



iSIMPLY 519189-LLP-2011-GR-KA3-KA3MP

D4.3 Design of iSIMPLY services and e-environment

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Executive summary

iSIMPLY's e-environment has two objectives; to facilitate effective and complete online training within formal learning settings, but also to enable innovative services and tools for informal types of learning, knowledge discovery and extraction from social media sites and online communities of practice. The e-environment aims at providing a self-regulated learning environment that ensures the learning flexibility required by the community of social media marketing professionals, considering at the same time the dynamics of web and user generated content and online communities.

This document describes the services designed and integrated into iSIMPLY e-environment in order to support and facilitate the exchange of both formal and informal knowledge through a variety and mixture of interoperating e-learning, online collaboration and communication and knowledge discovery/extraction/recommendation tools.

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1 Introduction

Social media and social networking applications play an important role to the transition and reform of the traditional learning model deployed by early e-learning systems. Such tools do not focus on a well-structured, organized and packaged e-learning content but rather to content that is created, aggregated and shaped according to the learner needs, preferences, background and skills. In this scenario/context, there is no longer a finished or complete course or product but rather a learning resource that can be remixed, repurposed and fed into another learner's learning experience (Downes¹, 2005). The shift from the design of the learning content to how this content is used and distributed defines a new type of learning, referred to as technology-enabled social learning, e-learning 2.0 or online collaborative learning.

Though, the transition to this new type of learning cannot be abrupt, as both instructors and learners have become familiar with existing, more formal-oriented, e-learning systems and services for distance learning and training.

iSIMPLY's e-environment can be used for supporting different types of learning. More specifically, its main objective is to facilitate effective and complete online training within formal learning settings, but also to enable innovative services and tools for informal types of learning, knowledge discovery and extraction from social media sites and online communities of practice. However, the same environment could also be used to supplement the face to face training (which is out of the scope of iSimply). The e-environment aims at providing a self-regulated learning environment that ensures the learning flexibility required by the community of social media marketing professionals, considering at the same time the dynamics of web and user generated content and online communities.

To address the above mentioned needs of e-learning with state-of-the-art features of social networking applications, iSIMPLY adopts a hybrid model of learning for the e-environment. More specifically, within the framework of iSIMPLY a Knowledge Discovery and Recommendation mechanism will be developed (WP5) for knowledge discovery, extraction and assessment from social media contributed content. This mechanism will then provide recommendations on relative filtered content to a formal Learning Management System, so as to support the dynamic creation of educational content and its feed to formal learning processes.

Based on the above, this document describes the design of all services that the iSIMPLY e-environment will contain ranging from searchable definitions of social media marketing and

its aspects to e-training services and online training content to the respective tools that will be integrated into the e-environment.

More specifically, this deliverable is structured as follows:

- **Section 2** presents an **overview** of the iSIMPLY **e-Environment** in terms of its basic components for supporting the learning process in formal and informal online learning settings
- **Section 3** presents in detail iSIMPLY **services** for each of the e-environment's components
- Having completed with the description of the services **Section 4** presents the **tailored e-Environment solutions** that will be adopted and supported by iSIMPLY.
- **Section 5** summarizes the deliverable.

¹ Stephen Downes. 2005. E-learning 2.0. eLearn 2005, Volume 10

2 iSIMPLY e-Environment Overview

iSIMPLY aims to create an innovative social media driven e-environment where the use of social media tools will enable social media marketing professionals to interact, while the system extracts knowledge from this interaction which will later be structured and reused as training content, in an effort to help the new wave of social media marketers understand the potential of social media as a direct marketing tool.

The created social learning & collaborative model & system & the interaction through social media tools will allow marketing professionals to interact and collaborate using the offered social media tools, while extracting inherent user knowledge (from user interactions & generated content) subsequently creating, based on a set of domain ontologies (per social media marketing field & respective deployed tool), mining and reasoning methods, respective training content to feed formal learning processes within known open source LMSs (to integrate the devised tools and host the respective virtual communities). The adaptation of this innovative paradigm in learning will enable Target Group (TG) users to interact as they usually do while at the same time, evaluating posts, comments & suggestions by other users online. Such tagging and evaluation will support the automated extraction of valuable knowledge stemming from communities, presented to training experts in the marketing field for further validation and feeding into formal learning processes. This process will be further facilitated by the use of content templates & training structures to create & upload learning objects for sustainable use.

The e-environment aims to become a valuable asset for social media marketing specialists to understand, reach and communicate with consumers in online social communities, while at the same time, providing best practice for advancing existing learning and training processes.

2.1 Layered System Architecture

iSIMPLY e-Environment includes a number of services and tools for supporting user access, user and group communication and collaboration, content creation, content discovery and recommendation from social media, as well as learning and assessment. These services along with the necessary tools could be categorized on different provision layers, as presented in Figure 1.

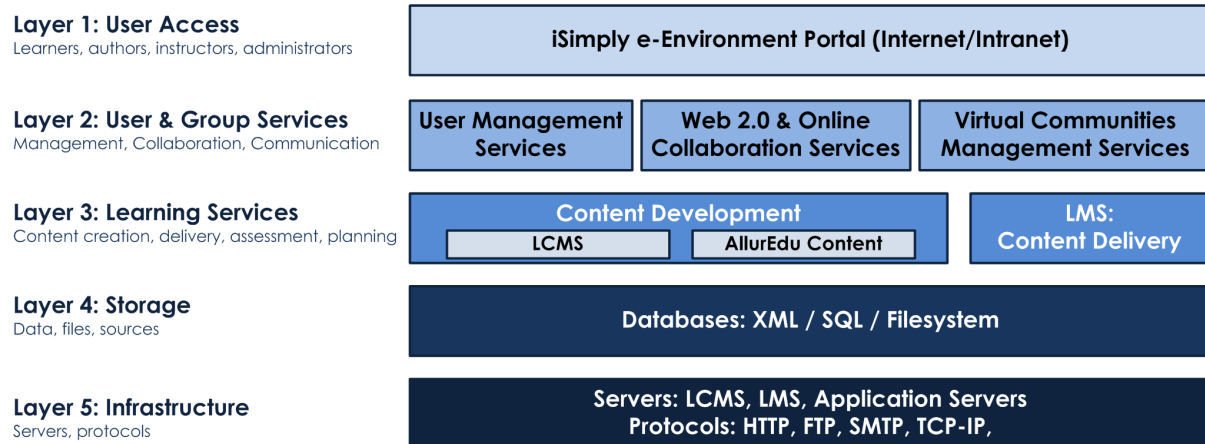


Figure 1: iSIMPLY Layered Architecture

- **Layer 1: User Access**—Users, given their role and access rights, have access to all corresponding parts of the iSIMPLY e-Environment via a standard web browser, by inputting their access credentials.
- **Layer 2: User and Group Services** — these services are provided to every user and are not strictly tied to any particular pedagogic function. However, most of these services can be set as parts of learning activities as they promote communication, collaboration, knowledge extraction and management.
 - User Management Services: Each user is identified with a unique ID, to which roles can be assigned with distinct privileges. Roles include: learners, authors, instructors, system administrators, etc. Individuals can have multiple roles and therefore numerous privileges assigned to them. The User Management Service records and handles all of this user information and conducts the authentication process. The User Management service provides a consistent, high-quality interface to guide the user experience — irrespective of the user's role.
 - Web 2.0 and Online Collaboration Services: Learners need to enhance the collaborative and learning experience through a number of state-of-the-art as well as innovative tools and services that facilitate knowledge creation and collaborative learning (i.e. blogs, wikis, rss feeds, knowledge discovery and extraction from social media and recommendation, etc).
 - Virtual Communities Management Services: iSIMPLY end users need tools and spaces for establishing virtual communities. These communities facilitate the learning process through communication and collaboration among users with common interests and learning goals.

- **Layer 3: Learning Services** — these services provide core functionality for the production and consumption of eLearning resources.
 - LCMS: Content Development (Learning Objects / Aggregation): The LCMS is the Learning Content Management System. This system allows content to be entered into a database repository, and appropriately indexed and meta-tagged for easy search and retrieval. The LCMS provides the mechanism for an author to submit content into the repository for subsequent review, editing and final approval. This interface allows authors, content experts, reviewers and administrators to control the backend of the learning services. The LCMS offers maximum flexibility in the authoring process allowing importing and meta-tagging of all types of content through easy to use course editing tools and content description templates.
 - LMS: Content Delivery (Enrol / Track / Report): The LMS is the Learning Management System. It is the heart of the learning services that interface with the learner — allowing catalogue review, course selection, enrolment, student tracking and launching the online content. The LMS is tightly connected to the User Management services in order to give learners access to the resources that their level of privilege allows, and to establish student tracking of their enrolments and scores. The LMS is able to generate reports of the learners' activities (scheduled and actual). The LMS not only manages delivery of online events, but authors and tutors use the LMS to schedule and manage enrolment in classroom events.
- **Layer 4: Databases** — this level of infrastructure allows relational databases, typically using SQL, to be interconnected with new XML database technology along with the necessary filesystem.
- **Layer 5: Infrastructure** — this level of infrastructure establishes client-server network communication and physical hardware, utilizing standard internet technology protocols.

2.2 Conceptual e-Environment Architecture

One of the most important and innovative aspects of the iSIMPLY project is the design and development of the mechanism for knowledge asset discovery and extraction from the wisdom generated within relevant communities in popular social networking sites;

Facebook², Twitter³, LinkedIn⁴ and thematically relevant to iSIMPLY blogs. The dynamically created content of educational value produced by this mechanism is fed to iSIMPLY's e-Environment that is supported by an open-source e-learning 2.0 platform. At this point it is important to mention that the mechanism is platform agnostic; in terms that it can be "attached" to any e-learning platform with the development of the necessary interfaces that follows the defined communication and data exchange protocol requirements.

Following the classification of iSIMPLY service provision layers, Figure 2 presents the iSIMPLY e-Environment in a component-oriented manner so as to define its main components and demonstrate the way they are orchestrated for supporting the learning process.

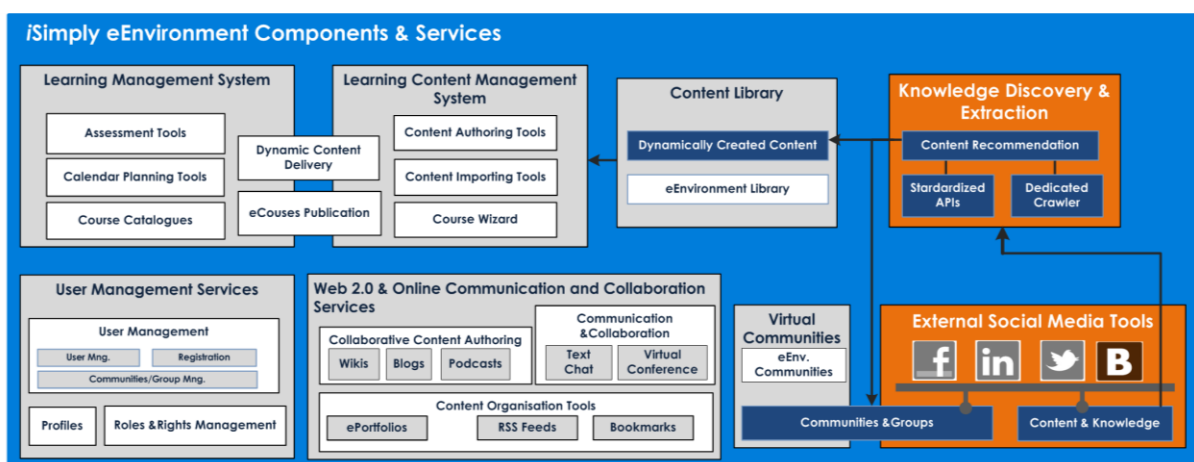


Figure 2: iSIMPLY conceptual e-Environment architecture

The iSIMPLY e-environment main components include a number of services and tools based on the type of functionality they aim to support. iSIMPLY's core environment components are the following:

- The Learning Management System (or LMS) enables the management and delivery of e-courses and learning resources to the users of iSIMPLY environment along with assessment and event planning tools.
- The Learning Content Management System is a multi-user environment where learning content authors can create, store, reuse, manage, and deliver digital learning content from a central content library. Thus, this component includes all necessary services and tools for content authoring, content importing from external

² Facebook: <http://www.facebook.com>

³ Twitter: <http://www.twitter.com>

⁴ LinkedIn: <http://www.linkedin.com>

or internal sources along with content creation wizards for facilitating the creation process.

- User Management and Virtual Community Management tools for user and community management, in terms of setting their profiles, their roles and access rights within the environment and for allowing the formation of groups of interest that can collaborate, create and exchange knowledge.
- Web 2.0 and Online Communication and Collaboration services and tools that support and promote collaborative knowledge creation, management and exchange as well as communication among end users.
- Knowledge Discovery and Extraction from Social Media tools that dynamically discover web content from social media and blogs, extract knowledge assets generated within external relevant communities, and recommend them as part of existing e-courses within the LMS. The content generated is stored within a repository of the respective tools (knowledge base) and references to these are fed to the content library of the LCMS for use during content production and/or e-course consumption.

The orchestration of the above mentioned components into one integrated e-environment provide the necessary functionality for both formal and informal learning for social media marketing professionals and not only.

These components along with their services and tools are described in detail in the Section that follows.

3 iSIMPLY Services

As presented in Figure 2, iSIMPLY e-Environment components consist of tools and services for supporting the learning process. These services are classified as follows:

- Learning Management System services
- Learning Content Management System services
- User Management services
- Virtual Communities management services
- Web 2.0 and Online Communication and Collaboration services
- Knowledge Discovery and Extraction from Social Media services

The sub-sections that follow describe in detail iSIMPLY services for each of the above mentioned categories.

3.1 Learning Management System Services

A Learning Management System (LMS) is a software application for the administration, documentation, tracking, reporting and delivery of e-learning courses or online training programs. LMSs range from systems for managing training and educational records to software for distributing online courses over the Internet with features for online collaboration. The focus of an LMS is to deliver online courses or training to learners, while managing students and keeping track of their progress and performance across all types of learning and training activities.

More specifically, learning management systems enable:

- deployment and management of all types of learning
- delivery of learning to specific groups
- assessment and reporting on learner progress

This section describes the services that the Learning Management System of iSIMPLY should support for effective learning provision and support.

3.1.1 Course catalogues

A course catalog is an organized, detailed, descriptive list of course offerings at an institution, organization, university or other educational outlet. Course classification assists learners in accessing courses of their interest and facilitates searching in long lists of course offerings. iSIMPLY course catalogue service will provide the course list along with the possibility to organize, classify and list the courses available based on multiple fields, as for example:

- per organization offering the courses,
- per thematic area,
- per subject

The creation, expansion and maintenance of the course catalogue will be mainly handled during the creation of the online courses. More specifically, after the creation of an online course the e-environment will enable course authors to assign this course either to one of the existing course lists or to a newly created course list. Thus, user's access and search to courses of interest will be facilitated.

3.1.2 Courses and Learning Content Provision

The provision of courses and learning content requires careful design in order to make it as self-contained as possible, with clearly stated objectives. It implies a clear separation of concerns that will ensure that learners do not suffer from cognitive overload. Well-structured and well-composed learning content is crucial in motivating learners and in maintaining their interest. This is more necessary for the case of standalone learning where both learner-instructor and learner-learner interactions are limited, if not totally absent.

The iSIMPLY e-environment will provide online courses and learning material in a uniform, consistent and coherent manner through the Web. The courses provided could be both synchronous (for the hybrid learning model) and asynchronous (for the standalone model). Regarding the learning content, the environment will support rich media types as for example multimedia presentations, video, audio and podcasts, well-structured so as to meet the learners' needs.

Users' access to courses and learning content will be regulated by the rights and access privileges that each user is assigned with; either as individual or as member of a learning/working group.

3.1.3 Calendar with automatic notifications

Calendar services are an important element of Learning Management systems as they facilitate users in keeping track of due dates and important events related with the learning process. In learning communities the event can be related to a specific course or activity within a course, to tasks of a learning/project group or individual tasks. Therefore, it is essential for the system to support calendar functionality for all above mentioned cases. In this direction, iSIMPLY will support calendar service that will provide a number of calendars for storing, viewing and accessing events. More specifically, iSIMPLY environment will provide:

- course calendar: this calendar will be available in any course where course-related tasks and events will be posted. Thus, entries of course calendars will be linked directly to course elements.
- group calendar: this calendar will assist in managing all appointments and tasks within a group. Members of a group will have direct access to this calendar.
- user/personal calendar: this calendar will assist users in keeping track of personal entries. Other users will not be able to get access to these private entries as long as they not explicitly marked as "public."

As calendars aggregate and present tasks and events related to the learning and collaboration process, it is essential to promote their visibility in the system. This can be achieved by incorporating automatic notifications for upcoming events that will be made available to the users when they log in to iSIMPLY environment. For facilitating accessibility and visibility links to calendars will be made available in the home area of the environment. Finally, in order to improve the usability of this service all calendar types (private, group and course calendars) will be made visible in the personal calendar in an overlaying and aggregated view.

3.1.4 E-Courses Publication

iSIMPLY courses can represent among other lectures, seminars, podcasts, group activities, etc. so that the didactic concept can be optimally communicated to the learners. The variety of course elements that can be included in a course require for special management so that course material can be represented during the publishing operation. In this direction, the iSIMPLY e-environment will provide the necessary tools for the publication of courses and learning content, i.e. for video presentation or multimedia data in a wide range of formats.

Furthermore, e-courses, with the first set of examples being the iSimply e-courses related to social media marketing, will be dynamically modified and updated with new dynamic information stemming from filtered and analysed user generated evolving content recommendations from Social media and respective communities. In this direction, the course publishing service of iSIMPLY will support the modification and publication of new recommended content within courses and the introduction of additional course elements in an efficient way, without affecting the structure and coherency of the course. The process is described in the subsequent subsection on Knowledge Discovery and Extraction from Social Media services.

Finally, the e-courses publishing service will include the necessary functionality for assigning the course to existing or newly created course catalogues during the publishing process as

well as the definition or course/course elements visibility and access to specific users, roles or learning/working groups.

3.1.5 Self-assessment

Self-assessment requires students to reflect on their own work and judge how well they have performed in relation to assessment criteria set by their tutors within courses or learning activities. Self-assessment can encourage students to take greater responsibility for their learning, for example, by encouraging engagement with assessment criteria and reflection of their own performance. Through this, students can learn from their previous mistakes, identify their strengths and weaknesses and learn to target their learning accordingly. Self-assessment can facilitate learners in:

- understanding both learning intentions and success criteria
- using these criteria to judge what they have learnt and what they still need to learn
- reflecting on the learning process to ascertain how they learn best
- acting on feedback received from their teacher and their peers
- setting learning targets based on what they still need to learn
- managing the organization of their learning.

Getting students more actively involved in their assessment can make assessment itself a means by which they can learn and develop.

In this direction, the system will provide multiple multi-level self-assessment processes. The self-assessment service of iSIMPLY environment will support the self-assessment of each learner's progress and record, through tools that monitor his/her performance and actions throughout the learning process. More specifically, self-assessment could be made available after the completion of the study for a learning matter (learning resource, content, course) in the form of tests and quizzes. The multi-level support of self-assessment process means that iSIMPLY users can be self-assessed as a learner of a course, as a member of a learning group or as individual.

3.1.6 Automatic tracking of user actions and reports generation

The system will provide the ability to track and record user actions within the iSIMPLY system and in particular in relation to the learning and training process of knowledge building, with special care on the protection of personal data. The information that will be tracked and recorded will be used to create usage reports on different levels. Such levels can be:

- User participation in communities
- Frequency in content production
- Participation in the learning/training process

- frequency in the use of tools for communication and collaboration

Access to information and reports that will be produced by the system will be accessible only to users with specific roles and access rights.

In this direction, this service will provide the necessary functionality for automatic monitoring/tracking and recording of user sessions from the initial access to iSIMPLY system until the time they log off. More specifically, the service will monitor and store information to the database related with user's actions, the courses and material s/he accessed, the interactions made, etc. The availability of this data can provide useful information both to content authors, tutors and administrators.

3.2 Learning Content Management System Services

3.2.1 Course authoring

A course is a unit of teaching that typically lasts one academic term, is led by one or more instructors (teachers or professors), and has a fixed roster of students. It usually describes an individual subject taken. Students may receive a grade and academic credit after completion of the course.

The course must accompany different types of teaching material and/or activities offered in a daily, weekly or monthly format according to the course teaching schedule. Students enrolled in the course should view the material and participate in the course activities. Course material may include documents, videos or sound representing lectures undertaken and Web URLs with extra or supplementary material. Course Activities may include questionnaires, quizzes, wikis or forums.

The Course Authoring service must provide all the necessary functionality for managing courses (insertion, deletion, editing) and course material as well as managing student enrolment through a friendly to use web interface.

3.2.1.1 Course Authoring based on iSIMPLY Learning Object Template

One of the tasks of the iSimply project was the design and specification of the appropriate Learning Object template and Content template that will be used as the guide for the development of the project courses learning objects/educational content with the appropriate instructional design in the form e.g. of interoperable SCORM packages. These templates (defined in deliverable D4.2) should also be supported in iSIMPLY's course authoring service, either as internal content and LO authoring tools/services or external ones that allow the authoring of SCORM-compliant LOs/packages and are imported within the

iSimply LCMS services and courses using the Import functionality of SCORM packages (SCORM 1.2).

More specifically, the iSIMPLY course authoring service needs to either provide an LO authoring service (coupled with a content description service) allowing the description and formulation of LOs based on the defined template, as shown below, or allow the seamless import functionality of SCORM 1.2 compliant LO packages, created by respective external LO authoring tools, according again to the template defined below, that either of them will provide to the user, through a tabular interface the ability to complete all fields required for all sections needed for the full description of a complete iSIMPLY LO and the associated instructional design specification. These sections along with the corresponding fields are presented in Table 1. The first column of the table presents the LO description field and the second column indicates whether this field is mandatory or reserved by the system (in terms that it is handled automatically by the respective authoring tool).

Overview/General Information	
Title of the Learning object	Mandatory
Number i.e. the Learning object id number/code	Reserved
Language in which language/s is this learning object written in	Mandatory
Description	Mandatory
Opening dates / Closing date	Mandatory
Duration	Mandatory
Subject area	Mandatory
Subject Subarea/s	Mandatory
Keywords to be used for subject/content search and description, according to the thematic taxonomy/classification	Mandatory
Target learning community Higher education or VET students	Mandatory
Level Of Difficulty (i.e. beginner, intermediate, advanced)	Mandatory
Pre-requisites i.e. necessary skills to take the learning object	Mandatory
Intellectual Property Rights	Mandatory
Objective	

From the learner's point-of-view, a learning objective is defined as the desired learning outcome expressed in terms of the learner's change of state		Mandatory
Instructional Content		
Presentation	Mandatory: The following structure should be <u>at least</u> supported: Introduction/Main Body/Conclusions	
Reading Material	Mandatory: A list of minimum one reading material (i.e., either word file, ppt file, video, online resource, etc.) per course	
Supplementary Reading Material	Mandatory: A list of minimum one reading material (i.e., either word file, ppt file, video, online resource, etc.) per course	
Learning Activities		
A minimum of one learning activities to be included per course.		
Self-Assessment / Assessment questions		
Self-assessment	Mandatory: Instructor needs to define a minimum of one self-assessment activity to be included (e.g., quizzes, games, puzzles, answer student- raised questions (see learning activities), etc.)	
Formal assessment	Mandatory: Instructor needs to define a minimum of one assessment activity to be included (e.g., quizzes, etc.)	
Social learning assessment	Mandatory: Instructor needs to define a minimum of one assessment activity to be included (e.g., learners evaluating blogs of other learners, etc.)	

Table 1: iSIMPLY Learning Object (LO) template

To support the LO creation based on the above mentioned description template, the iSIMPLY LO authoring service/external tool and the respective course creation service need to include mechanisms for ensuring that all mandatory fields will be completed and all minimum template's requirements are met. This is guaranteed by following the SCORM 1.2 specification.

3.2.1.2 Course Material creation based on iSIMPLY Content Authoring Template

Similar to the Learning Object template defined, the description of the primary educational material/resources for the courses/LOs will be based on the Content Authoring Template, also defined in Deliverable D4.2. Table 2 displays the content authoring template that will be used for the learning resources description, referenced within the iSimply learning objects

and in turn iSimply e-courses. The first column of the table presents the field, the second column the description of each field and its necessity and the third column indicates whether this field is mandatory, optional or reserved by the system (in terms that it is handled automatically by the authoring tool).

General		
This category groups general information for the learning resource		
Identifier	Unique value that identifies this learning resource.	Reserved
Title	The title of the learning resource instructional focus. This title should be as descriptive as possible, giving users relevant information about the learning resource instructional focus.	Mandatory
Description:	A short description of the thematic focus of the learning resource	Mandatory
Subject area/s	Defines the thematic area that the resource falls into. Subject areas will be pre-defined and will be presented as drop-down lists.	Mandatory
Subject sub-areas	Defines sub-areas of the thematic area that the resource falls into.	Optional
Keywords	Keywords or keyword phrases that describe the subject matter of this resource. Keywords will be defined and will be displayed in the form of text boxes that users can select.	Mandatory
Language/s:	The language(s) this learning resource uses to communicate with the learner.	Optional
Educational		
This category relates to the key learning or pedagogic characteristics of this resource		
Learning resource type	page/ External page (url)/ SCORM learning content/ Folder/ Wiki/ Podcast/ Blog/ Forum/ File/ Assessment/ Task/ Test/ Questionnaire/	Mandatory
Target groups	According to iSimply TGs this item may take one of the following values: VET/HEI. This field will be presented as check boxes.	Mandatory
Difficulty level	Defines the level of difficulty and can have the following values: beginners, intermediate, advanced.	Mandatory
Lifecycle		
This category describes the history and current state of the learning resource		
Version	Current version of the learning resource.	Reserved

Status	Current status of the learning resource (draft, final, revised, unavailable)	Mandatory
Rights This category describes the intellectual property rights and the terms of use of the resource		
Cost	Indicates whether the learning resource usage requires payment. This item may be equivalent with either "Yes" or "no".	Optional
License Scheme	Shows if there are copyright restrictions or other licenses on use of the resource.	Mandatory
Authors & Attributions	Provides a list of entities (people, companies, etc) that have contributed to the creation of this learning resource.	Mandatory
Technical This category describes the technical characteristics of the resource		
File Type	This item is used to recognize the software needed to access and view the specific resource. File types could be: ppt, pdf, doc, docx for text files, mp3, wav, for audio files, swf for video , etc.	Mandatory
Hardware Requirements	This item is used to identify any hardware needed for viewing/playing the learning resource (i.e. speakers for audio and video files)	Optional
Size	Size in bytes of this learning resource	Reserved
Location	Points to the file location of the learning resource. This field can be used to specify an alternate location for acquiring the resource other than the content package.	Reserved
Installation remarks	Textual field for conveying specific instructions for installing this learning resource.	Optional
Duration	Represents the amount of time the learning resource occupies when delivered at the intended speed. (Useful for resources like video files or audio clips.)	Optional
Relation The relation category describes this learning resource's relationship with other components		
Relation Type	This field is used for defining any type of relationship (ispartof, isversionof, hasversion, references, isreferencedby, isbasedon, isbasisfor, requires, isrequiredby).	Optional
Related Resource	The component that this learning resource is related to.	Optional
Classification This category is used to categorize this learning resource within the context of a controlled vocabulary or classification system.		

Classification purpose	Defines the purpose of classifying this learning resource (discipline, idea, prerequisite, educational objective, accessibility restrictions, educational level, skill level, security level, competency).	Optional
Taxonomy Path	Defines the taxonomic path within the specific classification system.	Optional
Classification Description	Textual description of the learning resource as it relates to the classification purpose.	Optional
Classification Keywords	Keywords and descriptive phrases relating to the learning resource within the context of the classification purpose.	Optional

Table 2: iSIMPLY Content Authoring Template

To support the above mentioned template, the iSIMPLY course creation service needs to include mechanisms for ensuring that all content material will be inserted following the above mentioned template and all mandatory fields will be completed so that the template's description requirements are met. Alternatively, this needs to be ensured in case external content authoring tools are deployed, interoperating with external LO authoring tools.

3.2.2 Course wizard

This service must provide a wizard in order to facilitate users in creating courses. The wizard is meant for course authors who prefer to use only the most popular course elements of the platform without having to deal with the entire range of features available in the course editor.

3.2.3 Course/Content import and export

This service must enable the import of a course (course structure and material) into a compatible LMS as well as the export of course material into a portable format that can be re-used in a compatible e-learning system. The requirement is to allow importing of SCORM 1.2 compatible packages.

In each operation the user must be exposed to a graphical front-end with the ability to specify which portions of the (course) data will be processed. For instance the user may choose to export only data from the quiz module of the course.

3.3 User Management Services

iSIMPLY must support a number of tools and services for managing the users, their access rights and profile building. These services are the following:

3.3.1 Creation and Management of Users and Groups/Communities

The platform must support all the necessary functionality for creating, supporting and managing both individual users and user communities.

More specifically the platform must support actions for the following user activities:

- creation of user accounts and assignment of platform roles to users
- assignment of users to courses
- assignment of users to groups
- assignment of groups of users to groupings
- assignment of users to cohorts/project groups (system-wide groups not belonging to a particular course)
- generation of user reports depicting user behaviour in the system (login time and dates, course interaction & teaching material accessed, grades received etc.)

3.3.2 User Registration

Authorized persons may register either a single user manually or more users at once (bulk user registration) by means of Excel files import.

In the case of manual user registration, authorized users should be presented to a graphical front-end with configuration options and input fields for specifying the profile fields. For instance, nice to have profile fields should include first-name, last-name, email, town, city, phone, profile picture etc.

In the case of bulk user registration, authorized users should be exposed via a graphical front-end to import options for opting which portion of the input file will be mapped to corresponding profile fields.

3.3.3 User Profiles

Upon registration, users will dispose of different configuration options, a profile as well as the allocation to system roles. The profile should contain obligatory information that need to be provided as well as optional data that users can enter for creating a complete profile.

For instance users may change their preferences for forum subscriptions, upload a user picture, or share some personal details with other platform users.

3.3.4 Roles and Rights

The platform must implement controlled access to services and course material based on user's role. The platform should support multiple roles for different categories of users and different access rights for each of these categories.

More specifically the system must support at minimum the following roles:

- **Platform Administrator:** The most powerful role must usually be assigned to users belonging to the technical department (IT). This group of users should be involved with managing the technological aspects of the platform (server, database etc.).
- **Instructor:** The instructor role should be the most powerful course role. Instructors must be allowed to create and delete courses, add and remove users, modify user roles, add and modify content, and assign grades to student work. The only capability that an instructor must not have is the permission to edit site-wide settings (i.e. settings that would affect all courses on the site); this permission is reserved for the platform's site administrators.
- **Non-Editing Instructor:** The non-editing instructor role must be a stripped down variation of the instructor role meant for teaching assistants and graders. Non-editing instructors should view course materials and grade student work, but they cannot use any of the other course administration tools or add or modify content.
- **Student:** The student role should be automatically assigned to all students enrolled in your course. Students must only be allowed to view content, participate in activities, and view their own grades.
- **Guest:** The guest role should be designed for you to use when you want to allow someone from outside your class to view your course. Guests must only be allowed to view content and they should not be able to see any student-related information, including the class roster.

3.4 Virtual Communities Management Services

A virtual community is a group of users, potentially crossing geographical boundaries in order to pursue mutual interests or goals. These communities bring together individuals through online and usually web-based systems. For meeting the participants' needs, these communities encourage interaction, sometimes focusing around a particular interest or just to communicate. Community members need to be provided with all the available tools that foster interaction and communication as for example message boards, chat rooms, video conferencing, e-mail, discussion forums, etc.

In e-learning systems such as iSIMPLY, two types of virtual communities can be distinguished; virtual learning communities and virtual project communities. The first type of community is strongly related to one or more e-courses while the second type is related to groups of people that have joined for collaboration and problem or task solving. The two community types are described in detail below:

- Virtual Learning Communities: These communities are usually part of courses and supervised. There are two different roles that users can play: that of the coach and that of the participant. Coaches of a learning community need to have access to administrative tools for that community in order to administer single members of their community or to configure the community's attributes. The main purpose of this community type is for a course author to selectively grant someone access to course tools without appointing course administrators.
- Virtual Project Communities: These communities need to be accessible to all environments' users. All registered platform users should be able to initialize, create and manage project communities. Project communities have no relation to a specific course and are managed by community authors. These communities are either suitable for persons studying on their own or for collaborative tasks during a project not supervised by a coach.

The iSIMPLY e-environment needs to support a number of interconnecting tools and services for the management and operation of these community types (i.e. e-mails, calendar, shared folder, forums, chat, video conference, wikis, etc.). These tools should be available for the community creator that can select some or all of these tools that will be used in the community. At any point, the community administrator can modify (add or remove) the available tools as well as moderate the members of each community.

3.5 Web 2.0 and Online Communication and Collaboration Services

3.5.1 Blogs

3.5.1.1 What is

The word 'blog' is a contraction of 'web log'. Blogs are a form of online journal used by millions of people around the world for self-expression and communicating with family and friends. Blogs are usually organized as a chronological series of postings created by the author of the blog. Blogs usually are written by one person, although some blogs can be authored by groups of people.

Blogs are user based - each user has their own blog. Users can also register their external blogs, such as Blogger or Wordpress, so that entries are automatically included in their platform blog service.

3.5.1.2 Blogs in iSIMPLY

Because blogging can enhance the ability of students to self-reflect and process concepts, the use of a blog in the e-course should only be implemented when there are "concepts for students to think through, various resources and content segments to process, or ideas to construct.

3.5.2 Wikis

3.5.2.1 What is

A wiki is a collection of collaboratively authored web documents. Basically, a wiki page is a web page everyone in your class can create together, right in the browser, without needing to know HTML.

Wikis serve many different purposes, such as knowledge management and note taking. A wiki starts with one front page. Each author can add other pages to the wiki by simply creating a link to a page that doesn't exist yet.

Wikis get their name from the Hawaiian term "wiki wiki," which means "very fast." A wiki is indeed a fast method for creating content as a group. It's a hugely popular format on the Web for creating documents as a group. There is usually no central editor of a wiki, no single person who has final editorial control. Instead, the community edits and develops its own content. Consensus views emerge from the work of many people on a document.

3.5.2.2 Wikis in iSIMPLY

In iSIMPLY, wikis can be a powerful tool for collaborative work and collaborative content creation. The entire e-course learning community can edit a document together, creating a course product or something more generic such as a company vision or a product strategy or each student can have their own wiki and work on it with you and their classmates.

3.5.3 RSS Feeds

3.5.3.1 What is

RSS Rich Site Summary (originally RDF Site Summary, often dubbed Really Simple Syndication) is a family of web feed formats used to publish frequently updated works—such as blog entries, news headlines, audio, and video—in a standardized format. An RSS document (which is called a "feed", "web feed", or "channel") includes full or summarized text, plus metadata such as publishing dates and authorship.

RSS feeds benefit publishers by letting them syndicate content automatically. A standardized XML file format allows the information to be published once and viewed by many different

programs. They benefit readers who want to subscribe to timely updates from favorite websites or to aggregate feeds from many sites into one place.

RSS feeds can be read using software called an "RSS reader", "feed reader", or "aggregator", which can be web-based, desktop-based, or mobile-device-based. The user subscribes to a feed by entering into the reader the feed's URI or by clicking a feed icon in a web browser that initiates the subscription process. The RSS reader checks the user's subscribed feeds regularly for new work, downloads any updates that it finds, and provides a user interface to monitor and read the feeds. RSS allows users to avoid manually inspecting all of the websites they are interested in, and instead subscribe to websites such that all new content is automatically checked for and advertised by their browsers as soon as it is available.

3.5.3.2 RSS Feeds in iSIMPLY

A tutor can use RSS Feeds to subscribe to e-learning resources or material covering the latest developments, relevant to the course. Syndicated content can then be automatically imported in a special section at the course page. Learners can access the page and keep up to date with the latest developments about the course.

Users may also subscribe to feeds syndicating information about the latest forum posts, glossary entries and other events within the platform and access that information with an external program without logging into the platform (e.g. a mailer program).

3.5.4 Instant Messaging

3.5.4.1 What is

"Messaging" refers both to automatic alerts from the platform about new forum posts, assignment submission notifications etc., and also to conversations using the instant messaging feature.

3.5.4.2 Instant Messaging in iSIMPLY

Users can receive message alerts from the platform in a number of ways and for a number of reasons: learners may for instance receive instant messages from other users; students may be messaged by their course tutor; teachers might receive automatic notifications of assignment submissions and admins might receive notification of technical problems with the site.

3.5.5 Video Conference

3.5.5.1 What is

Videoconferencing uses audio and video telecommunications to bring people, usually located in different sites, together. In e-learning systems videoconferencing provides students with the opportunity to learn by participating in two-way communication. Students are able to explore, communicate, analyse and share information and ideas with one another or have access to real-time communication with course providers and/or mentors, so as to participate in courses, ask questions and keep notes, as in a real environment. Given the variety of tools and services provided by video conferencing, such services are also adopted in order to support synchronous virtual classes for the hosted communities.

3.5.5.2 Video Conference in iSIMPLY

Video conferencing in iSIMPLY can be used in two different ways:

- As a tool for virtual communities' communication and collaboration: this service should be available for both learning and project groups created in iSIMPLY. The service will enable the real-time communication and interaction of community's members with or without the presence of a mentor/teacher/facilitator.
- As a type of virtual classroom for real-time delivery of full or parts of courses: this service can be used to support the delivery of online courses in a synchronous mode, where learners will have the ability to collaborate with the mentor/teacher as it would happen in a real classroom. Full courses or parts of courses could be delivered through this service. Though, planning among the instructor and the participants is required so that time limitations can be managed.

In order for the iSIMPLY e-environment to support the above mentioned types of video conferencing services it needs to integrate and support all the necessary tools and functionality for fostering communication and collaboration. These tools are the following:

- Live video streaming: the virtual conference should support from 2 up to 12 concurrent users with their video stream (from a camera). The maximum number of concurrent participants is set to 12 as it is commonly used in real-time services so that both communication and learning experience are more effective.
- Hand raising/floor managing: In order to handle cases where the number of participants is high, the platform should support gestures like the hand raising in order a participant to express his/her intention to speak and if this is accepted by the moderator, the participant will be assigned with the meeting floor.

- Chatting: Text-chat should be enabled so as to allow the text-based real-time communication among the participants of a virtual conference.
- Application sharing: this tool enables the participants of a virtual conference to access a shared application or document from their respective computers simultaneously in real time.
- Whiteboard (pen and marker tools, etc.): The whiteboard should support slide projection, line, circle and ellipsis drawing in a wide range of colours and text input in many sizes and colours.

3.5.6 Knowledge Discovery and Extraction from Social Media and Recommendation

3.5.6.1 What is

A major set of Social Media Tools and Services of the iSIMPLY e-environment are the Knowledge Discovery and Recommendation ones addressing Social Media Content, and particularly content (discussions, posts, tweets, comments, etc.) from Facebook, Twitter, LinkedIn and Blogs on the Web. This set of tools composes the AllurEdu Search Engine for online social media content of educational value that is not formalized and constrained within e-learning systems or dedicated web sites offering e.g. open educational resources, recognizing the fact that knowledge is gained at a high extent through social interactions and natural knowledge sharing. A conceptual architecture of the AllurEdu Search Engine and backend Knowledge Discovery, Extraction and Recommendation tools is shown in Figure 3.

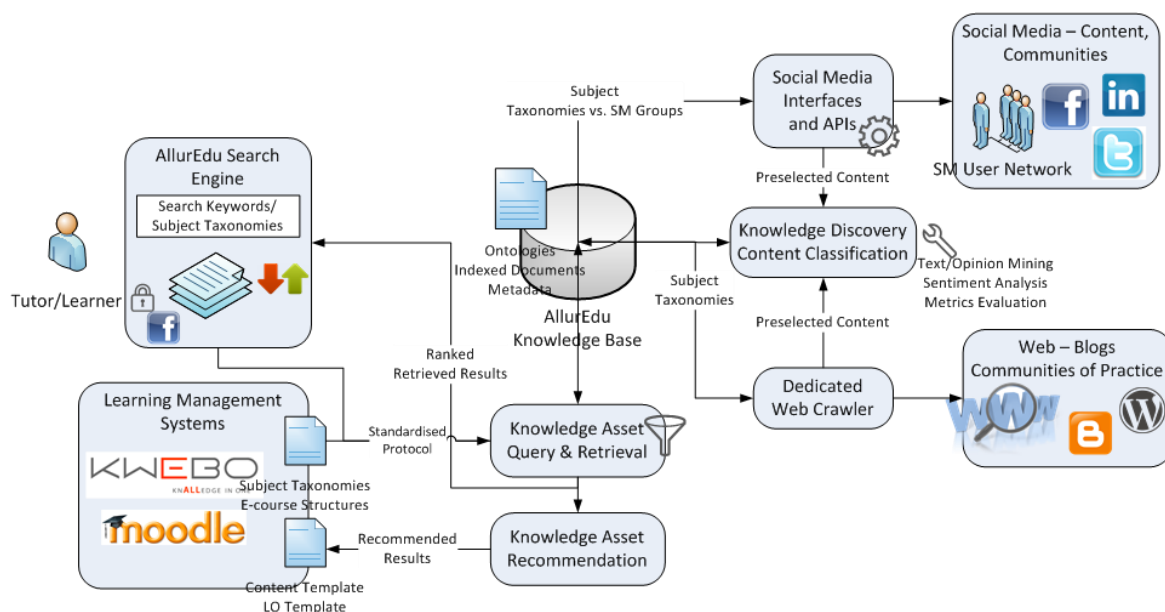


Figure 3: Conceptual Architecture of AllurEdu Tools/Services for Knowledge Discovery from Social Media and Recommendation

As can be perceived, two major sub-components compose AllurEdu: the Knowledge Asset Discovery from Social Media and the Knowledge Asset Recommendation to LMSs, which are presented in more detail in the subsequent sub-sections. A complete description of them will be provided within the deliverables of WP5.

AllurEdu's logic of operation is based on the fact that communities of practice and online communities in social media formulate knowledge communities that hold a big percentage of know-how in a specific subject field and contribute this know-how in informal discussions, shared content, experiences and opinions, such as surveys and reviews, success stories, best practices, etc. leading to higher knowledge retention compared to the achievable one within formal learning settings. This type of socially contributed content along with the very formation and dynamics of the community per se (composed of experts and peers in a specific field) are crucial assets when reviewed from an educational point of view. It is often the case that computer literate teachers draw significant resources and material for their courses and learning activities from such online communities and respective shared, community-contributed content, as well as actively participating to them.

Thus, the main purposes of AllurEdu and its associated services/tools are:

- to facilitate tutors in easily and fastly locating socially contributed material of educational value,
- to enable the dynamic updating and re-structuring of online e-courses with automatically found, filtered and ranked with respect to its educational relevance and value socially contributed material in social media.

AllurEdu is designed to accommodate two modes of operation, as shown in Figure 3:

- Standalone operation as a specialized Search Engine (with respective web-based frontend) for content search and ranking of educational value within Social Media
- Interoperable operation with an LMS, exchanging data (e-course structure/subject taxonomies, retrieved SM content, etc.) based on a predefined standardized protocol.

3.5.6.2 Knowledge Asset Discovery from Social Media

The Knowledge Asset Discovery from Social Media sub-component and associated services, shown in Figure 4, is primarily concerned with searching, finding, analysing, classifying and filtering socially contributed content of educational value from Social media. The found such content is appropriately indexed and stored within the AllurEdu knowledge base along with

its associated descriptive metadata, complying with formalized taxonomies/ontologies per educational subject area.

The above processes are achieved through the following sub-modules of the Knowledge Asset Discovery component of AllurEdu:

- The Social Media Interfaces and APIs that, using existing Social media interfaces libraries/code as well as necessary developed supplementary APIs, allow the seamless access to targeted Social media applications, mainly Facebook, Twitter and LinkedIn in iSIMPLY, and respective internal groups/communities as well as discussions/content streams
- The Dedicated Web Crawler module that crawls blogs and online communities of practice based on formalized pre-configurations of the types, categories, etc. of content to be located. Both this module as well as the previous one aims at preselecting content (based on certain 1st level coarse selection criteria) that is later on inputted to the Knowledge Discovery and Content Classification module for further advanced analysis
- The Knowledge Discovery and Content Classification module, which is concerned with the most crucial process, that of analyzing preselected content using a set of text mining, opinion mining, sentiment analysis, etc. algorithms to determine both the educational value of the content in question (based on derive specially defined metrics) but also the semantics of the content for proper classification and indexing within the Knowledge Base to later on assist the search process in producing high quality results.

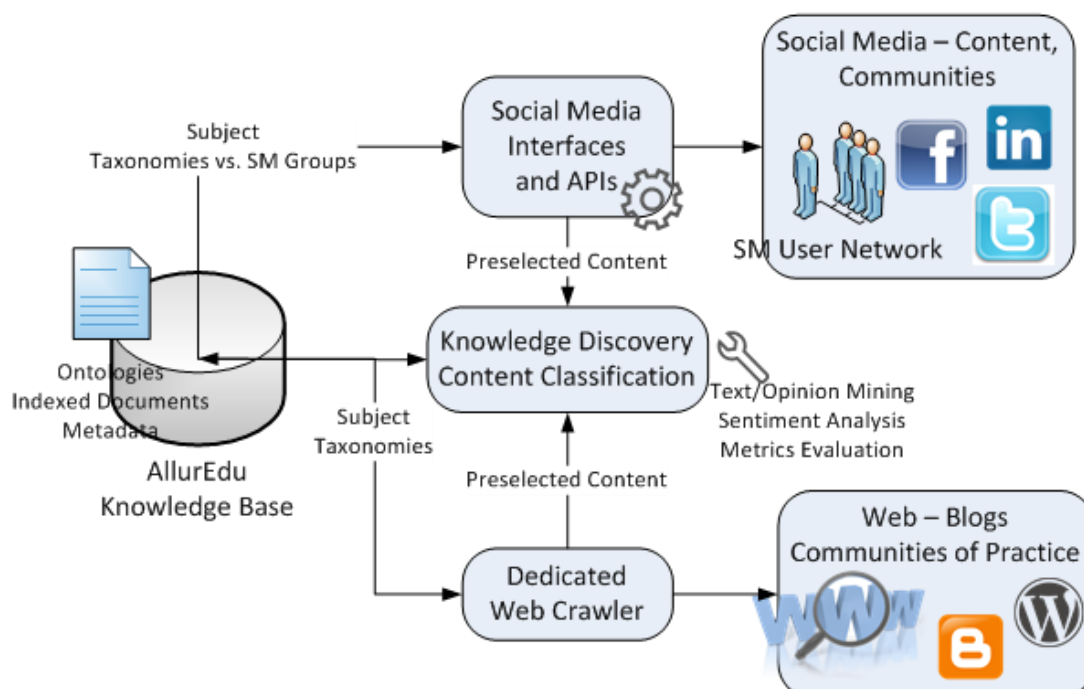


Figure 4: The Knowledge Asset Discovery from Social Media services and tools of AllurEdu

The AllurEdu Knowledge Base is the connecting module among the two major sub-components of AllurEdu. Within AllurEdu, apart from the results of the Knowledge Asset discovery process, i.e. retrieved and indexed content, indices and associated descriptive metadata, also the respective subject area taxonomies and ontologies are stored. It is noted that the crawling, analysis and knowledge discovery process is a never ending process, producing dynamic findings where available, all the time.

The access to Social Media is initially managed by creating an AllurEdu account to each one of the targeted Social Media for the AllurEdu application. Then for each social media application, a seed set of potential group participations is manually (or dynamically) constructed according to “registered” subject areas for which the respective taxonomy/ontology exists within the AllurEdu Knowledge Base. These seed values, along with the subject area taxonomy/ontology, will assist the content search and filtering process, but also the joining process to other (potentially) new groups and online communities in the same field of expertise.

By default AllurEdu has limited access to the social media through its own community manager (managed by the administrators). An administrator “follows” or “adds” some groups, pages or persons with high expertise in some areas of research. The information of those groups or persons is by default accessible to any registered user. When relevant information is found it is analyzed for any “external” link it may contains. These links are then passed to the crawler and the web pages are then scanned. The knowledge analyzer/extractor then extracts the relevant information, stores record in the history and presents to the user the relevant data. User then reviews and assesses the data and the source of that data. In next similar searches the most relevant data is shown first.

3.5.6.3 Knowledge Asset Recommendation to LMSs

The Knowledge Asset Recommendation to LMSs sub-component of AllurEdu is responsible for posing user/LMS queries to the AllurEdu Knowledge Base and quickly retrieving relevant results or allowing dynamic content recommendations to “registered” internal LMS e-courses and learning communities. The first mode of operation resembles that of a search engine, while the second mode of operation that of a recommendation engine, enabling at the same a seamless interface with well-known open source LMSs – two such LMSs will be deployed in the context of iSIMPLY, Moodle and Kwebo (which is based on OLAT). The high level conceptual architecture and modules of the Knowledge Asset Recommendation to LMSs sub-component of AllurEdu is shown in Figure 5.

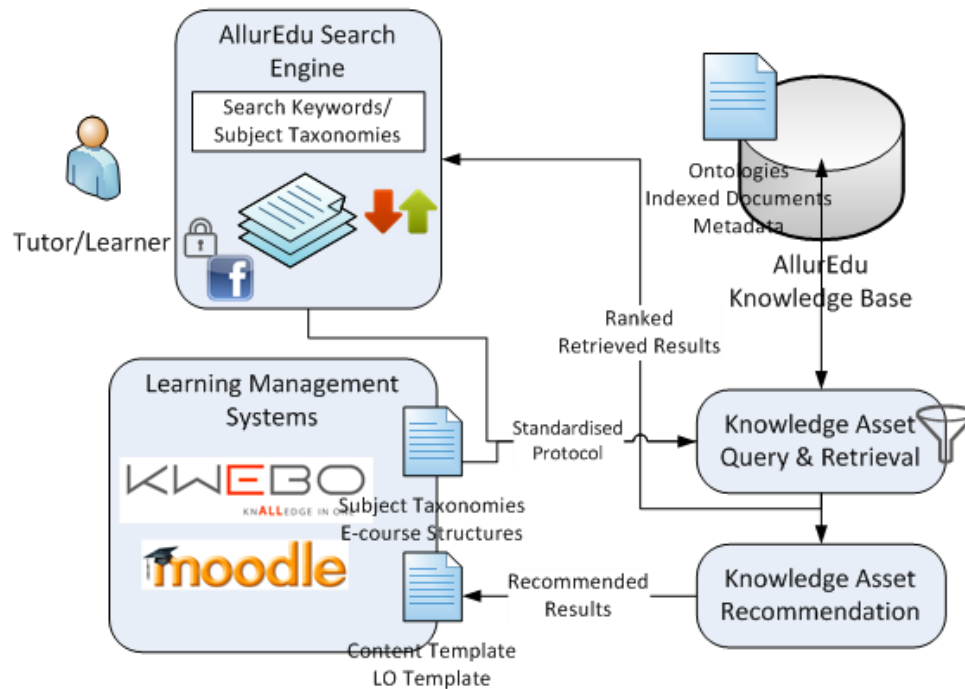


Figure 5: The Knowledge Asset Recommendation to LMSs (and Search Engine) services and tools of AllurEdu

This sub-component is composed of the following modules:

- The Knowledge Asset Query & Retrieval module, which is responsible for querying the AllurEdu Knowledge Base based on the query terms/search keywords, the defined/selected subject area taxonomy or the properly formulated (according to a standardized protocol) description of the query and its association with internal LMS e-courses/subject area taxonomies. It is also responsible for retrieving relevant and accurate results from the Knowledge Base based on metrics weighting and index terms of stored documents, and ranking the results with the most relevant (based on an educational value rank index) document/content first.
- The Knowledge Asset Recommendation receives the ranked results of the Knowledge Asset Query & Retrieval module and matches those with the internal e-courses and learning communities within the targeted LMSs, recommending them dynamically where a positive match is found and at the same time instantiating partially at the same time content and LO templates as the ones already described in the previous sub-sections. These recommended educational content and LO results are then left to the tutor or "power user" to moderate accordingly as well as complete (i.e. introduce the instructional design and learning activities part of the instantiated LO) deploying the respective LO/content authoring tools (either internal or external to LCMS).

To access the respective component, user or AllurEdu application credentials are checked for correct login. If this is the first time the user connects to AllurEdu he/she is requested to accept certain privacy terms requested by every social API (Facebook, Twitter, etc.) so that the application can "harvest" the information needed.

Apart from the direct interoperation with LMSs, AllurEdu may have a Search Engine frontend which operates in the same manner: users/application need to login with a social media account and the queries posed with the same structure and semantics as in the case of LMS initiated searches. Retrieved and ranked results may be moderated and through relevance feedback accepted or rejected to enhance the accuracy of the retrieval process in subsequent requests.

4 iSIMPLY e-Environment Instances

As described in the sections above, one of the most important and innovative aspects of the iSIMPLY project is the design and development of the AllurEdu tools and services for knowledge discovery and extraction from the wisdom generated relevant online communities in popular social networking sites. AllurEdu is platform agnostic in terms that it can be “attached” to any e-learning platform with the development of the necessary interfaces, as long as properly defined communication and data exchange protocol requirements are met. To demonstrate the “independence” of the tool to e-learning platforms, the iSIMPLY project will interface and adopt these services in two e-learning platforms that will be used in the pilots. More specifically, the AllurEdu tools and services will be interfaced with:

- **KWEBO** e-learning platform, an online, web-based integrated e-learning 2.0 environment developed by Athens Information Technology.
- **Moodle**, a well-known and widely used e-learning platform.

In the sections that follow, these two platforms interoperating with the AllurEdu tools/services are described as iSIMPLY e-Environment instances so as to demonstrate the way that their features address the iSIMPLY's e-Environment specifications.

4.1 KWEBO's e-Environment for iSIMPLY

KWEBO⁵ is an e-learning 2.0 platform developed and operated by Athens Information Technology. KWEBO's core is based on the open source OLAT⁶ project (e-learning system) and the platform's fundamental components have been improved and extended so as to create an integrated synchronous and asynchronous learning and collaboration environment with a more advanced and intuitive Graphical User Interface.

In the sections that follow, the existing services supported by KWEBO are described for meeting the specifications of the iSIMPLY e-Environment in terms of all fundamental components/services described in Section 3 apart from the AllurEdu tools/services that will be design, developed and fully documented in WP5.

⁵ KWEBO platform: <http://kwebo.aif.gr:8081/dmz/>

⁶ OLAT: <https://www.olat.org/>

4.1.1 KWEBO's Learning Management System

KWEBO's LMS enables the management and delivery of learning content and resources to the users of the platform. The LMS is web-based in order to facilitate "anytime, anywhere" access both to learning content and administration. More specifically, KWEBO's LMS core technology is the OLAT LMS and the services offered are described in the paragraphs that follow.

4.1.1.1 Course catalogues

The platform supports lists of courses that can be categorized and listed based on multiple fields (i.e. per organization offering the courses, per thematic area, per subject, etc.) so that the catalogue can display the given organizational structure. More specifically, after the creation of an online course the platform allows to course authors the assignment of this course either to one of the existing course lists or to a newly created course list.

4.1.1.2 Courses and Learning Content Provision

The platform provides online courses and learning material in a uniform, consistent and coherent manner through the Web. The courses can be both synchronous and asynchronous; while for the learning content rich media types are widely supported, as for example video, audio and podcasts.

4.1.1.3 Calendar with automatic notifications

The platform support three types of calendars for storing, viewing and accessing events; a course calendar, a group calendar and a user/personal calendar. The course calendar is available in any course. Furthermore, additional calendars of learning groups of each course can be seen. Entries of course calendars can be linked directly to course elements. The group calendar assists in managing all appointments within a group. Members of a group will see the group calendar on their home area. The personal calendar assists users in keeping track of personal entries. Other users are not able to get access to these private entries as long as they not explicitly marked as "public." Along with the private calendar, group or course calendars are seen in the personal calendar in an overlaying view. The calendars also allow the use of different colours for different calendar types so as to increase usability.

4.1.1.4 E-Courses Publication

As mentioned above, for the publication of courses and learning content, the platforms supports a wide range of content and media types along with the necessary tools for the presentation of this content, i.e. for video presentation or multimedia data in a wide range of formats.

4.1.1.5 Self-assessment

The platform supports the self-assessment of each learner's progress and record, through tools that monitor his/her performance and actions throughout the learning process. Such tools are tests and quizzes. In addition, the system allows the dynamic processing and management of learning communities' and learning groups' progress while it also supports the generation of reports that are sent to the tutor assigned to each course with multiple ways: general community/group progress, per course element progress, per individual group member, etc.

4.1.1.6 Automatic tracking of user actions and reports generation

The platform supports the necessary functionality for automatic monitoring/tracking and recording of user sessions from the initial access to the platform until the time they quit. More specifically, the platform monitors and stores information to the database related with user's actions, the courses and material s/he accessed, the interactions made, etc. The availability of this data, along with functionality for combining and extracting (through queries in database) data can provide useful information both to content authors, tutors and administrators.

4.1.2 KWEBO's Learning Content Management System

The Learning Content Management System of the platform is a multi-user environment where learning developers can create, store, reuse, manage, and deliver digital learning content from a central content/LO repository. KWEBO's LCMS core technology is the OLAT LCMS and offers the following functionality and services:

4.1.2.1 Course authoring

A course is a unique document type and can accompany lectures, seminars or tutorials and represent diverse didactic concepts such as group puzzles or problem-based learning. The course can contain any number of course elements. The platform through the Course Authoring service provides the necessary functionality for creating different types of courses, with rich media content through a friendly to use interface. More specifically, course authoring can be performed through the platform's course editor that allows for the integration of whatever content (nested frames, mathML, SVG) via iframe. Through this editor the course structure becomes easily configurable with a number of course elements (i.e. structure, tests and questionnaires, forums, file dialogues, etc.). For course authoring both local (via file upload or WebDAV, or the integrated WYSIWYG content editor) as well as external (image database, web application) content can be used.

4.1.2.2 Course wizard

The platform provides a wizard in order to facilitate users in creating courses. The wizard is meant for course authors who prefer to use only the most popular course elements of the platform without having to deal with the entire range of features available in the course editor.

4.1.2.3 SCORM and CP support

SCORM is short for "Sharable Content Object Reference Model" and is a reference model for exchangeable electronic learning content. KWEBO supports SCORM 1.2 as well as the IMS Content Package format to import content, the LTI standard for connecting tools to KWEBO and the QTI standard to import tests and quizzes. Both SCORM and CPs are suitable for being either used in KWEBO courses or outside of it. Given the fact that the platform supports these standards and their formats, learning content cannot only be used in KWEBO but in other LMS as well.

4.1.2.4 Course/Content import and export

As mentioned above, KWEBO adopts both SCORM (1.2) and CP standardized formats for importing SCORM or CP-compliant course material/packages. Similarly, the platform supports exporting of courses created within KWEBO in an OLAT defined sharable format.

4.1.3 KWEBO's User Management

The platform supports a number of tools and services for managing the users, their access and profile building. These services are the following:

4.1.3.1 Creation and Management of Users and Groups/Communities

The platform supports all the necessary functionality for creating, supporting and managing both individual users and user communities.

4.1.3.2 User Registration

Authorized persons may register either a single user manually or more users at once by means of Excel files import. The platform also supports the Shibboleth protocol for cases so that users do not have to be enrolled manually. Instead they will be registered automatically during their first login. Further integration possibilities such as LDAP are supported.

4.1.3.3 User Profiles

Upon registration, users dispose of different configuration options, a profile as well as the allocation to system roles. The profile contains obligatory information that need to be provided as well as optional data that users can enter for creating a complete profile.

4.1.3.4 Roles and Rights

The platform implements controlled access to services through the identification of the user's account and secure password encoding. The platform supports multiple roles for different categories of users and different access rights for each of these categories. More specifically, the platform supports seven basic roles. These roles along with the rights for each of them are the following:

- **Guest:** This is the guest system role with a limited set of rights which allows browsing the repository and launching content which is available to guests. All guest accounts are assigned this role.
- **User:** This is the regular user role. All registered and authenticated users within the platform are assigned this role. The role allows for the basic functionality such as personal briefcase, browsing the repository, creation of buddy groups and other.
- **Author:** This is the author system role. It includes all rights of the user system role but includes the author right which allows for example the creation of content and courses in the repository.
- **Administrator:** This is the administrator or superuser system role. Users with this role have the whole set of rights within the platform. In some workflows, users with this system role are treated differently from the rest of the users, giving them access to administrative functionality.
- **User-manager:** This role can manage user (create new users, edit user properties and delete users).
- **Group-manager:** This role can administer course-comprehensive groups, project groups and communities.
- **Institutional-resource-manager:** This role is related with author rights for all resources of certain institutions (e.g. has the same university like the author of the resource).

4.1.4 KWEBO's Virtual Communities Management

The platform supports two types of virtual communities; virtual learning communities and virtual project communities. The first type of community is strongly related to one or more courses of the platform while the second type is related to groups of people that have

joined for collaboration and problem or task solving. The two community types are described in detail below:

Virtual Learning Communities

These communities are part of courses and supervised. There are two different roles to play: that of the coach and that of the participant. Coaches of a learning community automatically dispose of administrative tools for that community in order to administer single members of their community or to configure the community's attributes. Furthermore, the platform also supports the Right Community type which is also part of courses and is managed by course authors. The main purpose of this community type is for a course author to selectively grant someone access to course tools without appointing course administrators.

Virtual Project Communities

All registered platform users can initialize, create and manage project communities. Project communities have no relation to a specific course and are managed by community authors. These communities are either suitable for persons studying on their own or for collaborative tasks during a project not supervised by a coach.

KWEBO supports a number of interconnecting tools and services for the management and operation of these community types (i.e. e-mails, calendar, shared folder, forums, chat, video conference, wikis, etc.). These tools are available for the community author that can select some or all of these tools that will be used in the community. At any point, the community administrator can modify (add or remove) the available tools as well as moderate the members of each community.

4.1.5 KWEBO's Web 2.0 and Online Collaboration Services

The platform supports popular and widely used Web 2.0 tools that allow for collaborative content creation and editing as well as synchronous and asynchronous online communication. These tools, which are described below, can be included in each course or virtual community created.

4.1.5.1 Blogs

Blogs aim to provide a type of micro-sites for the members of the KWEBO platform that are arranged in chronological order from the most recent 'post' (or entry) at the top of the main page to the older entries towards the bottom.

4.1.5.2 Wikis

Wikis aim to allow members to create and edit content of the site from their own computer. More specifically, wikis aim to provide members with the ability to write down quick ideas or longer ones, instantly collaborate and keep the groups in sync.

4.1.5.3 Bookmarks/RSS Feeds

Personal bookmarks can be created for learning resources. A bookmark list on the user's Home grants easy access to courses, etc. Bookmarks can be deleted or added at any time. These bookmarks can be used externally by means of a RSS news feed.

4.1.5.4 Instant Messaging

Instant messaging allows the text-based real-time communication among the users of the platform. When a user connects to KWEBO and through the Chat service, she/he can view the members that are available online along with their chatting status (i.e. Available, I would like to chat, Absent, Absent for longer, Please do not disturb). Also, if the chat element has been included in the virtual communities that the user is a member then upon connection the communities are synchronized with the chat service. Thus, members of a virtual community will immediately see if other members of the same community are logged in. For supporting the chat service a connection to a real-time collaboration server is required. In this direction, KWEBO adopts and extends the Openfire⁷ server. Openfire uses the widely adopted open protocol for instant messaging, XMPP. For integration with KWEBO, KWEBO's database is extended so as to include Openfire's database table. Upon creation/modification/deletion of a KWEBO user, Openfire's database is dynamically updated in order to maintain synchronization and single-sign one services for the chat service.

4.1.5.5 Video conferencing and Virtual Class

The platform integrates and supports a video conferencing and virtual class service for allowing platform members to communicate and collaborate online as well as arrange and run synchronous virtual class sessions. The video conferencing service can support from 2 up to 12 concurrent users, based on each group's needs. Furthermore, each video conferencing/virtual class room comes with a number of tools and services that can be enabled or disabled by the virtual conference moderator. These tools are the following:

- Live video streaming: the virtual conference can support from 2 up to 12 concurrent users with their video stream (from a camera).

⁷ Openfire Server, <http://www.igniterealtime.org/projects/openfire/index.jsp>

- Hand raising/floor managing: In order to handle cases where the number of participants is high, the platform supports gestures like the hand raising in order a participant to express his/her intention to speak and if this is accepted by the moderator, the participant is assigned with the meeting floor.
- Chatting: Text-chat allows the text-based real-time communication among the participants of a virtual conference.
- Application sharing: this tool enables the participants of a virtual conference to access a shared application or document from their respective computers simultaneously in real time.
- Whiteboard (pen and marker tools, etc.): The whiteboard supports slide projection, line, circle and ellipsis drawing in a wide range of colours and text input in many sizes and colours. It also offers undo last action capability as well the erasure of all previous actions on the whiteboard.
- Video recording: The service provides the ability to the moderator of the video conference/virtual class session to record the session. The recording is stored in KWEBO's file system and can be later used as learning content.

For supporting the Virtual Conferencing service both for virtual meetings and virtual classes KWEBO adopts and interoperates with the Big Blue Button⁸ open-source application that provides high quality support for all afore-mentioned features.

4.1.6 KWEBO's Additional Services

The platform supports a number of Web 2.0 components that facilitate collaboration, sharing and learning. These components and the associated tools and services are the following:

4.1.6.1 E-mail

Users can send private e-mails to each other in order to exchange information.

4.1.6.2 Forum

Forums provide a digital space where members of the KWEBO platform can get and discuss issues related, among other, to courses, projects, assignments and tasks.

4.1.6.3 Internal Messaging

The platform supports this functionality in order to allow members to communicate within the platform, without the need of an external application. More specifically, this tool creates a

⁸ Big Blue Button: <http://www.bigbluebutton.org/>

KWEBO messaging system with functionality similar to that of the e-mail (i.e. Inbox, Sent Messages, etc.).

4.1.6.4 Podcasts/Vidcasts

A podcast/vidcast is a series of digital media files (either audio or video) that are released episodically and are mainly downloaded through web syndication. A list of all the audio or video files currently associated with a given series is maintained centrally on the KWEBO server as a web feed, and the platform employs a podcaster that can access this web feed, check it for updates, and download any new files in the series. In KWEBO this process is automated so that new files are downloaded automatically. Files are stored locally on the user's computer or other device ready for offline use, giving simple and convenient access to episodic content.

4.1.6.5 Content sharing

The platform supports tools that facilitate content sharing among the KWEBO users.

- Group/Community folders: The group/community folder serves to upload files to the community's area. This facilitates the exchange of information and data among the community member while it also provides a central point where useful community documents are stored. The community folder is also accessible as network drive via WebDAV (Web-based Distributed Authoring and Versioning).
- Group/Community calendar: As mentioned above, the group calendar assists in managing all appointments within a group. Members of a group will see the group calendar on their home area.

4.1.6.6 ePortfolio

An ePortfolio is used to document learning results as well as learning processes and is therefore meant to assist in reflecting on someone's process of development. The menu entry ePortfolio serves to create accumulative folders of portfolios before making those accessible to certain people (KWEBO users as well as guests). In order to create a portfolio folder or perform a portfolio task the user needs to create or assemble artefacts first. Artefacts are documents of users' learning process as well as their work performed. Artefacts can be e.g. texts, files, posts in a forum or blog, or evidences of achievement.

4.1.6.7 Notifications

Each folder, each wiki and each forum offers a notification service. Users subscribed to such services will get the news on their Home. This information can also be read externally by

means of a personalized RSS feed. In addition, users get an e-mail every night if there are any modifications made on the subscribed entries.

4.1.6.8 Personal Folder

The personal folder serves to upload files to the user's private area. This can come in handy if users want to access files from home or a computer room. The personal folder is also accessible as network drive via WebDAV. The public folder on the other hand serves to store files that should be accessed by other KWEBO users.

4.1.6.9 Notes

If there are course notes users will see the corresponding list of personal notes on their Home. These notes can be modified or deleted at any time.

4.1.6.10 Evidence of Achievements

Any evidence of achievements is seen on the Home site, if this option is activated in the respective course. Thus, students can easily get an overview of their achievements in different courses.

4.1.6.11 Digital repository

The platform provides a digital repository in order to provide the ability to course authors to share learning resources with other authors.

4.1.7 Tailoring KWEBO for iSIMPLY

As presented in the above sections, KWEBO currently supports the majority of the features of iSIMPLY e-Environment (apart from the innovative AllurEdu tool/services). Though, there are certain customizations necessary for fully addressing the e-environment's needs and the interoperability with AllurEdu:

- **Course Creation based on the Learning Object Template / LO Authoring tool:** either KWEBO's course creation service will need to be customized so as to include and support the specifications of iSIMPLY's learning object template and create LOs accordingly or a respective LO authoring tool service will need to be provided for, outputting the resulting LO in a SCORM 1.2 package to be seamlessly and effectively imported within KWEBO's respective e-courses.
- **Content Creation based on the Content Authoring Template:** KWEBO's content creation/import service will either need to be customized so as to include and support the specifications of the iSIMPLY's content authoring template, that is extending the current mechanism by allowing the insertion of the additional

metadata descriptions, or an external content authoring tool/service will need to be incorporated as a component within the external LO authoring tool to accommodate the necessary insertion/editing capabilities of the iSimply educational content description requirements.

- **Well defined Interfaces to/from the AllurEdu tool/services** so as to achieve seamless data exchange with the latter utilizing a properly defined communication and data exchange protocol.

4.2 Moodle's e-Environment for iSIMPLY

Moodle's e-Environment for iSimply presents available courses in a catalogue form organized by individual course categories. LMS Administrators can define access permissions for each course making a specific number of courses accessible to guest users (without login).

Tracking of user activity is provided by a sophisticated reporting mechanism, capable of handling multiple platform metrics.

Currently it supports:

- Logs of course or site activity
- Activity Reports (a report showing the number of views for each course activity and resource)
- Participation Reports (for a particular activity)
- Visual Statistics (visual representation of user activity during various time frames in the form of line graphs)

Moodle features calendars as a means of informing users of important educational events taking place in the platform such as assignment or quiz deadlines. Calendars can be embedded in each individual course, tracking course-related events or in the frontpage, tracking global-wide platform events.

Necessary options for various administration tasks are exposed via blocks. Blocks are items which may be added to the left or right or centre column of any page in Moodle. They may also be added to the centre of the My Home (My Moodle) page.

4.2.1 Moodle's Learning Management System Services

Moodle (acronym for Modular Object-Oriented Dynamic Learning Environment) is a free source e-learning software platform, also known as a Learning Management System, or Virtual Learning Environment (VLE). As of October 2012 it had a user base of 70,793 registered and verified sites, serving 63,204,814 users in 6.7+ million courses with 1.2+ million teachers.

Moodle has several features considered typical of an e-learning platform, plus some original innovations (like its filtering system) Moodle is very similar to a learning management system. Moodle can be used in many types of environments such as in education, training and development, and business settings. Some typical features of Moodle are:

- Assignment submission
- Discussion forum
- Files download
- Grading
- Moodle instant messages
- Online calendar
- Online news and announcement (College and course level)
- Online quiz
- Wiki

4.2.2 Moodle’s Learning Content Management System Services

4.2.2.1 Course Authoring

Moodle provides a specialized block for course authoring. Via this block users can manage courses or assign courses to a course hierarchy they created. More specifically users can perform the following actions:

- create or edit a new course category (or subcategory), by specifying a descriptive category (or subcategory) name. They may also specify additional information such as a course id and a course description.
- create/edit/delete a course. A specialized form exists for that purpose. In that form you can specify:
 - the Course Category
 - the Course Name
 - a Short Descriptive Name for that Course
 - the Course Summary
 - the Course Format (Weekly, Topic, Social, SCORM)
 - the starting date this course will be available from
 - guest access (you may restrict access by specifying a password. Only guests who know the password may access the course)
 - course language (restrict course to a specific language)
 - course grouping level
- enrol users: you may specify individual users or cohorts (system-wide groups of users)

- toggle course visibility
- take a course backup (you may specify which portions of the course will be exported) and restore the course content by importing the backup
- position the course in the course hierarchy (move up or down)

4.2.2.2 Course Wizard

Moodle provides clear navigation controls which guide you (just like a wizard) in creating course content. Via these screens, authors can create or structure the content of the courses by:

- Importing a SCORM compliant package
- Importing contents from a folder, located locally or in the cloud (for instance from a specialized Dropbox account)
- Referencing a Web URL which contains supplementary course content
- Creating a book (pages of course content)
- Adding a questionnaire
- Adding a wiki
- Adding a database
- Adding an assignment (relevant users will be notified)
- Adding a poll
- Adding a quiz
- Adding a vocabulary
- Adding a forum

In addition to adding course content, authorized users are presented (for each content type added) with multiple options for controlling access to course material based on user group or other criteria.

4.2.2.3 Course Content Import and Export

Moodle provides a wizard with various steps of configuration options for importing/exporting a previously exported backup/course. In each step you may choose what portions of the course data will be processed:

- enrolled users
- user assignments (projects, tasks etc.)
- course activities (quizzes, questionnaires, vocabularies, forums etc.)
- user completion details
- course logs
- grade history

4.2.2.4 Digital Repositories

Moodle provides to instructors the ability to share learning resources via external repositories (such as Dropbox). This task is accomplished by installing the necessary connectivity modules. Once this is done instructors are given the option to link (embed) external files in Course material.

4.2.3 Moodle's User Management Services

4.2.3.1 Creation and Management of Users and Groups

Moodle supports all the necessary functionality for creating, supporting and managing both individual users and user communities.

More specifically Moodle supports actions for the following user activities:

- creation of user accounts and assignment of system roles to users
- creation of user groups and groupings (users have the option to import groups from CSV files)
- assignment of users to courses (you have the option to specify enrolment dates)
- assignment of users to groups
- assignment of groups of users to groupings
- assignment of users to cohorts (system-wide groups not belonging to a particular course)
- generation of user reports depicting user behaviour in the system (login time and dates, course interaction & teaching material accessed, grades received etc.).

4.2.3.2 User Registration

Moodle provides authorized users the ability to register either a single user manually or more users at once (bulk user registration) by means of Excel (or CSV) files import.

In the case of manual user registration, authorized users will be presented to a graphical front-end with configuration options and input fields for specifying the profile fields including first-name, last-name, email, town, city, phone, profile picture etc.

In the case of bulk user registration, authorized users will be presented to a graphical front-end with import options for opting which portion of the input file will be mapped to corresponding profile fields.

Moodle also provides the option for user profile bulk image import. With this option you can upload a large number of user images at once.

4.2.3.3 User Profiles

Moodle provides various fields and status flags for user profiles including:

- Profile Fields
 - username
 - password
 - First-name
 - Last-name
 - Email
 - City
 - Country
 - Timezone
 - Language
 - Description
 - Photo and Photo Description
 - Interests
 - Web Page
 - Skype
 - ICQ
 - Academic Department
 - Phone
 - Mobile Phone
 - Address
- Status Flags
 - Suspended account (denotes if the account has been suspended)
 - Force user password change
 - User authentication method

4.2.3.4 Roles and Rights

Moodle implements controlled access to services and course material based on user's role. Currently the following roles are supported:

- Administrator: The most powerful role which is usually assigned to users belonging to the technical department (IT).
- Teacher: Teachers are allowed to create and delete courses, add and remove users, modify user roles, add and modify content, and assign grades to student work
- Non-editing teacher: The **non-editing teacher** is a stripped down variation of the instructor role meant for teaching assistants and graders. Non-editing teachers view course materials and grade student work, but they cannot use any of the other course administration tools or add or modify content.

- Student: The **student** role is automatically assigned to all students enrolled in the course. Students are allowed to view content, participate in activities, and view their own grades.
- Guest: Guests are designed for when you want to allow someone from outside your class to view your course. Guests are allowed to view content and they should not be able to see any student-related information, including the class roster.

Authorized users have the ability to control the visibility of course material to specific groups of users or groupings (groups of users). This is appropriate when for example you have users of multiple levels and want to segregate the visibility of course material based on each user level.

4.2.4 Moodle's Web 2.0 and Online Collaboration Services

4.2.4.1 Blogs

Blogs in Moodle are enabled by default. They may be disabled by a site administrator by setting the blog visibility to 'Disable blog system completely' or users may limit visibility to only the authors (view own blog) or if no options apply open visibility to all users.

Blog comments are enabled by default, though may be disabled if required.

Users may optionally import content from external blogs. Moodle will regularly check these blog feeds and copy the new entries to the local blog of that user.

4.2.4.2 Wikis

In order for learners in Moodle to use a wiki for collaboration, the instructor has to add a wiki activity in the course. Once the wiki is set up, users can click the appropriate link and start adding new pages.

In the new page screen users can specify the page content (usually in HTML) and tags, words describing the wiki page. Once this is done other users can either add more content or start commenting the content that was previously added.

Moodle facilitates the whole process by providing a history log, which is a special page logging user activity in the current wiki (which user added what and when).

4.2.4.3 RSS Feeds

RSS Feeds are usually supported within Moodle in two ways.

- Users can add a block inside a course syndicating content from an external e-learning resource. Learners visiting the course can read the RSS feed (usually headlines of e-learning news) and keep up-to-date about the latest developments.

- Moodle provides RSS feeds for various events within the system such as latest forum posts, vocabulary & glossary entries etc. Learners can subscribe to those feeds and access this information with an external program without logging into the platform.

4.2.4.4 Instant Messaging

Moodle provides individual users the ability to specify for each event type how they wish to be notified (via popup or email) when they are logged in or not. Relevant options are under Profile Settings block. Currently the following event types are supported:

- Assignment Notifications
- Course Creation Request approval notification
- Course Creation Reject approval notification
- Essay granted notification
- Personal Messages between users
- Feedback notifications

If a user wants to send an instant message into another user it does so by visiting the requested user profile and clicking the appropriate link. Usually text only messages are supported but third-party plug-ins can also be installed which enhance Moodle's messaging system with additional formats and capabilities (for instance you may send an HTML message with attachments only to a specific group of users).

4.2.4.5 Synchronous Learning

Moodle supports synchronous learning via a special plugin which is installed by the LMS administrator and connects Moodle with the BigBlueButton web conferencing system. Instructors & Learners join the conference session by clicking a special button link usually embedded in the course area alongside with other course material.

BigBlueButton is a free, open source web conferencing system that allows remote presentation with slides, audio, video, chat and desktop-sharing.

It currently supports 3 different user roles:

- Viewer: are users who have no authority within the conference; their primary role is to view the presentation as well as chat amongst other participants. In a course the viewer would be the students.
- Presenter: has the same capabilities with the viewer/participant, with the added features of uploading presentations and sharing their desktop.
- Moderator: has all the capabilities as a participant, with the added features of uploading presentations and sharing their desktop.

4.2.5 Tailoring Moodle for iSIMPLY

As presented in the above sections, Moodle currently supports the majority of the features of iSIMPLY e-Environment (apart from the innovative AllurEdu tool/services). Though, there are certain customizations necessary for fully addressing the e-environment's needs and the interoperability with AllurEdu:

- **Course Creation based on the Learning Object Template / LO Authoring tool:** either Moodle's course creation service will need to be customized so as to include and support the specifications of iSIMPLY's learning object template and create LOs accordingly or a respective LO authoring tool service will need to be provided for, outputting the resulting LO in a SCORM 1.2 package to be seamlessly and effectively imported within Moodle's respective e-courses.
- **Content Creation based on the Content Authoring Template:** Moodle's content creation/import service will either need to be customized so as to include and support the specifications of the iSIMPLY's content authoring template, that is extending the current mechanism by allowing the insertion of the additional metadata descriptions, or an external content authoring tool/service will need to be incorporated as a component within the external LO authoring tool to accommodate the necessary insertion/editing capabilities of iSIMPLY's educational content description requirements.
- **Well defined Interfaces to/from the AllurEdu tool/services** so as to achieve seamless data exchange with the latter utilizing a properly defined communication and data exchange protocol.

5 Summary

This document described the services of the iSIMPLY e-environment in order to support and facilitate the exchange of both formal and informal knowledge through a variety and combination of tools.

More specifically, this deliverable presented an overview of the iSIMPLY e-Environment in terms of its core components for supporting the online learning process, the individual services for each of the e-environment's components as well as the tailored e-Environment solutions that will be adopted and supported by iSIMPLY.