DigiCulture

O2.4 - Technical development of the DSC Mobile App FINAL

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Executive Summary

The aim of this report is to provide details regarding the development and implementation of the mobile app dedicated to the DigiCulture courses. This meant updating and adapting the existing Unicampus mobile application, the app of the open-source Moodle based platform where the DigiCulture courses have been integrated. There were a total of 112 downloads of the app for iOS, 93% from iPhones and 7% from iPads. For Android there were a total of 200 new users that installed the app. Continuous development of the app was planned with updates based on usability evaluation, piloting analysis and technological improvements.

Objectives of this document

To provide details regarding the development and implementation of the DigiCulture adaptation of the Unicampus mobile app.

Who is this document for?

➔ Pedagogues and didacticians interested in the technical infrastructure behind the DigiCulture adaptation of the Mobile App.
➔ Researchers interested in discussion and presentation of currently existing infrastructures of VLE mobile apps.

What topics are addressed in this document

The main topics are based on research of different VLEs, educational mobile apps and their use in Moodle, as well as mobile app integration for Moodle platform.

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1   Aims and Scope

The aim of this draft is to provide details regarding the development and implementation of the DigiCulture adaptation of the UniCampus mobile app.

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2   Background and rationale

One of the main outcomes of the project was to include the Digital Skills and Social Inclusion for Creative Industries MOOC Courses available online and through blended learning, in an innovative mobile app aimed at low-skilled and at risk adults, besides the Integrated Virtual Learning Hub.

The project is built around the notions of openness and inclusive - the use and development of Open Education Resources, integrated open tools accessible to the low-skilled and people with disabilities and open online and mobile courses built as a MOOC allowing free and easy access to relevant knowledge.

Research has shown that blended, online and mobile ICT-based education is ideal for providing educational opportunities to at-risk and disadvantaged adult learners.

In 2014, the Politehnica University of Timisoara took the initiative to create and offer the first Romanian MOOC. The initiative goes under the name of UniCampus and is intended to be an independent platform used by several Romanian universities. At the moment of the project's proposal submission, UniCampus was offered only in the Romanian language, with courses based on open educational resources and with no tutor support. The platform was not yet adapted to the mobile environment and had a fairly low level of interaction. It did not offer any credentials or open badges' integration.

The output for which this report is written was dedicated to the adaptation, further implementation as a whole unit and performance of usability testing on an integrated online and mobile virtual learning hub for developing digital competences in the culture and heritage sector using Open Educational Resources, Tools and Practices. This development was based on the Romanian MOOC platform UniCampus, which hosts the course for the project duration and beyond. The course in each partner language is also available for integration into other online platforms (of partner universities) as communication between the platforms will be assured by the Single Sign-on web protocol and the development implies standardised SCORM features.

The technical conception and the architecture of the integrated online and mobile platform will incorporate the core components or services as described in O1, O3, O4 and O5.

The DSC Mobile version is a mobile application interface for accessing and interacting with the Digital Skills for Culture Course, which alsos allows learners to save locally on their mobile phones small snippets of information or knowledge in order to have them at hand for use when needed in their real-life activities as cultural actors.

The development of the Virtual Learning Hub (VLH) focused furthermore on the development of a responsive interoperable interface, with simple features adapted to low digital skills adults, implementation of social software, integration of tools for mobile learning, development of a common working space, inclusion of adaptable and semantic features and learning analytics,

The VLH development implied an interdisciplinary approach from web technologies, mobile technologies, Web 2.0, interactive media and audio-video technologies, open access and tools from semantic technology. It was created in all partners' languages (EN, RO, DE, IT, LT, DK, GA) with a possible extension to other languages which will allow communication at European, national and regional levels.

The VLH is an innovative multilingual ICT-based environment to promote collaborative learning using connectivist social networking as an instructional method, OERs as the main content, and open digital credentials as recognition and validation of digital skills which can be applied to all ages, genders, cultural backgrounds and levels of digital education in order to promote social inclusion at a digital level. Development of the VLH respects the W3C Consortium Web Content Accessibility Guidelines (WCAG) 2.0 which ensures ease of use for people with disabilities.

Both the user-friendly interface and the mobile interface are encouraging all users to access the VLH, engage in a variety of open learning activities, connect with other cultural actors and develop their own digital skills.

The mobile app was developed with a focus on participants with fewer opportunities and also volunteers, as it is more likely that they will use low-level smartphones rather than computers. As DSC learners they will be allowed access to the universities libraries as they are recorded in the universities learners database.

The technical development of the DSC Mobile App was developed based on the concept guidelines and needs (O1) and using the content resulting from (O3) integrated into the platform from (O2.2). The mobile app was developed using the native languages of the most used mobile operating systems (iOS for Apple and Android JS for the majority of the rest) and was made available in the respective application stores (AppStore and Play). The mobile app includes online real-time access to the content and activities of the DSC, and as an innovative feature, the possibility of saving content locally on learners' mobile devices as small snippets of information or knowledge, standards to other social media apps in order to allow learners to share their experiences on the DSC.

3   Methodology, tools and research

The applied methodology follows the principles of socio-engineering (Sharples, 2002) with agile development focus on frequent iterations and user tests to improve user experience, and methods as personas and user stories.

The Moodle Open-Source application can also be found in the virtual stores and it has a main screen from where you can type in a Moodle website URL to connect through the application. The code on the other hand, allows developers to make it a single site application and offers

configuration to do so. The application has a configuration file from where you can configure it to be a single site application and add the hub URL along with others. Also, extra configuration has to be done on the server side as well to enable the Moodle Web Services API.

4   Results

4.1 DigiCulture mobile app requirements

The first stage was to establish the requirements, how the application will work and what modules it should contain to meet the needs of the courses that will be available on the platform. This stage had the result that the Moodle Mobile open-source application could be adapted to meet the needs.

Moodle LMS can be added to a website and be configured in different kinds of ways. For example, a Moodle website belonging to a University shouldn't give users the ability to sign in or might disable or encourage the usage of different course material types.

In the case of DigiCulture, the application and the hub allows any kinds of users with different backgrounds to create an account and enrol in the MOOCs available on the platform. At the same time, we needed to make sure that the application allows the users to access any kind of material and to be able to go through quizzes and other activities, natively, making the mobile application a complete experience, for the user to not have the need to be in front of a computer for him to learn. The version used on the Hub has also allowed the application to have all the latest features enabled which could not have worked if the Hub was not up to date.

DigiCulture mobile app main features are:

- Smooth onboarding process – personal background questionnaire for assessing existing skill levels;
- Easily accessible course content - browse the content of DigiCulture courses, even when offline;
- Connect with course participants - quickly find and contact other people in DigiCulture courses;
- Keep up to date - receive instant notifications of messages and other events;
- Post in forums, submit assignments and answer Tests in DigiCulture courses from mobile device;
- Track progress - View completion progress in DigiCulture courses and access badges;
- Rich content features – H5P is supported by the application.

In order to personalize the application, it was needed to figure out the required resources and image dimensions for them to be used on mobile devices and tablets, on Android and iOS

platforms. Besides the resources, a set of colors were needed to be selected. There are many online resources which show the required assets for a mobile application. The sources we used are the iconhandbook site and the Apple documentation and the links can be found in references. We have configured the application to provide these mandatory assets. In order to personalize further, a couple of other logos (for the login screen) and a new color theme has been added.

The next step was to set them up, configure and integrate all the resources in order to change the appearance of the application and to match the DigiCulture branding.

4.2 DigiCulture mobile app development

The application has a lot of features to offer to its users. First of all, it features a dashboard from where the courses can be seen and from where the user can start the enrollment into DigiCulture courses and access the course material.

Inside the courses, users have full access to activities like assignments, choices, database, feedback, forum, glossary, lesson, quiz, SCORM, survey, wiki, workshop and to resources like book, file, folder, IMSCP, label, page, URL. All these activities and resources can be enriched with H5P content which is available for providing a more interactive experience for the users. All the other types of resources and activities are recognized and are opened in a web page.

The course's progress is permanently tracked, the users have the ability to have private conversations, to look at different events in the calendar or make different configurations in the application like change the default language.

Besides, the application sends notifications of different types to the users, like reminders for upcoming events or deadlines.

The applications for Android and iOS have been generated.

Store listings for AppStore and Google Play Store have been set up and necessary certificates have been created. In order to successfully deliver the application to users, through the stores, test accounts and additional information needed to be provided for the applications to be approved by the review teams.

In order to have an application listed on Android and iOS first you need an account, after which you can add a new application and configure the store listing. The store listing for both platforms require the title which will show on the store listing, a short and a full description, the icon which will be visible on the stores, screenshots (Apple requires more screenshots from their different types of devices), a featured graphic, the type and category of the application, some keywords, privacy policy links and extra contact information. On top of this, a build of the application which

![DIGITAL culture logo]

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will be installed when the application is downloaded needs to be provided. This build is thoroughly tested by the Apple team and extra details and a test account needs to be provided.

The framework used for the development of the Moodle applications is Ionic and the primary programming language used is TypeScript. The applications for Android and iOS have been generated with the Cordova CLI. The release APK file for Android has been generated using Cordova CLI and manually signed with the Android SDK build-tools and manually uploaded to the Google Play Store, while the IPA file for iOS has been archived and sent to iTunesConnect from XCode Organizer.

The reason why iOS allows automatic builds is because of the certificates which need to be created from the Developer Console, to allow the development and release of an application with a specific id. These certificates are added to the development environment and thus recognized by iTunesConnect when building and publishing.

Please see the development environment screenshots in the following figures:

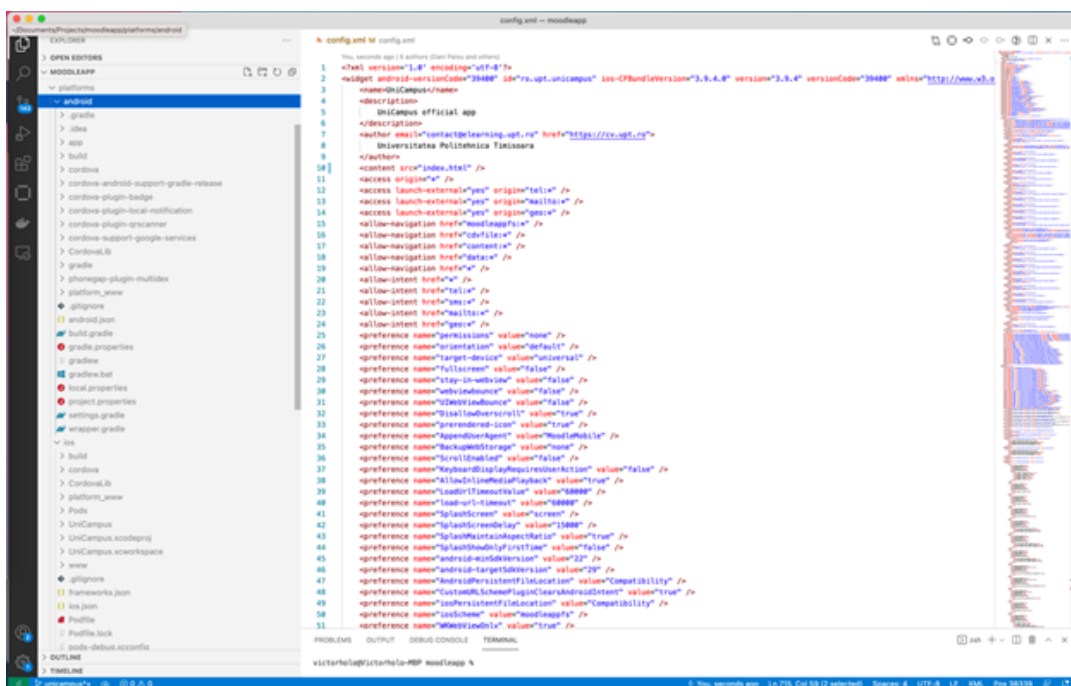1. Visual Studio Code from where the application was developed and mobile apps sources generated:

Figure 1. Development environment 1

2. XCode IDE used to export the app and send to the AppStoreConnect from where it can be added to a release:

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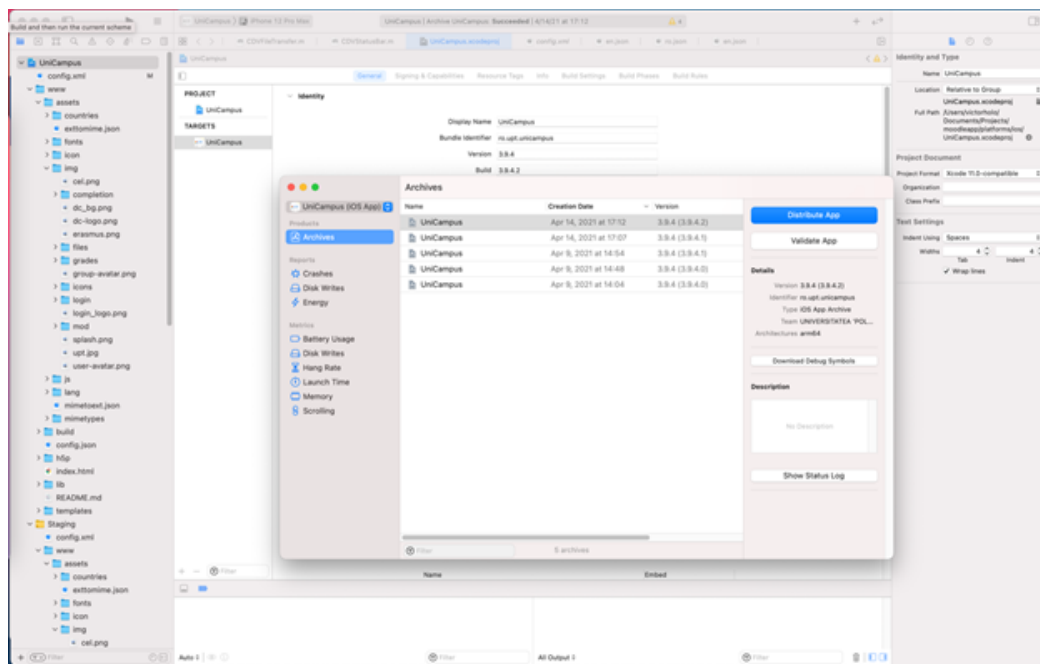of the European Union

Figure 2. Development environment 2

3. GitKraken Git Graphical Interface was used for handling versioning and keeping track of the changes for the DigiCulture project.
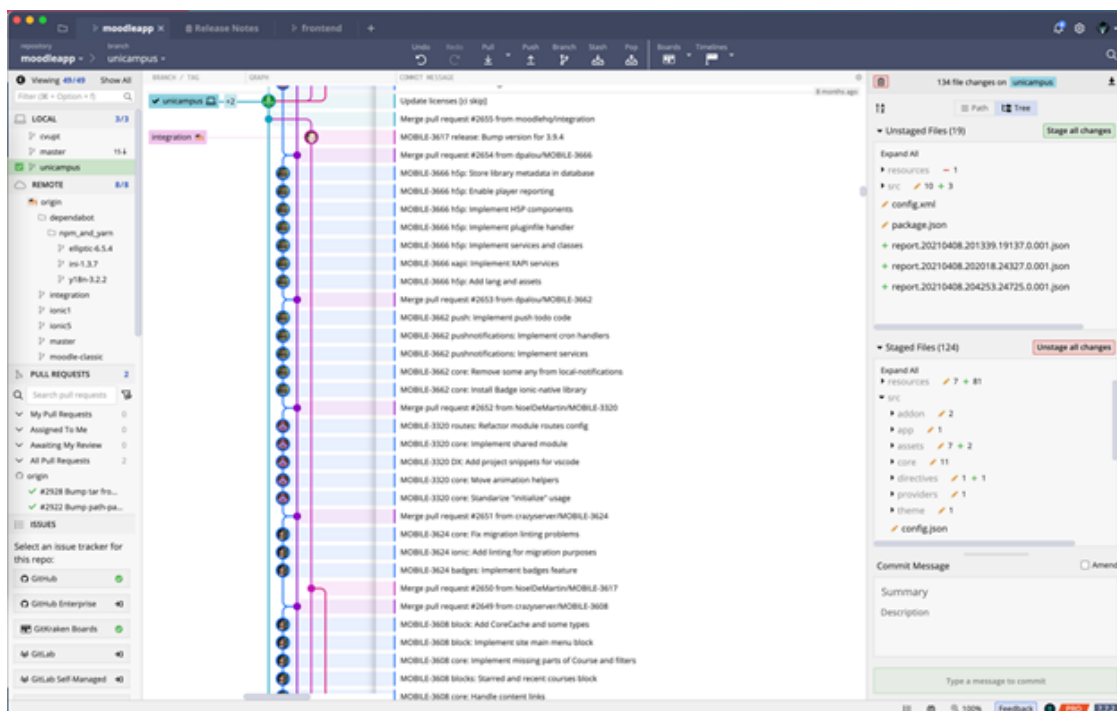

Figure 3. GitKraken Git Graphical Interface

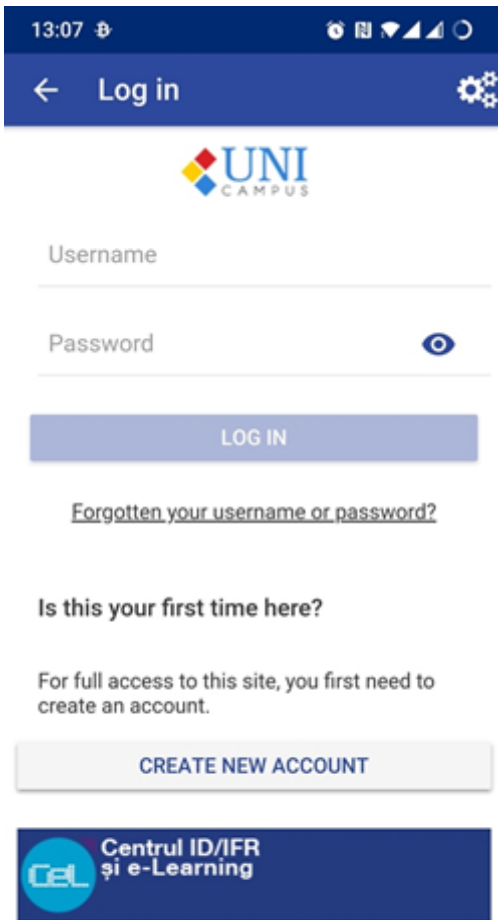Below are a number of screenshots from the application:
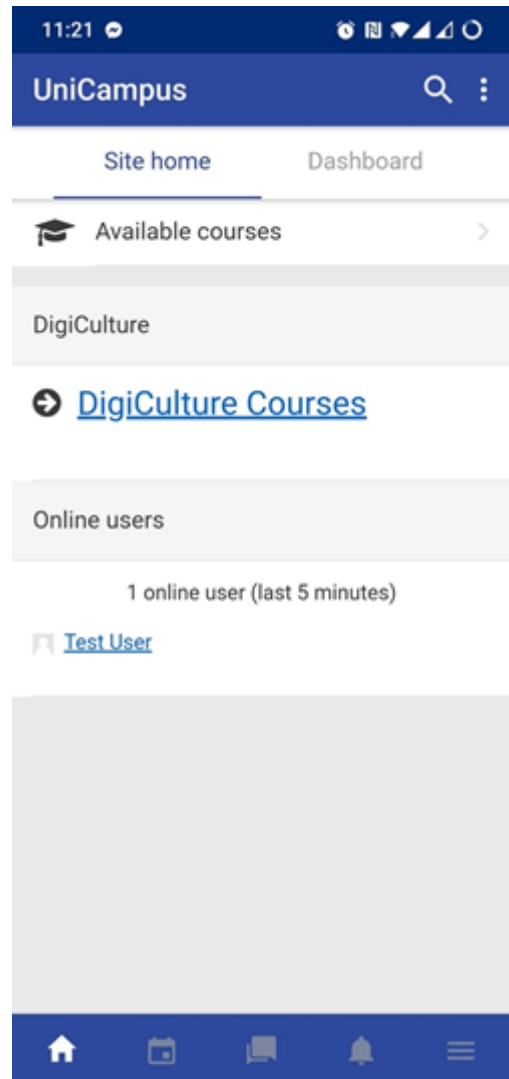

Figure 4. UniCampus Mobile app login screen   Figure 5. UniCampus home
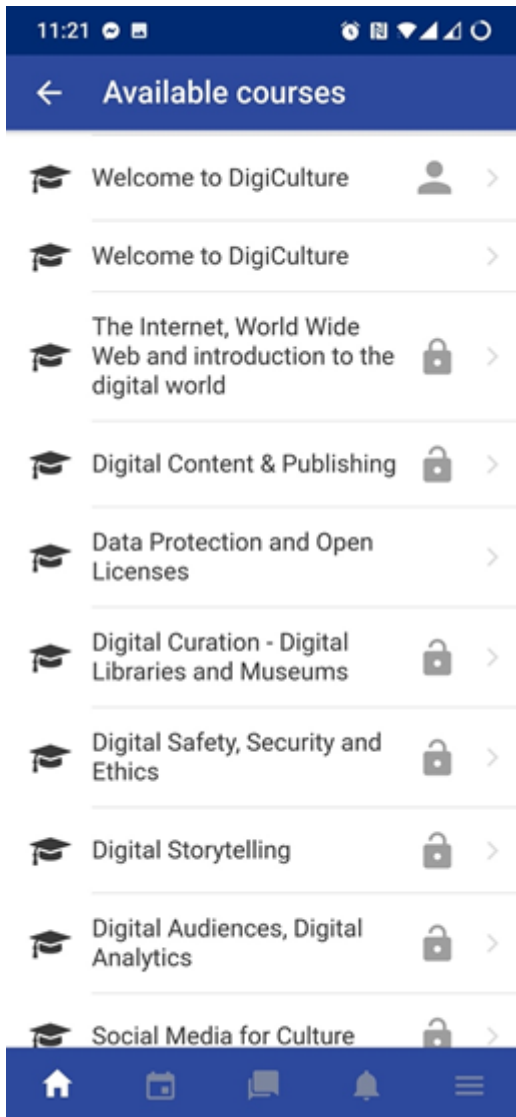
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Figure 6. Available Courses on DigiCulture

Figure 7. Welcome to DigiCulture

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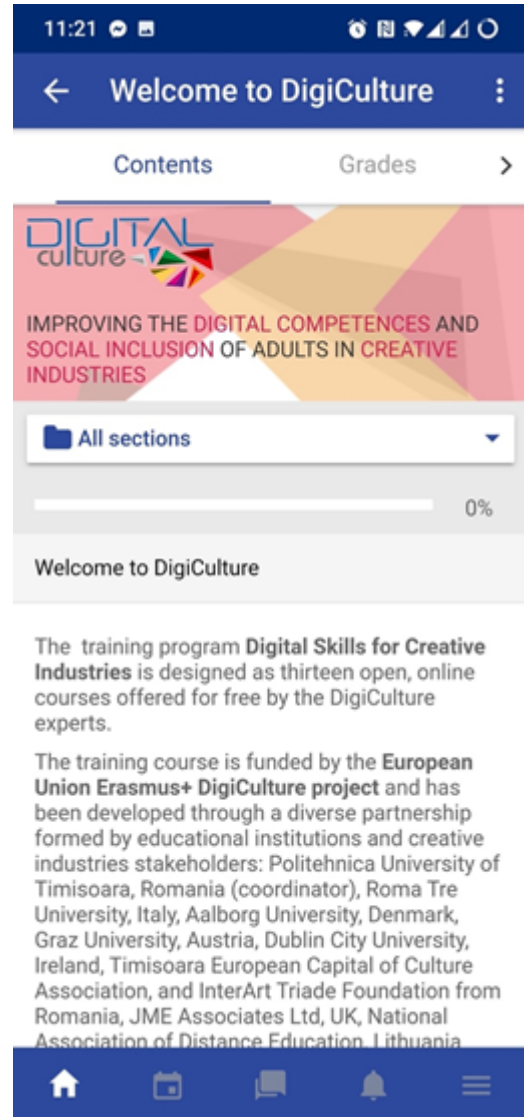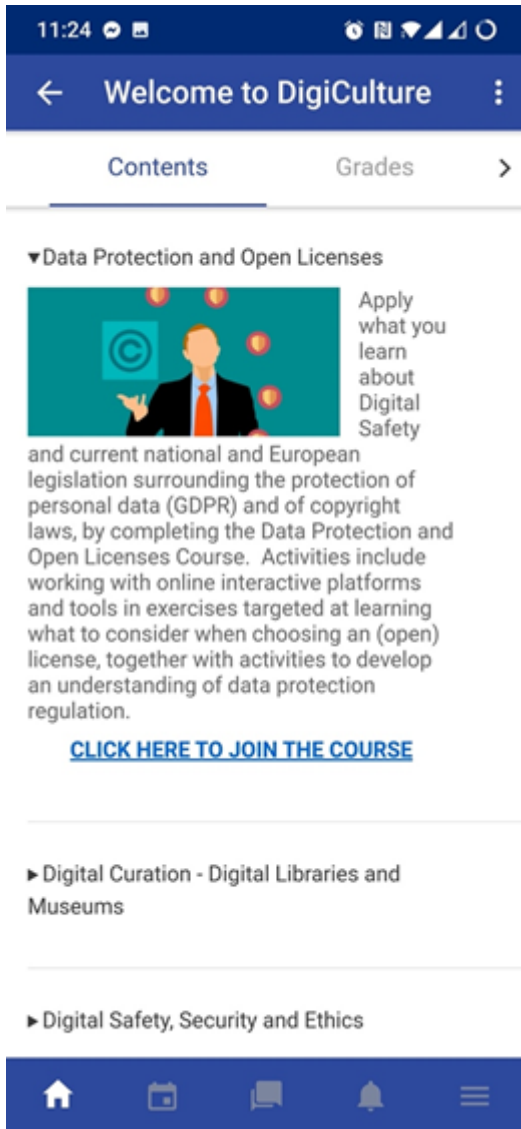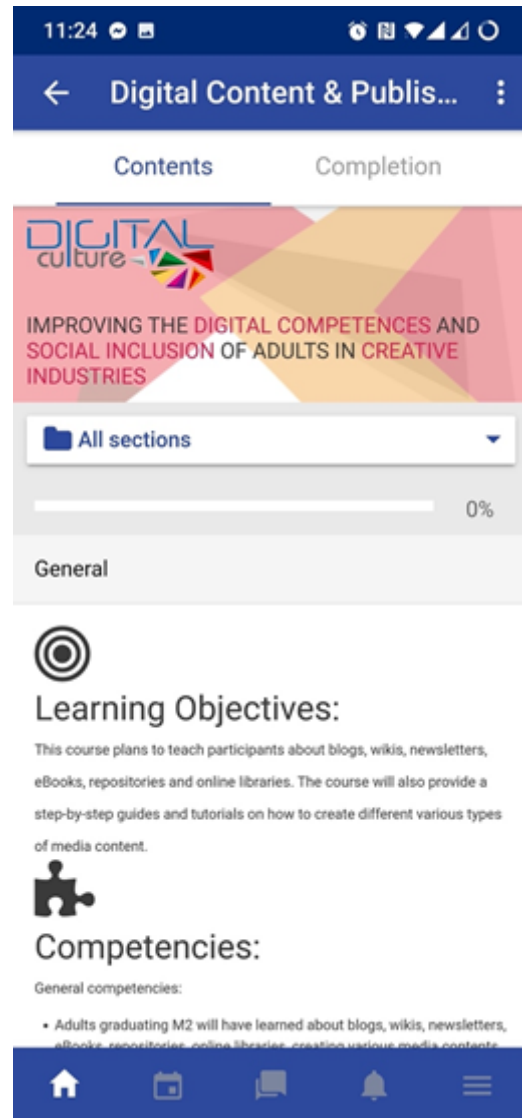
Figure 8. DigiCulture course onboarding
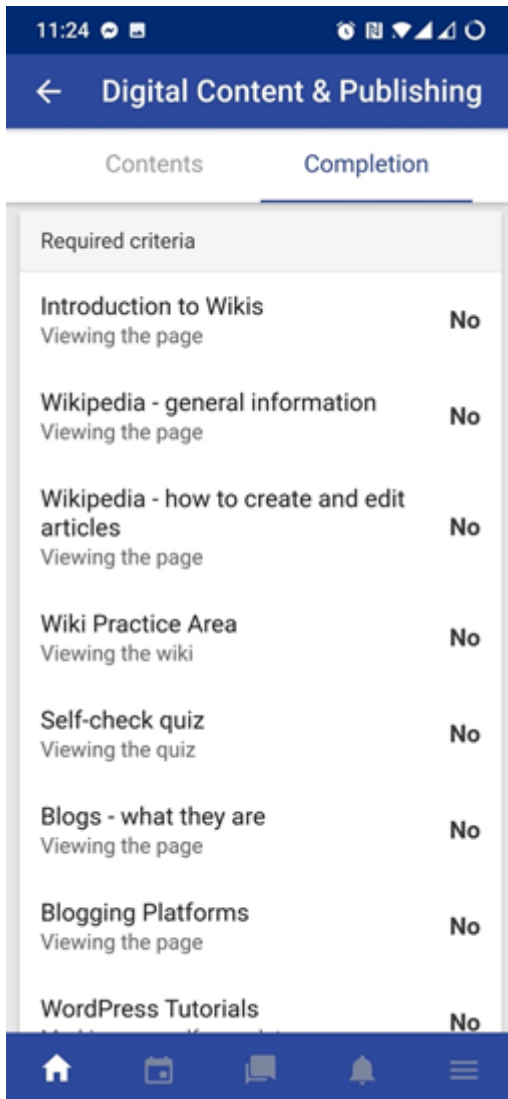

Figure 9. Digital Content & Publishing course contents

Figure 10. Digital Cotent & Publishing required completion tasks

The app links are integrated into the web version of the DigiCulture project as presented in the next figure (Figure 11).

Figure 11. Unicampus/DigiCulture web footer

The mobile app is freely available for download:

For android: https://play.google.com/store/apps/details?id=ro.upt.unicampus

For iOS: https://apps.apple.com/us/app/unicampus/id1397170089

4.3 DigiCulture mobile app analytics

For IOS, one can see information in Figure 12. There were a total of 112 downloads of the app, 93% from iPhones and 7% from iPads. Most downloads were from Romania (45), India (17), South Korea (15), Italy (12) and Turkey (8). The app has an average retention of 7 days.

In Figure 13 we can see the product page views by territory, on a monthly basis. We can see increases after big dissemination events, such as the ones in March-April 2020, October and December 2020, March 2021 and July-August 2021.
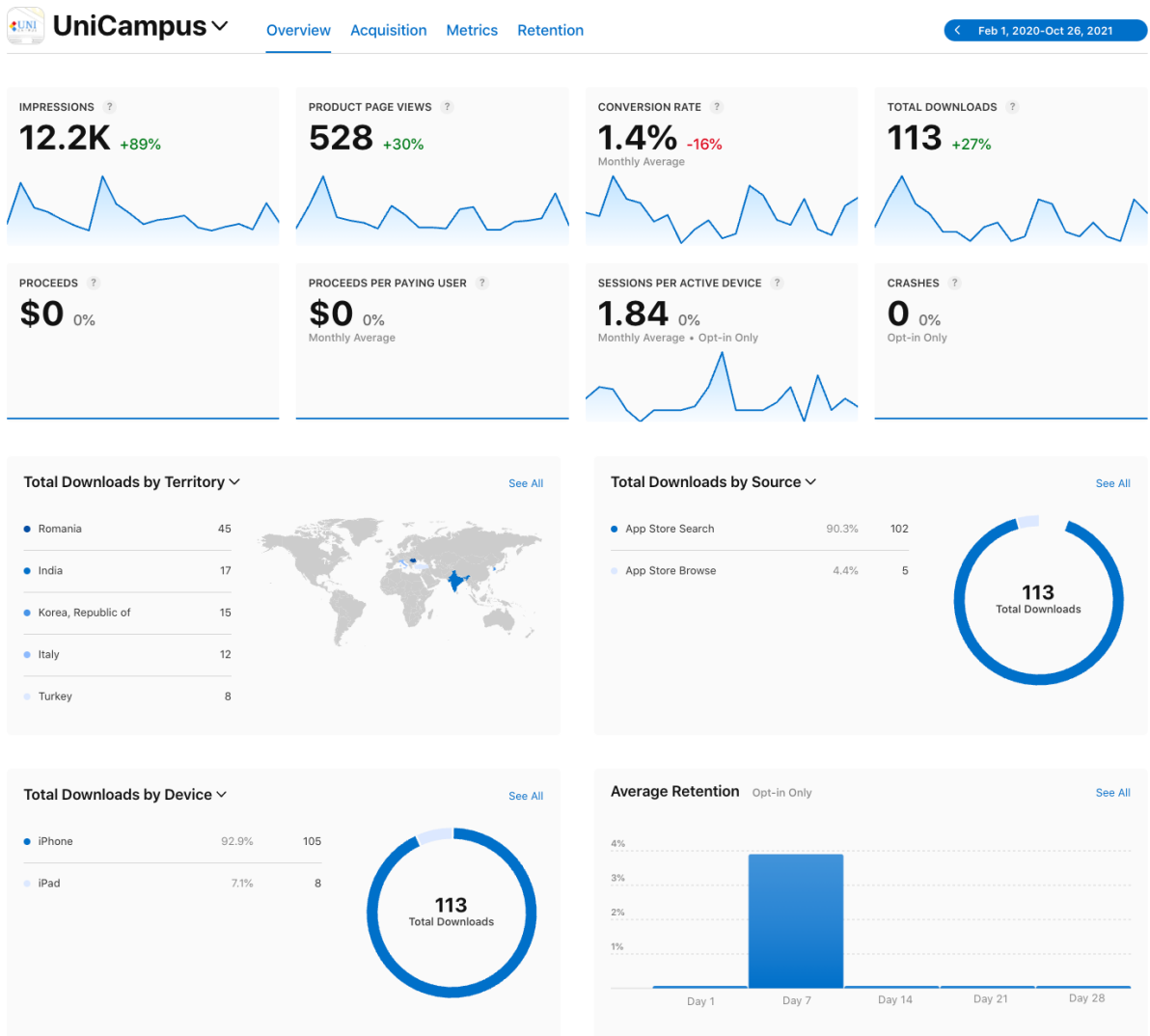
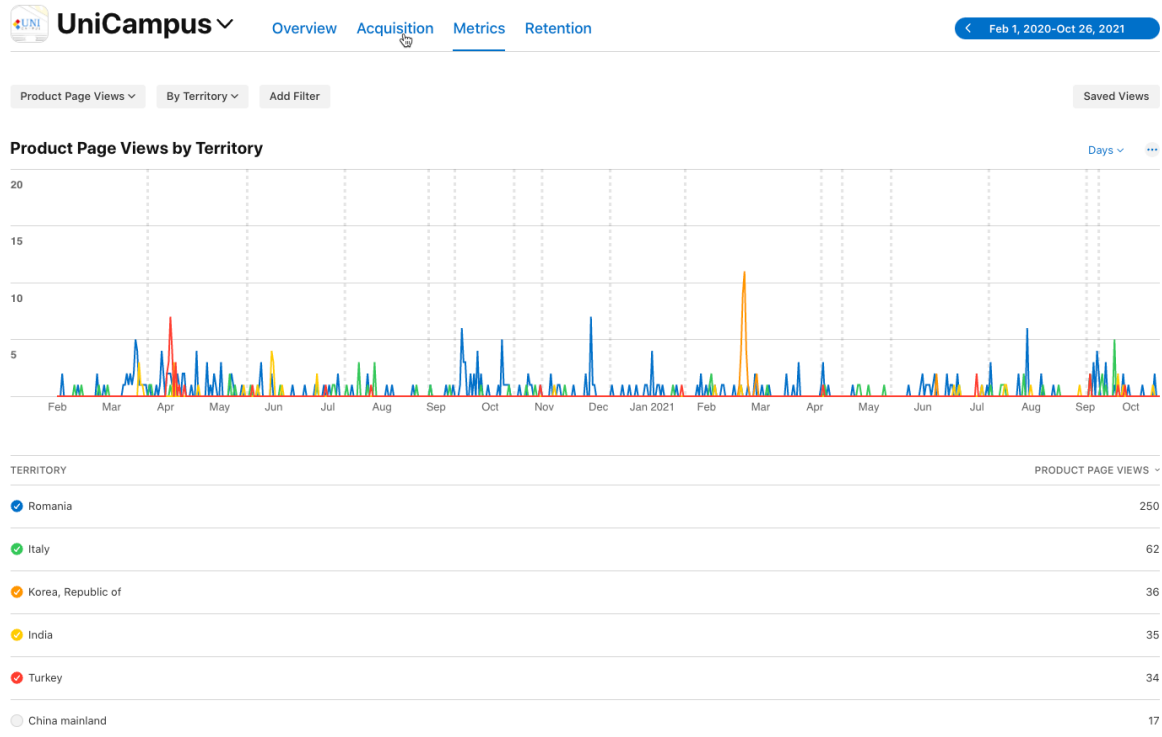Figure 12. UniCampus mobile app analytics on IOS

Figure 13. Product Page Views by Territory of the UniCampus mobile app

For Android, one can see information in Figure 14. There were a total of 200 new users that installed the app. Most downloads were from India (34), Romania (30), Spain, Turkey, Italy, Germany, Portugal etc. We can see increases after big dissemination events, such as the ones in March-April 2020, October and December 2020, March 2021 and July-August 2021. Users gave the app a rating of 3.667 out of 5 (Fig 15).

![DIGITAL culture logo]

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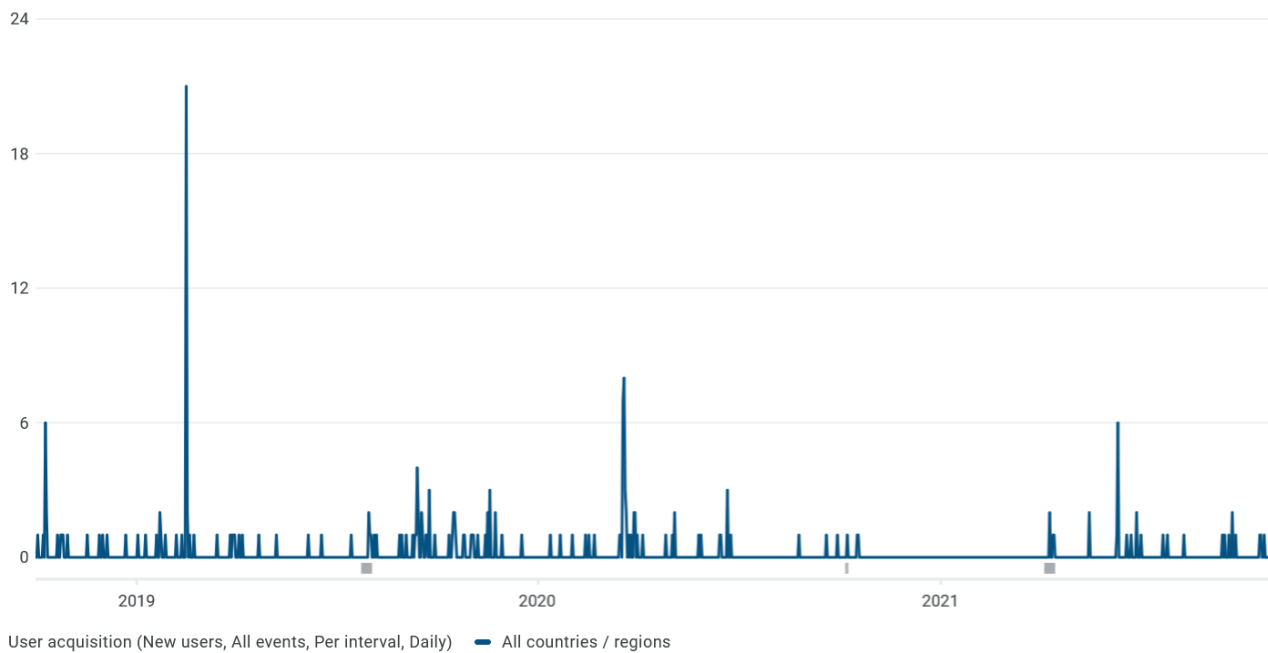Erasmus+ Programme
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Time series

Figure 14. New User Acquisition on Android (UniCampus mobile app)

Overview

3.667 ★
Google Play rating ⊘

3.667 ★
Lifetime average rating ⊘

Figure 15. Average User Rating on Android (UniCampus mobile app)

5   Next steps

Based on the usability evaluation the final version of the mobile app will receive various improvements. A continuous improvement will happen based on piloting using the mobile app and various usability evaluations of the mobile app.

6   Conclusions

The team from Politehnica University of Timisoara developed and implemented the mobile app dedicated to the DigiCulture courses, as an upgrade, adaptation and personalization of the existing Unicampus mobile application, a Moodle based platform of the university. This was developed based on the concept guidelines and needs (O1) and using the content resulting from (O3) integrated into the platform from (O2.2). Two

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mobile apps were developed using the native languages of the most used mobile operating systems (iOS for Apple and Android JS), evaluated and published in the AppStore and Play. Also two updates of the apps were done, according to new iOS and Android new released versions.

As the DSC course modules have been piloted and evaluated by participants also from their mobile devices, this helped improve and solve issues which arose. Until the time of writing this report there were a total of 112 downloads of the app for iOS and 200 new users who installed the app on Android based devices. Continuous development of the app is planned with updates based on usability evaluation, piloting analysis and technological improvements.

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