

# Open Virtual Mobility

## 02-A2.4 VMLH Mobile App

### TECHNICAL IMPLEMENTATION

Outcome 2 Activity A2.4 VMLH Mobile App	
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## Imprint

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This paper is O2-A2.4 document produced as part of Outcome 02 – A2.4 Virtual Mobility Learning Hub Mobile App and aims at presenting the development and implementation of the Virtual Mobility Learning Hub mobile app.

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## Executive summary

The aim of this draft is to provide details regarding the development and implementation of the mobile app dedicated to the Open Virtual Mobility Learning Hub. The OpenVM application was created by integrating the open-source Moodle Mobile application and it has been configured to work with the Open Virtual Mobility Learning Hub (VMLH), as it was described in the O2A1 LH Concept. Continuous development of the LH mobile app it is planned with updates based on usability evaluation and piloting analyse.

## What are the objectives of this paper?

To provide details regarding the development and implementation of the Virtual Mobility Learning Hub – VMLH mobile app.

## Who is this paper for?

- Pedagogues and didacticians interested in the technical infrastructure behind the Virtual Mobility Learning Hub Mobile App.
- Researchers interested in discussion and presentation of currently existing infrastructures of VLEs.

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## What topics are addressed in this paper?

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.

## Contributors

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## Acknowledgements

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## 1. Aims of this draft

The aim of this draft is to provide details regarding the development and implementation of the Virtual Mobility Learning Hub – VMLH mobile app.

## 2. State of the Art

The Open VM Learning Hub Concept incorporates several components, services and technologies. This document details the current configuration of the VMLH mobile app development and its integration with the OpenVM Learning Hub, online version.

With the huge adoption of smartphones in the last decade, developers now have a lot of different approaches to choose from when building mobile apps. The approaches for building a mobile application are the following:

- ❖ Native apps are built specifically for a mobile platform, for example Android currently supports 2 programming languages for development, Java, and the new official language for building android applications, Kotlin. iOS applications can be built with Swift and Objective-C. Both platforms also have their own IDE, Android Studio and respectively, XCode.
- ❖ Hybrid applications are basically web applications that can be run in a web container on applications that can be installed on any type of mobile platform. The advantage of using such an approach is that you will only have to maintain a single codebase, with technologies such as Cordova, written in JavaScript or TypeScript.
- ❖ A new approach which has become very popular lately is the one for building hybrid native or cross-platform applications. This means that while we only have one codebase to maintain,

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the applications which will be run on each platform will have almost native performance and each component will be rendered individually. There are currently two popular ways of building this sort of application: Flutter, maintained by Google, being backed by Dart programming language and React Native, created by Facebook, which is using JavaScript.

This document is based on the State of the Art analysis, part of the **O2A1 LH Concept and of the O2A2.2 Technical Implementation (section 4)**.

### 3. Methodology

The OpenVM application was created by integrating the open-source Moodle Mobile application and it has been configured to work with the Open Virtual Mobility Learning Hub. The used version is based on Moodle Mobile 3.7.2 released in September 2019.

The first step of the development process is to evaluate what we want the application to do and what are the approaches we can take to reach our goal. Moodle offers a set of REST APIs for building over it's core functionalities which is called Moodle Web Services APIs, besides it also offers a Open-Source Moodle Mobile hybrid application.

The result of this step was the decision to use the Moodle Mobile application. We previously tried the Moodle Web Services to build our own Android Mobile application and while the performance was better, we couldn't get all the features required in the application because of how vast the Moodle Web Services are and at the same time, maintaining two codebases wasn't feasible.

The next step of the development process was to get familiar with the Moodle Mobile application, to run and see how it works. Then we had to connect it to the Hub and make sure that all the data is flowing through and all the modules are available to the users. We have configured, color themed and added new images to the application. The application has been further tested and different problems have been fixed.

The last two steps were for the builds and store listings to be created and for the applications to be successfully published and visible to the user.

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 others. Also, extra configuration has to be done on the server side as well to enable the Moodle Web Services API.

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## 4. Results

### 4.1. VMLH 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 OpenVM, the application and the hub allows any kinds of users with different backgrounds to create an account and enroll in the MOOCs available on the platform. To make this a pleasant experience, OpenVM needed to offer users the ability to create an account or sign in directly with their social media accounts. 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 upload coursework, to make 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 with if the Hub was not up to date.

OpenVMLH mobile app main features are:

- Easily access course content - browse the content of OpenVM courses, even when offline
- Connect with course participants - quickly find and contact other people in OpenVM courses
- Keep up to date - receive instant notifications of messages and other events,
- Post in forums, submit assignments and answer Tests in OpenVM courses from mobile device
- Track progress - View completion progress in OpenVM courses and access badges

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 personalized 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.

### 4.2. OpenVMLH mobile app development

The modules which will be used in the OpenVM courses have been integrated in the application. These modules are:

- 
1. Media and Digital Literacy
  2. Intercultural Skills
  3. Autonomy-driven Learning
  4. Active Self-regulated Learning
  5. Collaborative Learning
  6. Networked Learning
  7. Open mindedness
  8. Open Education and Virtual Mobility

Different functionalities have been enabled, for example the creation of a new user from the application and the ability to login through social media accounts.

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 access the course material and the OpenVM Badges.

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, folder, IMSCP, label, page, URL. 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 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 a new keystore from Android Studio and manually uploaded 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 on the development environment and thus recognized by iTunesConnect when building and publishing.

Please see the development environment screenshots:

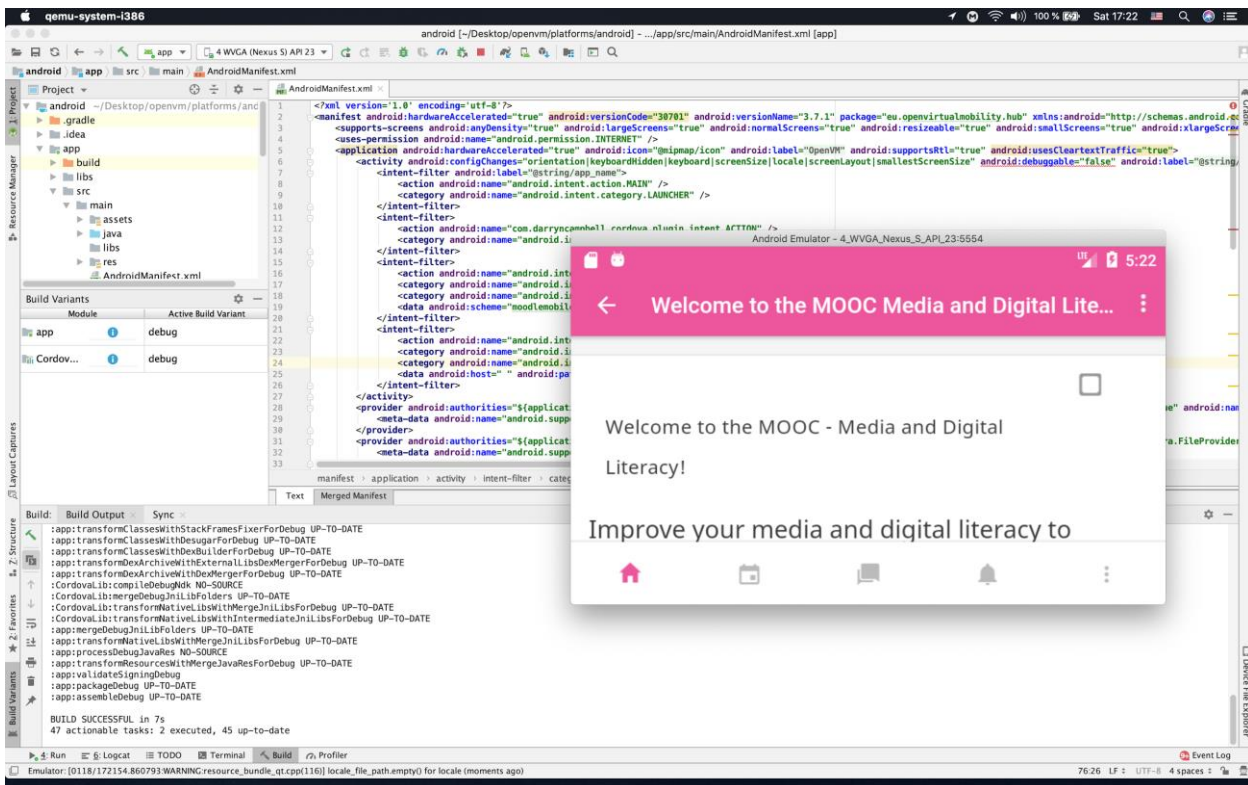


Figure 1. Development environment 1



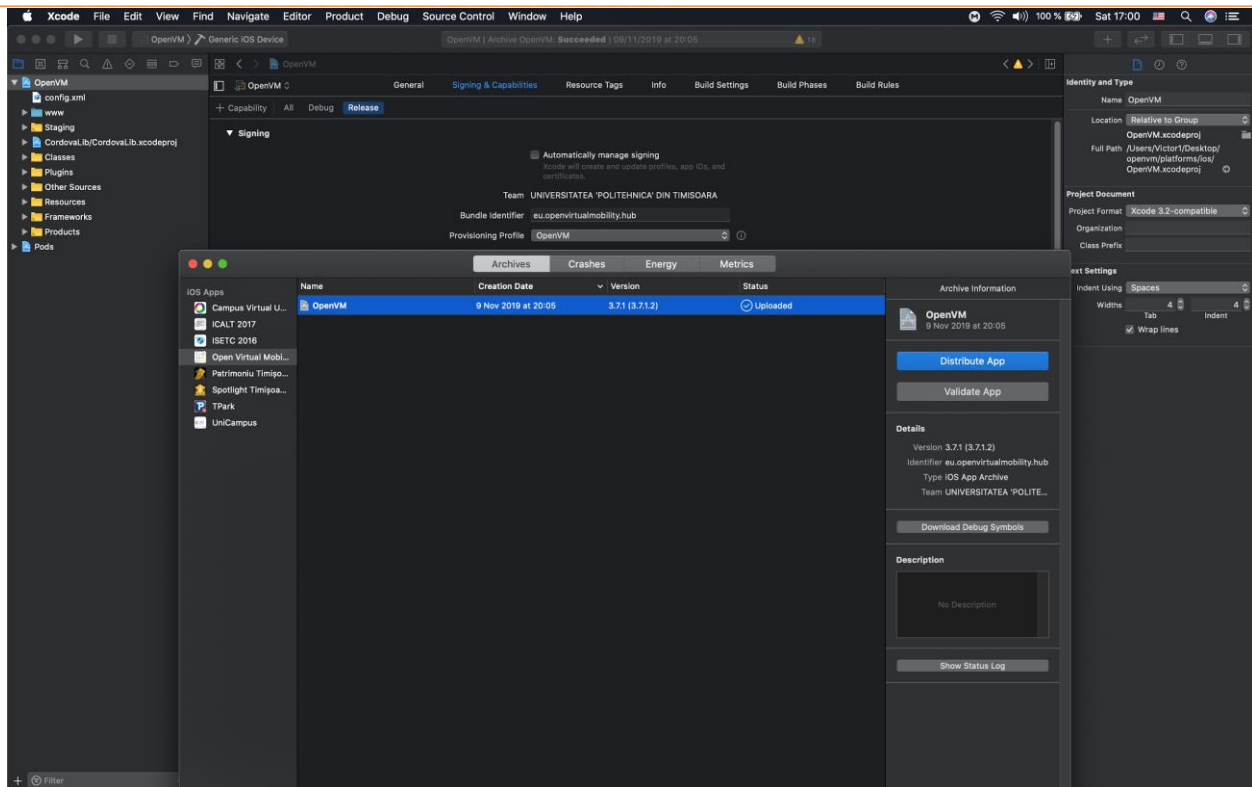


Figure 2. Development environment 2

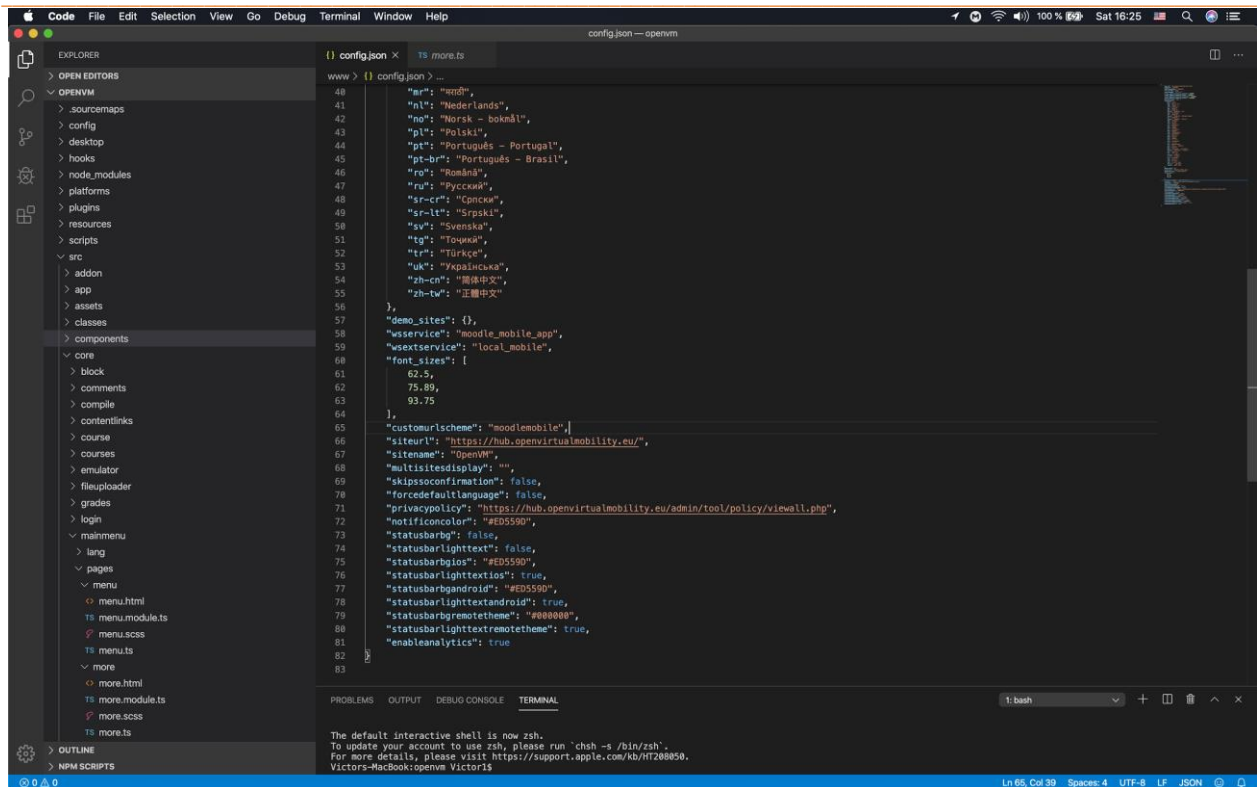



Figure 3. Development environment 3

Below are a number of screenshots with the application:

09:34 09:34 09:34

**Log in**



Open  
Virtual  
Mobility


Username


Password


**LOG IN**

**FORGOTTEN YOUR USERNAME OR PASSWORD?**

Log in using your account on:

 Google

 Facebook

 Microsoft

Is this your first time here?

For full access to this site, you first need to

Figure 4. VMLH Mobile app log in screen

09:34 09:34 09:34

**New account**

**OpenVM**

<https://hub.openvirtualmobility.eu>

Choose your username and password

Username \*

Username

Password \*

Password

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

More details

Email address \*

Email address

Email (again) \*

Email (again)

First name \*

First name

Last name \*

Last name

City/town

City/town

Figure 5. VMLH Mobile app configure new account

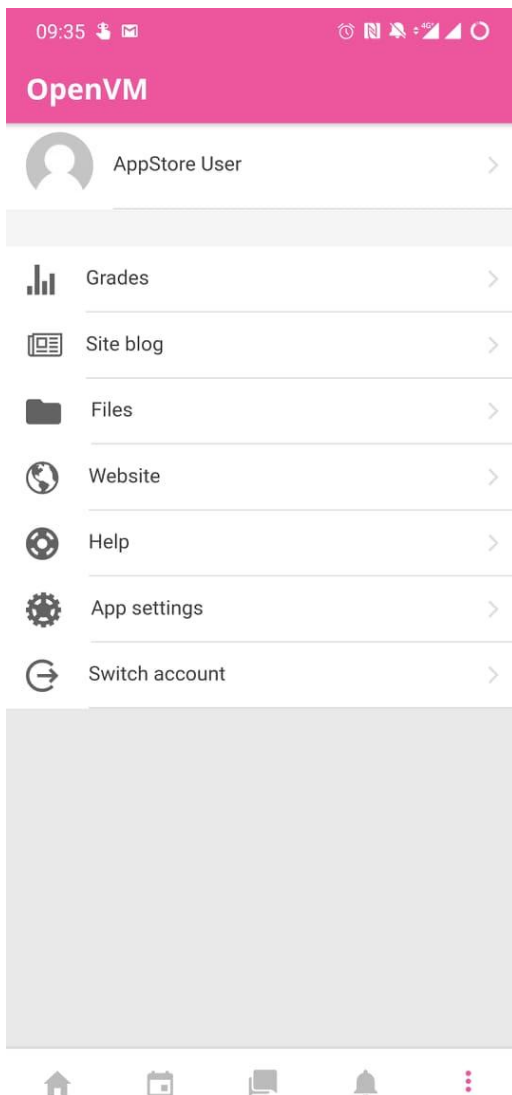


Figure 6. VMLH Mobile app menu

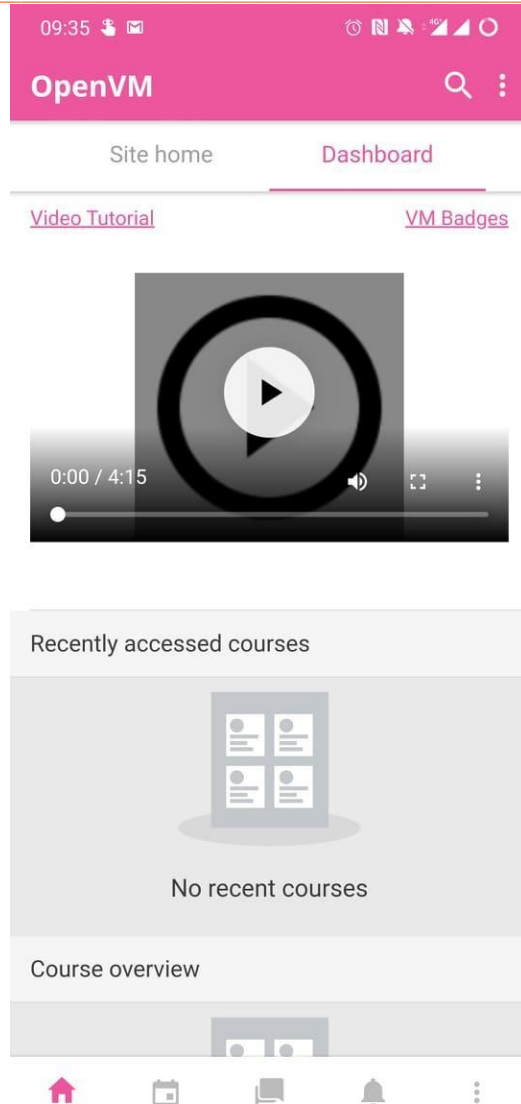


Figure 7. VMLH Mobile app dashboard

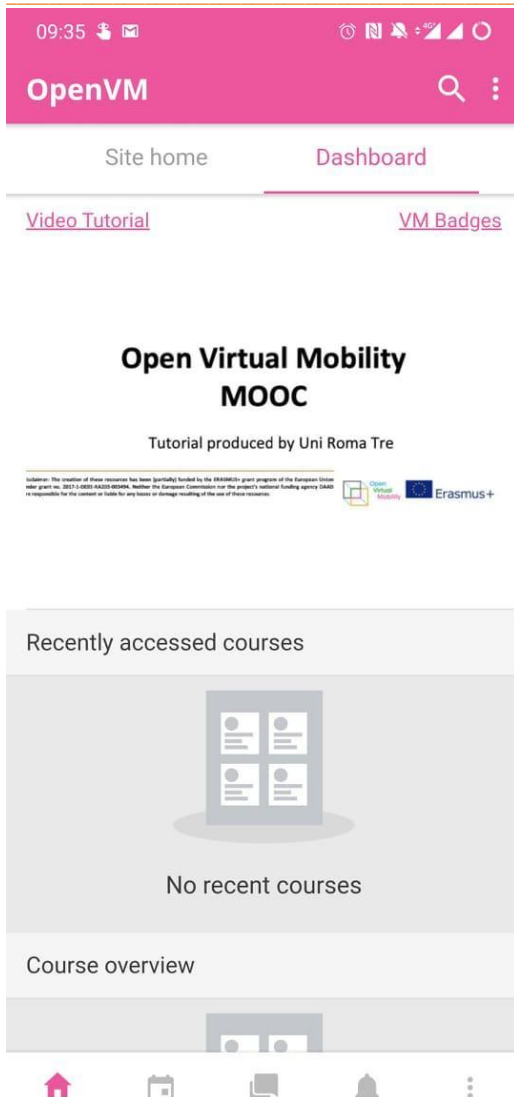


Figure 8. VMLH Mobile app dashboard -courses

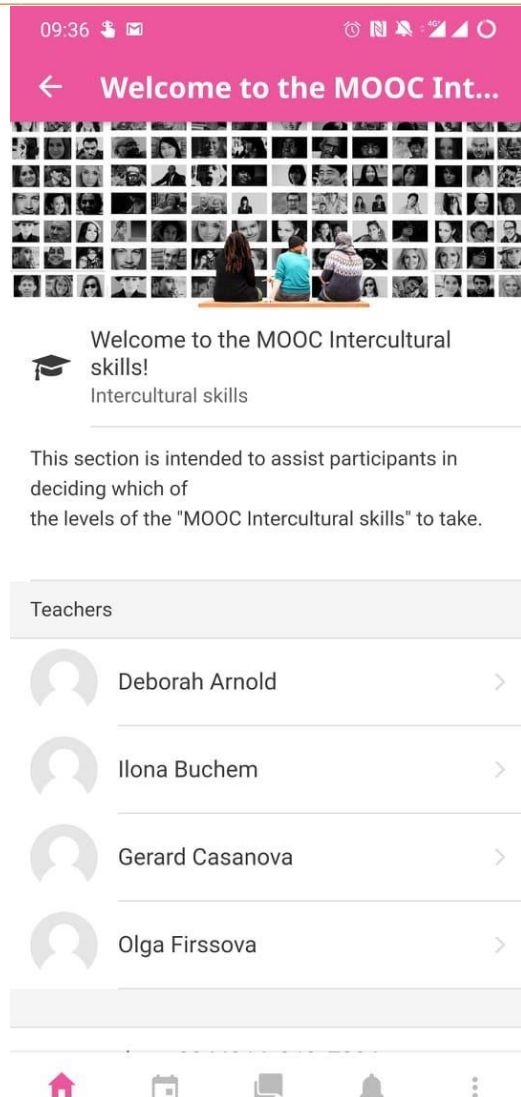


Figure 9. VMLH Mobile app Intercultural skills course view

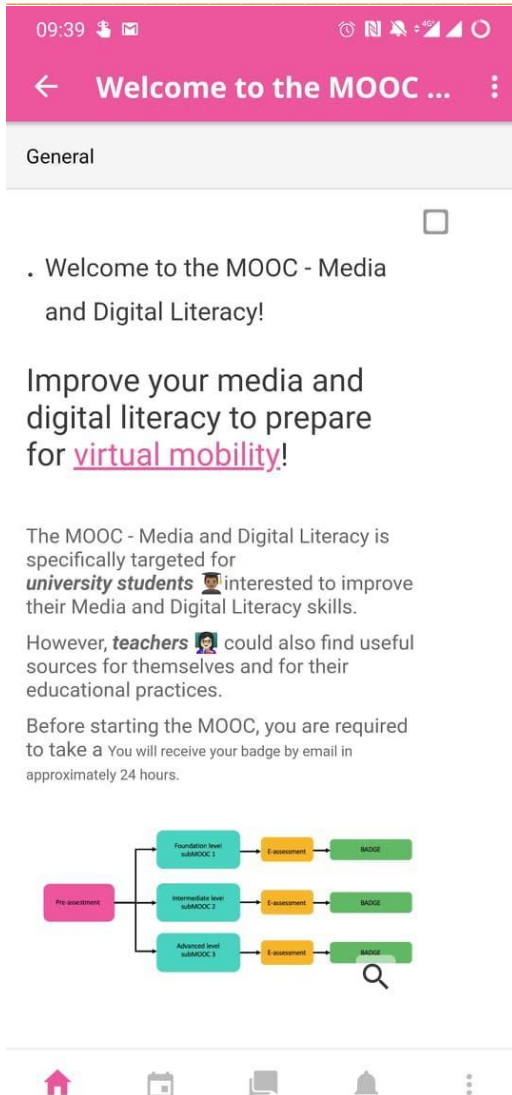


Figure 10. VMLH Mobile app Media and Digital Literacy course view

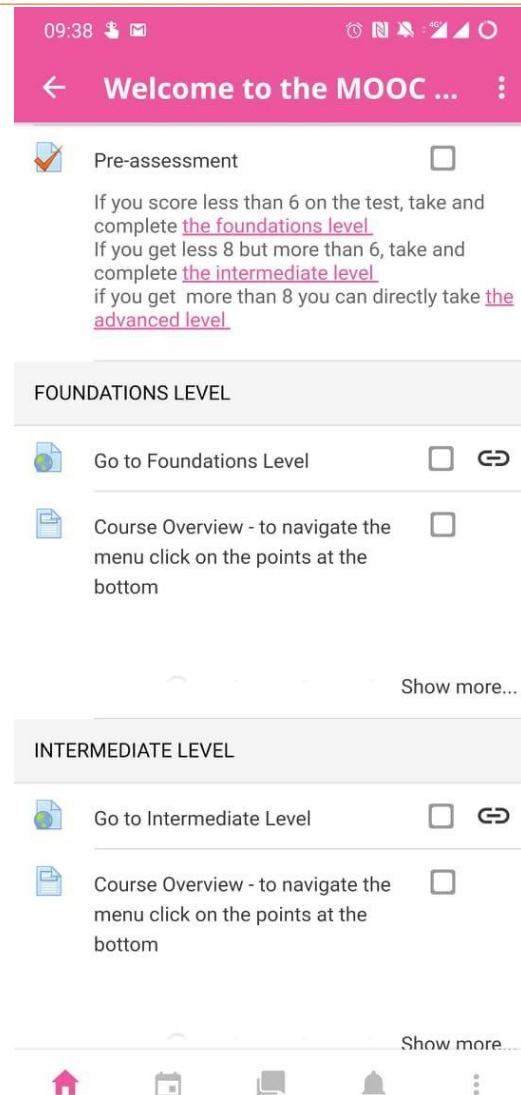
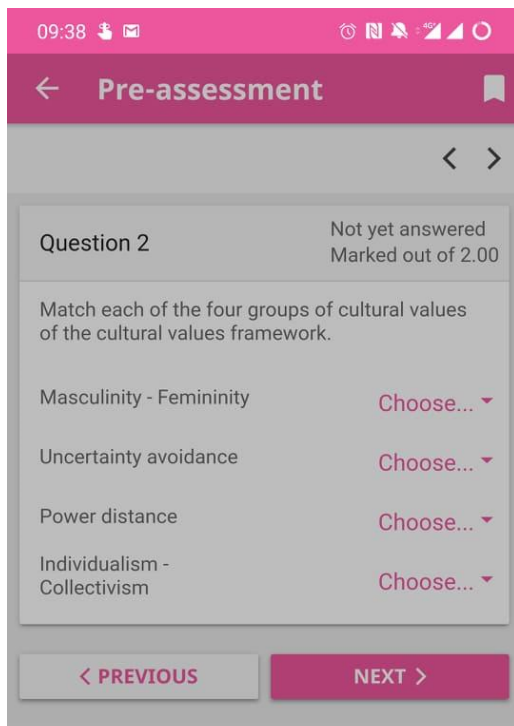


Figure 11. VMLH Mobile app course level selection



#### Choose...

Examines how power is distributed and to what extent people accept that power is distributed unequally

Focusses on social relationships between individuals

Refers to how much doubt and ambiguity a culture can tolerate

Based on how much a culture values power and success versus caring and nurturing

Cancel

Figure 12. VMLH Mobile app Pre-assessment

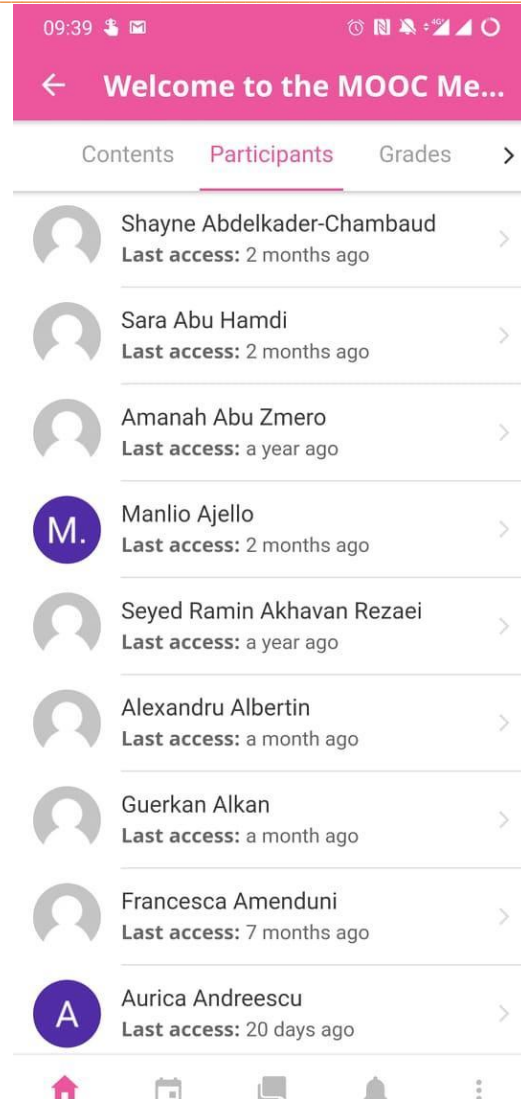


Figure 13. VMLH Mobile app course participants

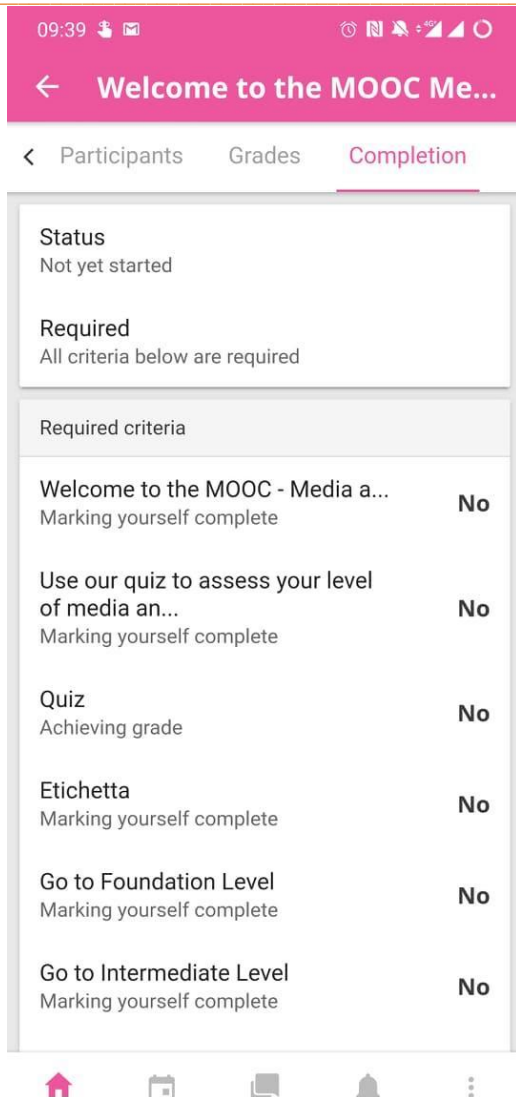


Figure 14. VMLH Mobile app  
course completion

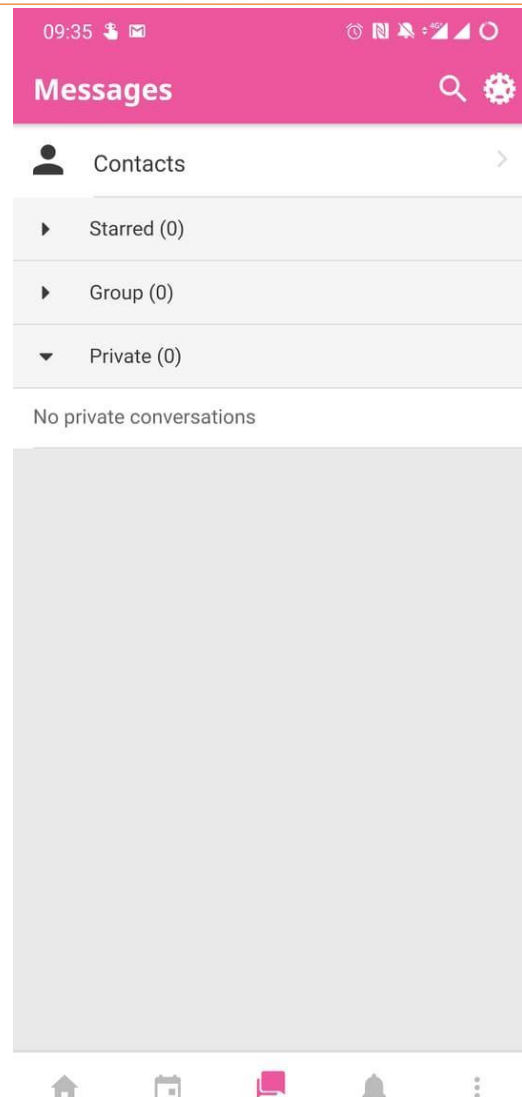


Figure 15. VMLH Mobile app  
private messages



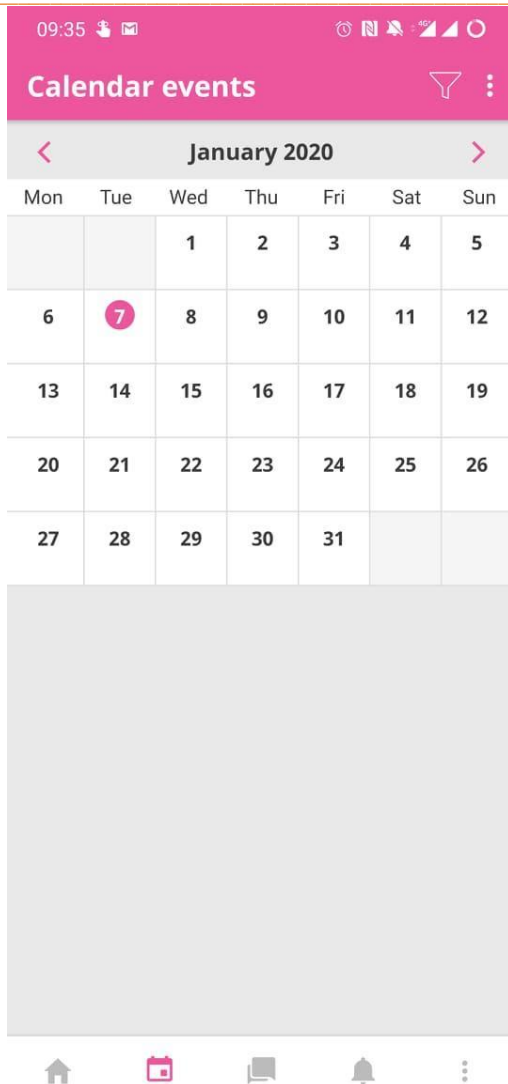
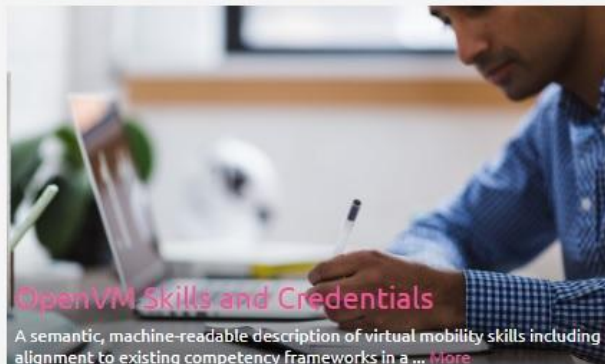


Figure 16. VMLH Mobile app calendar

The app links are integrated into the Open Virtual Mobility Learning Hub as presented in the next figure (Figure 17).

## Open Virtual Mobility Learning Hub



Registrations are now open! Sign-up [here](#)!



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Figure 17. Integration of mobile app in the Learning Hub

The mobile app is freely available for download:

- For android: <https://play.google.com/store/apps/details?id=eu.openvirtualmobility.hub>
- For iOS: <https://apps.apple.com/app/id1481003592>

## 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.

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<https://download.moodle.org/mobile/>

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