

Partners:



Combating Digital Exclusion

CHILDREN
EDUCATE
DIGITALLY ILLITERATE
ADULTS
IN SAFE & CREATIVE WEB



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Regional Directorate of Primary and Secondary Education in Western Greece

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Deliverable O4A1

Specification of e-learning environment

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List of Abbreviations

The following table presents the acronyms used in the deliverable in alphabetical order.

<i>Abbreviation</i>	<i>Description</i>

1 Introduction

1.1 *Project Overview*

This project aims to enhance the cooperation between schools and educational institutions across Europe in order to combat the digital exclusion of adults in terms of Internet use by making students, the educators of the digitally illiterate adult members of their families, in safe and creative web.

The development of this document was a result of a collaborative effort of the Eduweb partners and more particularly by CTI and BU.

1.2 *Purpose and Scope of this Specification*

This document reports on the specification of the portal/e-learning environment. More specifically, this report will produce an analysis of the software specifications and the hardware components required, as well as the limitations and prospects of the portal and e-learning environment that will be used. This activity will be performed by taking into consideration the results of O2.

In this report, specific software tools will be analyzed and proposed, so that to estimate whether they meet the specific requirements, specified on deliverables O2A1 and O2A2, their prospects and their limitations, considering the priority given to different requirements.

1.3 *Organization of this Specification*

This document is organized into two main sections. The first section, describes the specifications related to the portal of the project, as well as the tools that are proposed to be used, based on these. The second section, describes the requirements related to the e-learning environment, based on the O2 deliverables, the tools that are proposed to be used, as well as how these tools meet these requirements.

1.4 *Disclaimer*

This report aims to present the specifications of the proposed tools that will be used for the portal and the e-learning environment. The scope of the report is not to attempt to compare the different opensource tools and present the capabilities of each one. Therefore, the report will focus on the proposed tools only and how well they meet the requirements specified in the O2 deliverables.

2 Portal

In this section, the general specifications related to the portal of the project, as well as the tools proposed to be used, are described.

2.1 Requirements

The EduWeb portal is a web based environment which provides publicly available information to the visitors. More specifically, the portal should provide the following information:

Presentation of project information

An important purpose of the portal is to present to the visitors, general information about the project. This might include a project description, presenting the goals of the project, as well as the audience of people that it aims to educate. This content must be available in all four languages, English, Greek, Italian and Bulgarian.

Presentation of project news/publications

This area will be used as a means of hosting the latest news about the project. It may also host project publications, which can be thought more like presentations of the project in public places. This area must have the ability to be available in all four languages, English, Greek, Italian and Bulgarian, although, different content may be uploaded for each language.

Presentation of project documents

This part will be used as a means of hosting the documents of the project. Such documents may include leaflets, documents, deliverables etc. This area must have the ability to be available in all four languages, English, Greek, Italian and Bulgarian, although, different content may be uploaded for each language.

Presentation of courses information

This area will provide the visitor with the ability to browse through the publicly available educational material. It may also provide a way to search for specific content, based on some criteria and it may contain some other elements related to the courses, such as the most popular courses etc. This area must have the ability to be available in all four languages, English, Greek, Italian and Bulgarian, although, different content may be uploaded for each language.

User registration and authentication

A login and a registration form must be provided, so that the visitors can register and contribute to the educational content of the project, through the gamification procedure, described in the O2 deliverables. This area must have the ability to be available in all four languages, English, Greek, Italian and Bulgarian.

Links

The links section can contain useful links to external or internal pages, related to the project. This area must have the ability to be available in all four languages, English, Greek, Italian and Bulgarian, although, different content may be uploaded for each language.

Basic accessibility

Some basic accessibility measures have to be taken, so that the information in the portal can be more easily accessible to older people, or people with vision problems. This might include the ability to present a colour-free version of the portal or the ability to increase the font sizes, among other measures.

Multilingual elements

Apart from the content of the website, that must be multilingual, every other element of the website (links, logos etc.) must be available in all four languages, English, Greek, Italian and Bulgarian. However, the main and the default language of the portal will be English.

Cooperation with the e-learning environment

The project portal and the e-learning environment, despite being two separate things, must be treated, as much as possible, as one single entity. The transition of the user, from the portal to the e-learning environment, must be as transparent as possible. Users that have been registered in the portal must automatically be created in the e-learning application. Also, the content from the e-learning environment must be automatically presented and updated in the portal.

2.2 Software proposal

A content management system is a software that keeps track of every piece of content on a web site. Content can be simple text, photos, music, video, documents, or just about anything. A major advantage of using a CMS is that it requires almost no technical skill or knowledge to manage. Since the CMS manages all of the content, users don't have to know how to manually manage it.

Joomla is an award-winning content management system (CMS), which enables the creation of web sites and powerful online applications. Many aspects, including its ease-of-use and extensibility, have made Joomla one of the most popular web site software available. Best of all, it is an open source solution that is freely available.

Joomla is used by millions of websites and it is one of the the most popular open source CMS currently available as evidenced by a vibrant and growing community of friendly users and talented developers. Joomla's roots go back to 2000 and, with over 200,000 community users and contributors, the future looks bright for the award-winning Joomla project.

The proposition of using the Joomla for the development of the website of the project was not only based on its opensource and community-rich abilities, but most importantly on its features. For the features that are not covered, or partially covered by the Joomla core, suitable extensions are available, to meet the requirements. Table 1 summarizes the requirements of the portal of the project and explains how well these are met, using the Joomla CMS and extensions.

Table 1. Portal requirements compared to Joomla CMS features.

<i>Requirement</i>	<i>Joomla core CMS feature</i>	<i>Extension and feature</i>	<i>Level of requirements met (CMS and/or combined with extension)</i>
Presentation of project information	As a CMS, Joomla fully allows the creation and management of project information content, which is presented in various ways in the website.	Not needed	High
Presentation of project news/publications	As a CMS, Joomla fully allows the creation and management project news/publications content, which is presented in various ways in the website.	Not needed	High
Presentation of project documents	Joomla CMS, allows the uploading and management of project documents, which can be presented in various ways in the website.	Presentation of flip book type documents is supported through the Issuu Smart Look Plugin. Project documents are also kept local, in case the plugin fails to display them as flip books.	High
User registration and authentication	Joomla fully supports user registration and authentication mechanisms. It also uses an ACL system, which allows earlier management of the user rights.	Extension Joomla needed for cooperating with the e-learning environment	High
Links	As a CMS, Joomla fully allows the creation and management of links content, which can be presented in various ways in the website.	Not needed	High
Basic accessibility	Available mostly only by the way the content is organized and displayed in the website.	Extension Baccessibility needed to provide basic accessibility features	Medium
Multilingual elements	Fully supported. Offering over 65 languages	Language packs per language needed	High
Cooperation with	Not supported natively unless the e-	Use of the Joomla	High

the e-learning environment	learning environment is implemented in joomla	extension for the integration of joomla and the moodle e-learning environment	
Presentation of courses information	Partially supported through RSS feeds, unless the e-learning environment is implemented in joomla	Use of the Joomla extension for the integration of joomla and the moodle e-learning environment	High

2.3 *Hardware proposal and requirements*

The portal that will be developed for Eduweb is proposed to operate under the following hardware requirements, so as to ensure compatibility with the proposed software, good performance, capacity, availability and latency, good security features, as well as maintainability and portability:

Virtual hosting environment featuring

- RAM: 4Gb
- Hard drive initial capacity: 17Gb
- CPU: Intel Xeon x86 64
- Operating system: CentOS 7

This hardware must be able to run flawlessly:

- Apache 2.4.6
- PHP 7.1
- MySQL Ver 15.1 Distrib 5.5.52-MariaDB
- Joomla 3.6.5 with English, Greek, Italian and Bulgarian language packages, Joomla extension and the rest of the extensions installed mentioned in table 1.

This will ensure that all desktop clients (windows and linux), as well as mobile devices, with the latest browsers versions, can access the portal at any time without disruption.

3 E-learning environment

This section, describes the requirements related to the e-learning environment, based on the O2 deliverables, the tools that are proposed to be used, as well as how well these tools meet these requirements.

3.1 Requirements

The EduWeb e-learning environment is a web based environment which contains the corresponding educational material for adults' education on Internet use. With this, the participating users can train and assess their knowledge on ICT topics falling in one of the 7 themes (as defined in deliverable O1), or contribute with training material on these themes. Based on the O2 deliverables, the requirements for the e-learning environment fall into the three next three priorities:

- Priority 1 – a “must have”
- Priority 2 – beneficial, needed for improved processing
- Priority 3 – new functionality, “nice to have”

Apart from the prioritization, the requirements are categorized in functional and non-functional:

Functional requirements

- Confirmation screen
- User Registration Form
- Search bar
- Content selection and display
- I-mite content interface
- I-bundle creation form
- Assessment creation
- Multiple choice interface
- Topic metadata
- L-mite approval
- Content reporting
- Feedback
- Content selection interface
- Account deactivation
- Role allocation
- Follow trainer

Non-functional requirements

- User data processing and storing
- Provide content
- Content translation
- I-mite management (storing and approval)

- Suggest difficulty level for I-bundle
- Publish I-bundle
- Publish I-mite
- Return for editing
- Delist I-mite
- Delete I-bundle
- Report count
- Store and display feedback
- Reputation and ranking
- Delete Account

The exact function of each of these requirements has been explained in the O2 deliverables and it is beyond the scope of this document to perform an in-depth analysis of each one here. For each of the functional requirements, a priority level has been specified.

3.2 *Software proposal*

Moodle is a free, open-source and robust software learning management system powering learning environments worldwide. It is designed to provide educators, administrators and learners with a single robust, secure and integrated system to create personalised learning environments. Developed on pedagogical principles, moodle is used for blended learning, distance education, flipped classroom and other e-learning projects in schools, universities, workplaces and other sectors.

With customizable management features, it is used to create websites with online courses for educators and trainers to achieve learning goals. It allows for extending and tailoring learning environments using community sourced plugins. Moodle is:

- Built for learning, globally
 - Proven and trusted worldwide by more than 90 million large and small institutions and organisations
 - Designed to support both teaching and learning, delivering a powerful set of learner-centric tools and collaborative learning environments that empower both teaching and learning.
 - Easy to use, with a simple interface, drag-and-drop features, and well-documented resources along with ongoing usability improvements.
 - Free with no licensing fees, as anyone can adapt, extend or modify it for both commercial and non-commercial projects without any licensing fees.
 - Always up-to-date, as it is continually being reviewed and improved on to suit the current and evolving needs of its users.
 - Multilingual capabilities (more than 120 languages) to ensure that there are no linguistic limitations to learning online.
- All-in-one learning platform, providing the most flexible tool-set to support both blended learning and 100% online courses.

- Highly flexible and fully customisable in any way and tailored to individual needs.
- Scalable to any size from a few students to millions of users.
- Robust, secure and private when needed, to protect against unauthorised access, data loss and misuse.
- Use any time, anywhere, on any device, as it is web-based with cross-browser compatibility.
- Extensive resources available, documentation, forums and hundreds of plugins contributed by a large global community.
- Backed by a strong and active international community, a team of dedicated full-time developers and a network of certified moodle partners.

The proposition of using moodle for the development of the e-learning environment of the project was based on these features. For the features that can not be fully covered, or are partially covered by the moodle core, suitable extensions are available, to meet the requirements. Even if there is not such an extension, it can be written thanks to the open source capabilities of moodle.

3.3 Functional Requirements and proposed software

Table 2 summarizes the functional requirements of the e-learning environment and explains how well these are met, using moodle and possible extensions.

Table 2. Functional requirements compared to the moodle features.

<i>Requirement</i>	<i>Moodle and/or extension feature</i>	<i>Level of requirements met</i>	<i>Priority</i>
Confirmation screen	Moodle supports confirmation messages for content deletion, submitting quiz answers etc... Hiding content requires extension	Medium	2
User Registration Form	Moodle supports users registration form, as well as direct users addition from the manager	High	1
Search bar	Moodle provides search bar functionality which allows the user to search everywhere on the Moodle site that she has access to. Further filtering based on title, topic, theme etc. must be manually implemented b It need to be set up and enabled by the initial site administrator.	High	1
Content selection and display	a. Moodle’s search engine the can provide the user with a one page view of all content	High	1

	<p>based on the filtering performed by the provided search criteria</p> <p>b. Automatic course recommendations which are suitable based on the user's historical activity and profile could be manually implemented</p>		3
I-mite content interface	Moodle allows the trainer to upload her own as well as link external content to an I-mite.	High	1
I-bundle creation form	Moodle has not a build function which allows the trainer to select I-mites to be included in an I-bundle. This feature must be implemented. Proposed plug-in: Bulk Meta Course	Low	1
Assessment creation	Moodle fully supports the creation of assessment tests in the form of multiple choice questions for every course	High	1
Multiple choice interface	Moodle fully supports the creation of assessment tests in the form of multiple choice questions.	High	1
Topic metadata	<p>Moodle supports the addition of tags when a course is created:</p> <p>a. Tags must be created manually. A drop-down menu is not supported and must be implemented</p> <p>b. selecting a difficulty level in a 5-star format is not supported and must be manually implemented</p>	Medium	1
L-mite approval	<p>Moodle supports the concept of "course requests" in which a trainer must a request permission from an admin to create a course. The request though, cannot contain the actual content of the course. Thus, this function must be extended to support the aforementioned</p>	Medium	2

	feature		
Content reporting	Moodle does not support a report function. Manual implementation is required.	Low	3
Feedback	Moodle supports the creation of feedback forms through the “Feedback Module”. 5-star format is not supported and could be implemented as an extension	High	2
Content selection interface	Moodle supports content deletion and hiding as long as the content creator has the permission to do so. Permissions are granted from an Administrator during the initial setup	High	2
Account deactivation	Moodle does not support account deactivation or removal. Only an administrator can remove a user account. This feature should be manually implemented	Low	2
Role allocation	Moodle fully supports role allocations for existing or newly added users.	High	1
Follow trainer	Moodle does not support any function to allow users to follow trainers. It supports though, course enrollment so that users can follow courses.	Medium	3

3.4 Non Functional Requirements and proposed software

Table 3 summarizes the non-functional requirements of the e-learning environment and explains how well these are met, using moodle and possible extensions.

Table 3. Non-functional requirements compared to the moodle features

<i>Requirement</i>	<i>Moodle and/or extension feature</i>	<i>Level of requirements met</i>
User data processing and storing	Moodle creates a database upon its’ setup and fully supports user data and profile manipulation	High

Provide content	Moodle allows the trainer to upload her own as well as link external content to an I-mite.	High
Content translation	Moodle supports multi-language content filter which need to be enabled by an administrator. Moodle also support the creation of subtitles for videos created and uploaded by a user to the moodle platform.	High
I-mite management (storing and approval)	Moodle supports the concept of “course requests” in which a trainer must a request permission from an admin to create a course.	High
Suggest difficulty level for I-bundle	Moodle does not support any function which would allow calculation of the overall difficulty level of an I-bundler based on the level of its’ compromising I-mites.	N/A
Publish I-bundle	The concept of L-bundle is not directly supported by Moodle	N/A
Publish I-mite	When a requested course is approved then Moodle renders it searchable by default	High
Return for editing	When an administrator denies a course request, she can provide reasoning for doing so. The user can resubmit the request after further editing.	High
Delist I-mite	Moodle supports both hiding and deleting a course(I-mite), but it has no way of knowing if a specific course is member of an I-bundle and denying its’ deletion.	Low
Delete I-bundle	Moodle does not support directly the concept of L-bundles.	N/a
Report count	Moodle does not support a report function in its’ strict meaning. Report counting can be implemented as part of the report button extension.	N/a
Store and display feedback	Feedback given via the “feedback module” is stored and made available to the content creator to read. Public display is not supported by the module.	Medium
Reputation and ranking	The plug-in: “Ranking block” embeds gamification into the platform. Promotion mechanics must be implemented.	Medium
Delete account	Moodle does not support account deactivation or removal. Only an administrator can remove a user account. This feature should be manually implemented	Low

3.5 *Hardware proposal*

The e-learning application that will be developed for Eduweb, is proposed to operate under the same environment as the portal of the project. Thus, the hardware requirements, so as to ensure compatibility with the proposed software, good performance, capacity, availability and latency, good security features, as well as maintainability and portability, that are mentioned in section 2.3, are exactly the same for the e-learning application.

This will ensure that all desktop clients (windows and linux), as well as mobile devices, with the latest browsers versions, can access the e-learning application at any time without disruption.



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