



STEAMigPOWER
STEAM approaches at higher education for
mIGrants, refugees and asylum seekers'
emPOWERment
2022-1-PT01-KA220-HED-000088221

A1: Specifications of the STEAMigPOWER VLE

WP4: STEAMigPOWER VLE Platform

June, 19th, 2023





PROJECT INFORMATION

Acronym	STEAMigPOWER
Project Title	STEAM approaches at higher education for mIGrants, refugees and asylum seekers' emPOWERment
Agreement Number	2022-1-PT01-KA220-HED-000088221
Start Date	1 December 2022
Duration	36 months

DELIVERABLE INFORMATION

Deliverable Number	WP4/A1
Deliverable Title	Report on activity A1 of WP4
Submission Due Date	30 June 2023
Actual Submission Date	16 June 2023
WP Number and Title	WP4: STEAMigPOWER VLE Platform
Activity Number and Title	A1: Specifications of the STEAMigPOWER
Author and Organization	Elizabeth Tzialla Károly Szóke SEAL CYPRUS
Dissemination Type	Report

DISCLAIMER

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.



Contents

ABSTRACT	3
INTRODUCTION	4
AIMS AND OBJECTIVES OF WORK PACKAGE 4.....	6
1. STEAMIGPOWER VLE PLANNING ASSESSMENT	7
2 INSTALLATION, DEVELOPMENT AND CONFIGURATION OF THE SYSTEM SERVER AND THE STEAMIGPOWER VLE PLATFORM.....	10
3. CONCLUDING REMARKS	12



ABSTRACT

The specific objectives of the Work Package 4 reflect the project's general objectives and expected outcomes. In more detail, Work Package 4 will develop the STEAMigPOWER Virtual Learning Environment (VLE) that will contain the training and assessment material produced in Work Packages 2 and 3, making it applicable and accessible for all interested parties, even beyond the target groups. The overall objective is for the Platform to be disseminated with the results worldwide, especially within the EU family, to guarantee the project's sustainability and further enhance the project's results. The availability and accessibility of the Platform by the broader society will extend the project's results beyond its lifetime and allow future development either from the same Consortium or for further research and innovation. Activity 1 includes the design of contextual and technical specifications for the VLE, which will host the MOOCs.

INTRODUCTION

Considering the large number of migrants that the European Mediterranean countries are receiving, especially since the migration crisis in 2015, and strongly believing that HEIs should have a fundamental role and responsibility in their socioeconomic integration, the STEAMigPOWER project proposes to develop 7 STEAM courses, mainly in the environment, climate change and sustainable development study fields, which comes in line not only with European priorities but also with their home countries' needs, preparing them both to remain in Europe in the future as well as to return to their home countries, when conflicts come to an end, with the appropriate tools and skills to rebuilding them sustainably.

The developed courses will be delivered face-to-face at the partner institutions (UMinho, UBSF, UniPG, AUTH and METU), allowing the communities' integration through social activities as well as cultural exchange, with the strong support and participation of the Associated Partners (local/national authorities and associations responsible for the reception of migrants, refugees and asylum seekers) and the in-house volunteer students. The STEAMigPOWER courses will then be adapted to the online format, being available at the project's open VLE Platform, which intends to position itself as a well-recognized European Platform for offering STEAM courses during and after the execution of the project, fueled not only by the participating institutions but also by other institutions that may develop educational contents/courses to these target group.

STEAMigPOWER will start with an Intensive Program about EU civic integration, which is the basis for their integration, and participants will also receive training on digital storytelling, providing them with skills to create digital stories to express the thoughts, ideas, creativity and memories of their STEAM learning experiences (being also a way for participants to build their information and visual literacy in STEAM), which will be offered in the second phase of the Intensive Programs.

The project's partners were carefully chosen, considering the impact of the migrant crisis in the Mediterranean countries and the worsening situation in Southern Europe. In fact, around 90% of illegal border crossings to the EU are via the Mediterranean Sea (Giuliani, 2015). All partners are truly committed to the mission to integrate the migrants, working together to establish a Platform that will offer STEAM courses, skills and competencies oriented to these communities and creating a network of HEIs and other organisations which will work on a long-term with the same goal.

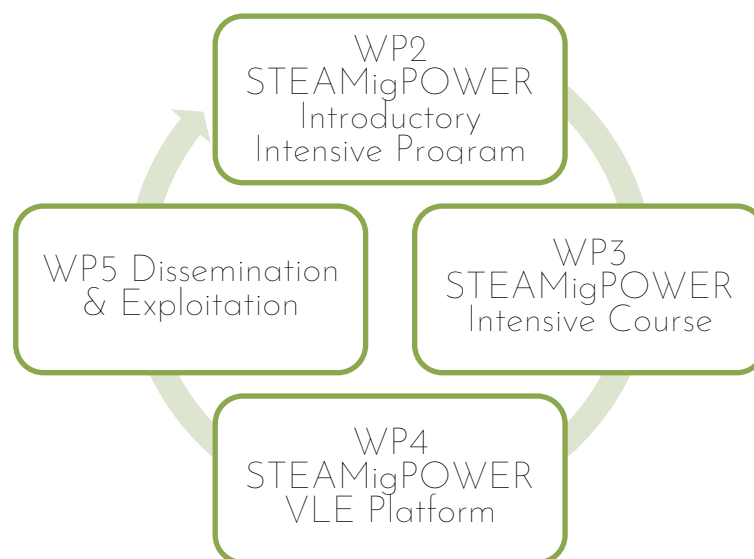
The STEAMigPOWER project addresses four main objectives during the project lifetime:

1. Development of the 2-days STEAMigPOWER introductory Blended Intensive Program (to be delivered at the partners HEIs to at least 250 migrants, refugees and asylum seekers, focusing on women and pupils in upper secondary school (15 - 18 years old) on EU Civic Integration and Digital Storytelling;

2. Development and delivery of the 5-days on-site STEAMigPOWER Intensive Program (5 STEAM courses on Environment and Fight against Climate Change)
3. Development of an open-access VLE platform to deliver the online courses created within the project, aiming also at the participation and content maintenance by other European and worldwide institutions who are interested in contributing to this cause after the project's lifetime;
4. Development and delivery of the STEAMigPOWER Intensive Program Modules in an online format, to be available at the VLE platform (aiming at reaching at least 500,000 migrants, refugees and asylum seekers).

Interconnections of Project Work Packages

The overall design and methodology approach of the STEAMigPOWER Project allows a strong integration among the Work Packages and the individual Activities. Each Work Package produces innovative, tangible and transferable outputs, broken down into key activities necessary for the project's implementation, achievements and finalisation.



Work Package 4 STEAMigPOWER VLE Platform has solid connections and interactions with all Work Packages; on the one hand, it provides the software and hardware Platform that serves as the main area where the online training is taking place; on the other hand, it includes dissemination and virtual communication channel. Moreover, the Platform will receive content from Work Packages 2 and 3, organise them into online courses (MOOCs), and host and offer a reliable Open Source educational portal

Aims and Objectives of Work Package 4

Work Package 4 specific objectives reflect the project's general objectives and expected outcomes. Specifically, to develop the STEAMigPOWER Virtual Learning Environment (VLE) that will contain the training and assessment material produced in Work Packages 2 and 3, making it applicable and accessible for all interested parties, even beyond the target groups, and create a Virtual Community space to support community interactions.

The overall objective is for the Platform to be disseminated with the results worldwide, especially within the EU family, to guarantee the project's sustainability and enhance the project's results further.

The availability and accessibility by the broader society will extend the project's results beyond its lifetime. They will allow future development either from the same Consortium or for further research and innovation within the EU by other organisations with similar expertise to allow further developments.

The direct users of the STEAMigPOWER VLE are:

- ✓ refugees/asylum seekers, mainly youth and women, who are particularly vulnerable to being marginalised from science, technology, engineering, arts and mathematics (STEAM), and
- ✓ partners' teaching and administrative staff that will participate in the delivery of the STEAMigPOWER MOOC.

Work Package 4 includes eight individual Activities:

A1: Specifications of the STEAMigPOWER VLE - SEAL CYPRUS

A2: Development of STEAMigPOWER VLE - SEAL CYPRUS

A3: Development of the STEAMigPOWER Online Course - SEAL CYPRUS

A4: Pilot testing of the STEAMigPOWER MOOC - SEAL CYPRUS

A5: Development of STEAMigPOWER Online Course in Greek, Portuguese, Italian, Turkish and Spanish - METU

A6: Course Delivery - SEAL CYPRUS

A7: Evaluation and improvement of the Course - UniPG

A8: Monitoring - UniPG

1. STEAMigPOWER VLE Planning Assessment

This section outlines the VLE requirements and specification analysis that are directed to the decisions regarding the Platform and design and configuration decisions.

1.1 VLE Requirements/Specifications

The VLE Platform is designed to support remote training and teaching material produced by the STEAMigPOWER project. Toward this direction, the consortium identified a general list of requirements and specifications as essential to be covered by the VLE Platform. The list is as follows:

1. The Platform needs to enable the mapping of the 7 STEAM courses developed in WP2 and 3, meaning breaking the courses into sections that can be assigned and assessed, serving in that way the project's particular educational purposes,
2. All the STEAMigPOWER learning resources and training materials need to be able to be included in the Platform to provide a main online area that hosts the entire educational content,
3. The Platform should be able to support multimodal learning materials presented in different media formats like text, audio, and video so that various types of multimedia training content can be supported to enhance users engagement,
4. The Platform needs to be either secure or shared with the learners, depending on the decided type of access,
5. Links to outside sources should be enabled through the Platform so that pathways to all other online learning places are allowed,
6. Information about each course must be provided within the Platform to facilitate its management,
7. The Platform should provide user feedback/comment features to encourage users to give valuable input about their learning/teaching experience, which can then be exploited to make improvements,
8. The Platform should have the form of an interactive system, like taking self-tests, uploading assignments, etc., to allow learner-learner and/or learner-trainer collaboration via audio/video conference, blackboard, chat, forum, etc.,
9. Protected online forum space will be embedded in the Platform to enhance interactivity and peer-to-peer interaction,
10. The ability to track the progress and achievement of all participating learners can be among the features of the Platform,



-
11. The Platform has to use an appealing design and provide a pleasant user interface that facilitates long engagement of the users,
 12. Participants should have open access to learning material and resources after the training is over,
 13. The Platform should promote communication and collaborative learning via the virtual space for discussion, feedback, and an exchange of information between users and HE Institutes,
 14. Learners using the Platform should be able to set a 'task' to complete at their own pace, time and location, encouraging independent learning and increasing their motivation to learn,
 15. Stakeholders should be able to request free access to the Platform to ensure the VLE Platform's open nature.

All of the requirements/specifications mentioned above are crucial for the STEAMigPOWER VLE Platform, and based on the output, the final deliverable is expected to meet the users' needs.

1.2 System Solution

Due to the ongoing COVID-19 pandemic, E-Learning's popularity significantly rose in 2022. E-Learning has become an essential tool for continuing education and training as more academic institutions and enterprises switch to online learning. Additionally, as more and more individuals became aware of the convenience and adaptability of E-Learning, the trend of "anytime, anywhere" learning continued to gain even more supporters.

A Virtual Learning Environment is a design space for teaching and learning. Virtual learning environments neither replace classrooms nor existing educational practices. They enhance them.

In conclusion, there are a lot of promising advances in the E-Learning field's future. The future of E-Learning promises to be more engaging, dynamic, and personalised than ever because of advancements in AI, VR/AR, microlearning, gamification, social learning, and collaboration.

1.3 Open-Source Solutions

The table below presents the characteristics of an Open-Source Solution against the aspects needed to build the VLE Platform

ASPECT	OPEN-SOURCE SOLUTION
License Free	It does not include any license fee
Time and Effort Required	Can require advanced technical skills
Support and maintenance issues	Requires a dedicated team or third-party support provider (after the end of the project)
Level of customisation easiness	The project's requirements may be implemented as much as the VLE architecture allows

1.4 On-Premise Deployment

The table below presents the characteristics of the open-source solution in terms of the deployment location.

ASPECT	OPEN-SOURCE SOLUTION
Web service deployment for VLE (domain, hosting, support, storage etc.)	Required
Dedicated Internal IT Team	Required
IT Support Costs	Included in the project budget during the implementation period - moderate to high after the end of the project
Hardware and Maintenance Costs	Hardware - use of the available hardware of Uminho Maintenance Costs - Included in the project budget during the implementation period - moderate to high after the end of the project
Ability to Customisation	On-premise Platforms allow for complete customisation, including gamification modules, adaptivity engines, and other high-level customisations
Security	The provider company typically guarantees system security

The Open Source Solution fits best because STEAMigPOWER requires an Open and Free of Access Platform with an environment that can be easily customised.

Additionally, hosting is possible at Uminho's premises and support and maintenance can be provided by their experienced IT Team.

Finally, after considering and waiting for all pros and cons of the available VLE solution, Moodle has been selected as the best option.



2 INSTALLATION, DEVELOPMENT AND CONFIGURATION OF THE SYSTEM SERVER AND THE STEAMIGPOWER VLE PLATFORM

Installation and Configuration of the System Server

The VLE Platform that will host 7 STEAM Courses requires the existence of a respectable server, which UMinho already has.

The servers of UMinho already have the capacity and capability needed to host the VLE Platform. However, cooperation between UMinho's and SEAL CYPRUS's IT team members is necessary to achieve the best result.

The server hardware requirements are the following:

Max number of concurrent users	Recommended setup
100 (small school)	Shared server
250 (large school)	Dedicated server
500 (medium-to-large college)	Dedicated application and database servers
+500 (university)	Load-balanced cluster

For the best performance to help the development of the VLE platform and to use it by the end-users, we recommend:

4 CPU CoreIntel Xeon Processor or equivalent, 8 GB DDR4 RAM, 150 GB SSD DISK

The server software requirements are the following:

The VLE is primarily developed in Linux using Apache, MySQL/MariaDB and PHP, and for that reason, we apply to install and develop on Linux as well.

PHP version: PHP 8.0.x or 8.1.x

PHP extensions:

Compulsory extensions: curl, ctype, dom, gd, hash, iconv, json, pcre, simplexml, spl, xml, zip, and zlib

Recommended extensions: intl, mbstring, openssl, tokenizer, soap, and xmlrpc, sodium, exif

Conditional extensions: mysql, odbc, pgsql, (depending on the database) and ldap, ntlm, and so on (depending on the authentication mechanism used)

PHP setting max_input_vars is recommended to be ≥ 5000

DATABASE	Minimum Version	Recommended
MySQL	8.0	Latest



MariaDB	10.6.7	Latest
---------	--------	--------

1 MySQL or MariaDB empty database for the VLE installation

The server will require the following installation steps to allow the best functionality of the VLE Platform.

1. Basic Installation

Installation of Linux distribution (e.g. Ubuntu 22.04 LTS)

2. Installation and Configuration of Firewall

3. Installation of the Packages for Activating Security Certificates

4. Installation of Remote Server for Hosting Backups

In order to protect against unpredictable hardware/software failures of the server, an additional server is recommended to host backup copies of the Online Platform.

5. Installation of the backup scripts

In order to protect against unpredictable hardware/software failures of the server, a number of scripts will be developed, which will automate the duplication of the online Platform files, as well as the Platform's database files, to the remote server.

6. Development and Configuration of the VLE Platform

The Platform hosting the courses requires a series of configuration steps to function effectively, such as installation of the database, installation of the special packages for the Platform operation, installation of the basic Platform files, installation of the Platform software, configuration of the Platform to meet the project's special requirements.

7. Database Installation and Configuration

8. Installation of the Special Packages for the VLE Platform Operation

The following software packages are recommended to install since they are required for the operation of the Platform: Graphviz, aspell, ghostscript, clamav, php8.0-pspell, php8.0-curl, php8.0-gd, php8.0-intl, php8.0-MySQL, php8.0-xml, php8.0-xmlrpc, php8.0-ldap, php8.0-zip, php8.0-soap, php8.0-String, git

9. Installation of the VLE Platform Software

The file moodle-4.2.x.tgz will be decompressed, and all installation steps will be followed.

10. Configuration of the VLE Platform to Meet the Project's special requirements

The extra features of the STEAMigPOWER project will be added, such as the logo, the colours to fit the Brand Identity of the project, etc., and several configurations will be made on the Platform so that the VLE is ready to host the developed educational material of the 7 STEAM courses and support online training.



3. CONCLUDING REMARKS

SEAL CYPRUS will start the development process on their servers, and when the production server is ready and/or the project is ready for publication, SEAL CYPRUS will move the ready-made project files to the production server.