Yes, provide more information (e.g software used)
    (Any proposal will be examined to test its compatibility with the LMS)
13. The courses/modules that your institution will produce will be available:
    (multiple choice)
    a.Available to all INGENIUM Students

  b.Available to all INGENIUM Staff (training of trainers or staff seminars, etc)
  c.Available to Certain INGENIUM Students
  d.Available to Certain INGENIUM Staff (training of trainers or staff seminars, etc)
  e.Open (without enrollment)

14. How do you propose to categorise the courses/modules offered in the IEP? (multiple choice)
  a.By relevant subject area
  b.By relevant WP
  c.By University / partner
  d.By certification/ accreditation process (awarding certificate courses, badges, ECTS, etc)
  e.Other (specify)

15. Your modules/ courses:
  (multiple choice)
  a.Are already created on other platforms and need to be transferred. Please state the LMS.
  b.Are going to be created on the INGENIUM LMS

16. IEP first page
  Proposal: The first page should strictly focus on course information (and not other INGENIUM events, etc). That could be:

- Promoted courses / New courses
- Selection of course categories (open, seminars, short or full semester courses, other) – By clicking an option you can see the topics and then relevant courses.
- Course search: According to tags / keywords.
- Also, there will be instructions regarding enrollment to courses, and other staff.

Please, write your comments on the proposed structure of the IEP first page.

17. Do you need any technical support to create courses? If so, please let us know if there are any specific topics you would like help with.
18. Please write any comments you would like to add about the INGENIUM Education Platform.

Annex [2]. Matrix to be used by partners to list and to monitor the progress of their key institutional priorities related to the deliverable.

Institutional transformation objectives	• Integrate the university's website with the INGENIUM website -portal, establishing a cutting-edge, professional, and intuitive digital platform that showcases the institution's mission, ensures equitable accessibility, and offers an engaging, seamless experience for all users. • Establish a unified and efficient intranet platform that enhances internal communication, streamlines access to resources and updates for staff, and provides a foundation for expanding tailored functionalities to meet the needs of students. • Expand the university's academic offerings by introducing flexible, high-quality distance learning courses that cater to students unable to attend on-campus classes, promoting accessibility, inclusivity, and educational equity.
Barriers faced to achieve those objectives at the institutional level	Achieving the objectives is challenged by technical organizational barriers, requiring IT dpts collaboration to ensure successful implementation.
Potential Actions to be taken at the institutional level	• Adjusting the university's website to align with the INGENIUM website, to create a modern, professional, user-friendly and dynamic online portal, that highlights our mission, enhances accessibility, and delivers professional digital experience. • Implementing a comprehensive intranet system to integrate with the university's internal eco-system. Providing staff with a centralized platform for resources and updates, with subsequent expansion to include tailored functionalities for students. • Introducing distance learning courses to provide flexible, high-quality • educational opportunities for students who are unable to attend on-campus

	classes, ensuring accessibility and inclusivity in academic offerings.
Actions to be taken at other levels	
Responsible(s) within the instituion	• UoC Rector • UoC Vice-Rector of development, international relations and outreach • UoC INGENIUM Project Coordinator • Faculty, Staff
Expected timeline and key milestones	