The digital platform for the Unite! Alliance: The Metacampus

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Abstract

Nine European technology universities constitute the Unite! alliance, a network that creates a new model for a virtual and physical European inter-university campus through close cooperation, physical and virtual mobility of members, joint programmes, communities that support teaching innovation, and open and entrepreneurial innovation networks. The Metacampus virtual campus platform is an important aspect of this framework. All participants in the Unite! community can join at the Metacampus, which coexists alongside other universities' virtual campuses. It must become a valuable and useful tool for a wide range of users who are used to very different tools and processes, which is only one of the many difficulties it faces. The Moodle platform was chosen as the base for the work, and it was decided to maximise its features while minimising the amount of new innovations required to achieve the goals. After four years, the number of users who have registered and taken part in the activities that have been suggested enables us to draw the conclusion that the path is the right one for handling a challenge like the design and execution of a multi-university virtual campus.

Keywords: Education; virtual campus; interuniversity network; e-learning; engineering education.

1. Introduction

Currently, one of the 42 European Universities in Europe is Unite! (University Network for Innovation, Technology, and Engineering)1. It was chosen for the 2019 Erasmus+ call, which had a three-year funding cycle that ended in 2022. It was chosen again for the 2022 Erasmus+ call as a European University. It is a network of universities from nine different countries that creates a novel framework for a digital and physical inter-university campus in Europe. The partners collectively have 280,000 students and 77,300 graduates each year. They already work closely together on more than 80 EU initiatives, including ones involving blended learning (Valderrama et al, 2018), and they have exchanged more than 2,000 students in the previous five years. The nine universities considerably span Europe, as shown in Fig 1. Northern Europe has KTH Royal Institute of Technology, Aalto University, on the one hand. Western Europe, on the other hand, is home to the universities of Wroclaw Tech, Technical University of Darmstadt, Grenoble INP-UGA, and Graz University of Technology. The Universidade de Lisboa, Universitat Politècnica de Catalunya, and Politecnico Di Torino are the last three institutions in Southern Europe. This close cooperation is made possible by, among other things, communities of innovation in education, virtual and physical mobility for all students and staff, an academy for teachers to create cutting-edge models and pedagogies, and, ultimately, an entrepreneurial open innovation network. The Metacampus2, an inter university virtual campus that allows for digital mobility, virtual spaces, and online resources, is necessary for this entire network. All of this while coexisting with the member universities' virtual campuses and highlighting their complementary nature.

Four fundamental principles must be followed while creating a learning ecosystem (Tiwana, 2014), such as simplicity, resilience, sustainability and the ability to evolve. The integration, interoperability, and evolution of its components must also be taken into account when establishing a framework for technological ecosystems, in addition to a proper characterization of the architecture that underpins it (García-Peñalvo, 2016). We satisfy these demands as well as those of the nine partner universities by using Moodle as a platform and reduced customised developments.

An interdisciplinary team from the Universitat Politècnica de Catalunya (UPC) created the Metacampus under the lead of the Institute of Education Sciences (ICE), in collaboration with the ICT Services Area and the company UPCnet, which provides IT services to UPC. The team has substantial expertise with the UPC institutional virtual campus (Atenea), which is built on the Moodle learning management system, and they have previous experience with

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[1] https://www.unite-university.eu/

[2] https://metacampus.unite-university.eu/

Campus Digital, an earlier version of it that was based on Lotus Notes, and that was used up to 2007 (Alcober, 2000).

Aalto University, Espoo/Helsinki
KTH Royal Institute of Technology, Stockholm

Wrocław Tech
Technical University of Darmstadt
Graz University of Technology
Grenoble INP-UGA
Politecnico di Torino
Universitat Politècnica de Catalunya · BarcelonaTech
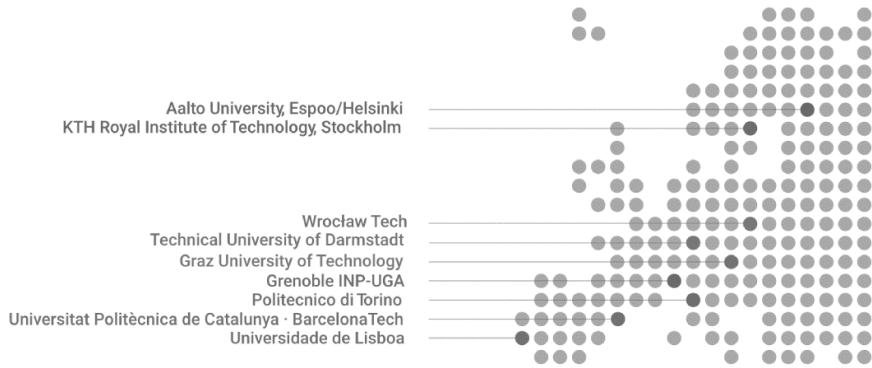Universidade de Lisboa

Figure 1. Partners of Unite! alliance. Source: Unite! website (2022).

The validation of the Metacampus platform's best practices is described in this study. The goals of the project are discussed in section 2, and the approach is presented in section 3. The activities that were undertaken and their results are described in Section 4. And lastly, section 5 presents the conclusions and finally section 6 is acknowledgment.

2. Objectives

One of the goals of the Metacampus is to serve as a meeting point for all those involved in the Unite! community, which includes the nine member universities' administrative and support staff as well as students and faculty. On the other hand, this portal aims to achieve the goals of the Unite! project, which include achieving high levels of collaboration in teaching innovation, the field of mobility, in communities, and in joint programmes. These goals were mentioned in the introduction section. As a result, the Metacampus must address demands, be effective and efficient, as well as long-lasting and with benefits that are transferable outside of the specific setting in which they emerged (García-Peñalvo, 2016).

3. Methodology

The methods used involves a number of time-ordered steps. The initial stage was to compile the needs as seen from the user's perspective. The users were community members from Unite! who contributed to a shared document that was divided into sections for the various work packages. After completing this compilation, the Metacampus team and UPCnet gathered, assessed, and prioritised a set of roughly 70 needs, forming the four pillars mentioned in Section 4. The third step involved the work package participants, academics as well as staff, suggesting additional project activities that allowed the Metacampus to

demonstrate its potential. The fourth phase involved validating the findings using various measures, such as the quantity of users who had signed up and the volume of visitors to the Metacampus website. In addition to the number of visits to the Metacampus website, this last metric, which is displayed in subsection 4.6, should also include the average session length, in order to measure the engagement of the user.

There were two working initiatives that deserve mention. On the one hand, there was a set of requirements with a specified development, such as enabling information sharing between universities and the Metacampus, allowing for the creation of a course catalogue, as well as the integration of a search engine and Learning Tools Interoperability (LTI)3 technology, which allows lecturers to offer courses in Metacampus from their home learning management system, without the need of replicating contents in other systems. While the other task groups worked together to analyse these needs and how the platform would be able to deliver a solution, the utilisation of the Moodle functionalities was prioritised. The deployment of corporate information systems (Parthasarathy, 2018), which suggests organisations adapt to these reliable information systems rather than customising these information systems to conform to the way businesses work, served as inspiration for the second line. This creates a learning ecosystem with the characteristics indicated earlier.

4. Results

The projects completed within the two lines of work previously described are outlined in this section, including the integrated search engine, the LTI integration, the course catalogue, eduGAIN, and the Moodle functions. Finally, it is explained how these results were validated.

4.1. Integrated search engine

The ability to search and find information from the nine universities is one of the key features that makes the Metacampus an entry portal for users of the Unite! ecosystem. Setting up a Google search within the nine colleges' domains is an easy fix. The idea goes one step further and enables results to be filtered by a collection of information, for example, the university of that result, one of the nine languages, or the type of result, such as a course, a person, or even a thesis proposal. This search engine's initial iteration, which is based on the Apache Solr search server, is currently being finished (Smiley et al, 2015).

4.2. LTI Integration

 LTI integration is a crucial feature that the team has experience with (Alier et al, 2021). This technology enables students to access courses through Metacampus that are actually hosted

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[3] https://en.wikipedia.org/wiki/Learning_Tools_Interoperability

in the university where the professors are currently employed. As a result, the professors can carry out their normal duties on their virtual campus of origin without having to duplicate their materials in a different system. Using an upgraded version of Moodle (v.3.8 at least), the development of a plugin by UPCnet, and the assistance of the University of Grenoble INP-UGA. There have been issues with user management and security that have been analysed and require further research to be implemented in the exploitation systems.

4.3. Course catalogue

The course catalogue is a feature that needs data to be shared across universities. Since all institutions are actively upgrading their procedures for the Erasmus without Papers4 (EWP) project, it was decided to use the API (Application Programming Interface) standards of the courses. The course catalogue will not be implemented until an updated version of the API is made available.

4.4. eduGAIN

A functionality that was considered important is the possibility to prevent users of the Unite! ecosystem to register again in the Metacampus. On paper the right solution is to use eduGAIN (Michael, 2019), although there have been technical difficulties. A temporary interim solution has been chosen, and that has been that users with institutional mail from any of the nine universities could register temporarily, pending the resolution of the technical obstacles.

Instead of re-registering in the Metacampus, users of the Unite community were able to access using their home credentials, which was a feature that was much valued. The best choice seems to be to use eduGAIN (Michael, 2019). As a result, the platform is aware of the user's role within the home university and can take appropriate action, such as hiding things that are not meant for that user.

4.5. Moodle functionalities

Another line of work attempted to maximise the use of Moodle functionalities to suit the needs of the work packages in parallel with the creation of the aforementioned functionalities. As a result, the Metacampus adheres to the General Data Protection Regulation (GDPR) (Amo et al., 2019) and follows the web content accessibility guidelines, Web Content Accessibility Guidelines (WCAG) 2.1, with an AA level (White, 2019). By combining the Atto Multilanguage plugin with the MultiLanguage Content filter plugin, users can upload content in any of the nine languages (Mangiatordi et al, 2019). The platform users must upload accessible material in a variety of languages in order for the platform to be in compliance with accessibility requirements or multilingualism. The outcome would not be

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[4] https://erasmus-plus.ec.europa.eu/european-student-card-initiative/ewp

accomplished without the users' active participation. It has been suggested that one of the essential elements for achieving the platform's objectives is training.

In addition to English being the primary language of instruction, partner institutions' native tongues and cultures are also included thanks to multilingualism. English is used for any interuniversity course even if none of the nine universities in Unite! have it as their primary language because it is the common language that all of them accept. Since Moodle has proven to be useful for multilingual teaching (Qin et al., 2022), Metacampus team has installed the nine various languages using the respective language packs.

Communities have been formed using the Moodle overflow plugin, which permits behaviour similar to StackOverflow in addition to the qualities stated above (Vasilescu et al, 2013). Additionally, OpenBadge credentialed course functionality (Myllymäki, 2014) has been used to deliver courses as a standard concept to students, faculty, and administration staff. Asynchronous collaboration spaces, such as project events (Boot Camp and Dialogue), or student co-creation initiatives, have also been used. The publication of Master's thesis proposals, which has been made available through the Moodle database activity, is one example of how Moodle functionality can satisfy a necessity that seems out of reach.

4.6. Validation of the results

The number of spaces developed by the Metacampus last year 2022 was 55, with 3 spaces having more than 150 people and 5 spaces having more than 50, in addition to 23 spaces with more than 20 attendees, according to the activities of the Metacampus. These areas included the Multicultural and Multilingual Training Center, the Teaching and Learning Academy, the Hackathon (H@ckyour-COVID), and Student Co-Creation Unite! Future and Joint Initiatives. The nine Unite member universities currently (April 23) have 5,450 registered users on Metacampus.It should be noted that the average session length (Fig. 2) and user count (Fig. 3) both demonstrate that there were 5200 users during this time and that the average engagement time was 3 minutes and 28 seconds. Additionally, it was discovered that 21% of users used mobile devices to visit the website, while 78% used desktop computers. The reason probably is because there is no specific mobile app to access the Metacampus.

Average engagement time ⓘ
3m 28s

Figure 2. Session duration time Source: Metacampus Google Analytics (2022).
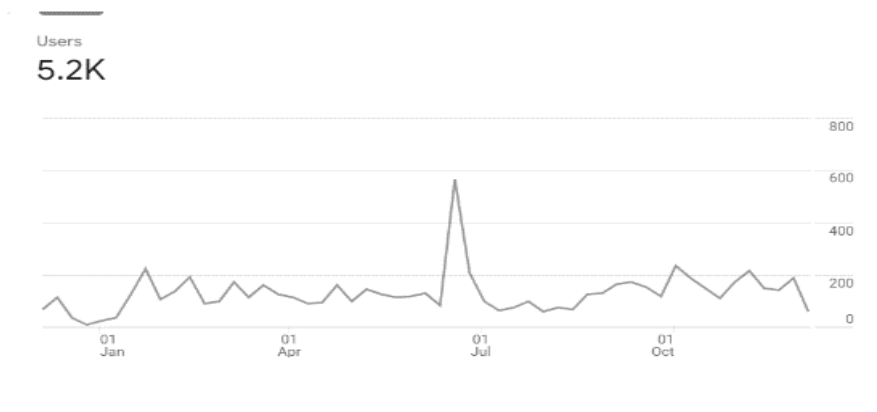
Users
5.2K

Figure 3. Number of users Source: Metacampus Google Analytics (2022).

5. Conclusions and Discussion

Due to the uniqueness of the alliance's member universities, with their various dynamics and expectations, and the engagement of distributed groups of people from each service, designing and launching a virtual campus like the Metacampus for Unite! Is a challenging endeavour. In the end, the platform must be beneficial to users and include educational tools that enable participants to grow their abilities. As a result of the variety, virtue, knowledge, and conviction that the project's criteria and objectives have finally been achieved, Unite! has become, in our opinion, a model for other European alliances with comparable goals that have been founded in Europe.

Acknowledgement

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