



## ToRs for the learning management system and related IT solutions

A **virtual learning environment (VLE)** is an education system based on the Web that models conventional real-world education by integrating a set of equivalent virtual concepts for tests, homework, classes, classrooms and other external academic resources. It normally uses **Web 2.0 tools** for 2-way interaction, and includes a content management system. VLE are the basic component of contemporary distance learning, but can also be integrated with a physical learning environment; this is sometimes referred to as **Blended Learning**.

The collaboration platform should address different target groups (students, professors, researchers, administration staff, project members, guests) and allow course development and management as well as collaboration features for both, students and professors.

Additionally the internet generation of learners will need a widespread adoption of new techniques and tools, such as instant messaging, mobile devices, collaborative software, blogs, use of digital libraries and digital content repositories, gaming, and more interaction.

From the technical point of view, an open, modular and scaling system architecture that's allows small, medium and enterprise settings is needed.

### **Functions:**

The collaboration platform needs to provide a basic set of functions that allows to be flexible to integrate different tools, able to address alternative pedagogic approaches adopted by teaching staff and provide the following functions:

- **Access management:** This function should control password-based access, identification of groups of users and their rights, and a list of courses and registration policies. These functions are accomplished with a high degree of customization by connecting the system with a "single-sign on" using a variety of techniques that allow for a smoother integration with legacy systems, for example Yale Central Authentication Service (CAS) or LDAP providers.
- **Content assignment and management:** This function should display course catalogs, targeted to specific audiences, allow for registration, and allow for synchronous and asynchronous content distribution, assessment creation and delivery, syllabus creation. Most of these services should get their information from external providers, such as technical services for students and courses.
- **Communication and collaboration:** This function deals with establishing, and maintaining communication and collaboration between learners and instructors. Several options exist for online, offline, synchronous, asynchronous, one to one or broadcast communication. Tools for messaging, Forums, WiKi and other collaborative content development should be provided. The choice of a specific technique and tool should maximize people engagement, and allow the expected impact to take place.
- **Content development:** This function allows content development and should help instructors with templates, import/export facilities and easy editing. Compliance with industry standards (Common cartridge, "Sharable Content Object Reference Model" (SCORM), IEEE LTSC, IMS and OKI "Open Knowledge Initiative ") helps with course creation, import and export of courses,



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and integration with other materials (for example book materials). An important issue of content deals with content copyright and licensing: the new Creative Commons licensing scheme should play a major role here.

- **Integration:** This function allows the integration of additional or external tools, like Web services, e-Portfolios and portal channels.

#### **Tools:**

Based on the feedback of partners we identify the following tools and services that we would like (and in some cases require) our system to have. These tools are the most important tools and services we selected in the first phase and that would guide the selection of the collaboration platform. Either these tools would be present or it should be possible to include them without major modifications to the system and to the code base.

The tools and services are:

- **Course management:** supports creation and management of courses, modules and other units of learning;
- **Assessment:** supports the creation, delivery and scoring of assessments;
- **Grading:** supports grading of units of work and evaluation;
- **E-Portfolio:** supports recording information about the learners, such as achievements, work, and artifacts;
- **Resource:** allows the creation of lists or pools of resources in various digital formats;
- **Alert:** allows for the dissemination of news, alerts and announcements;
- **Archiving:** allows for the long term archival of courses (exporting and importing functions);
- **Authentication:** verifies the identity of a given user, can be provided by an external source (CAS or LDAP provider);
- **Authorization:** establishes a realm for deciding which user which actions;
- **Roles:** supports the definition of roles such as security realms and organizational roles;
- **Scheduling, calendars:** allows for personal calendar management;
- **Chat:** supports multi-user chat rooms;
- **Membership:** provides for membership of users in groups, or courses;
- **Messaging:** provides for broadcast or one to one messaging services;
- **Profile:** provides for online basic information about users;
- **Search:** supports the search of any kind of information within the system;

#### **Additional criteria:**

By looking for the features underlying the tools and services described above, the most important issue we have identified so far has been open standards compliance (not proprietary standards compliance). However, additional criteria are also important in higher-education context:

- The open source initiative; Institutions have specific requirements and need the ability to adopt parts of the system; Innovation, sharing, research, collaboration are intrinsic higher education values, and these do not fit the commercial software offer.
- The level of open standards compliance; ability to import and export data;
- The level to which the system adapts to the university culture and values;
- The platform has to be both scalable and extensible, in order to cope with future requirements emerging from its use during and after the project.



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- The Platform must allow to host MOOCs

### **Structure of Modules for blended learning**

Course designers must consider carefully the structure in designing e-learning and online learning courses.

Important features in an online course:

- course information including syllabi, schedules, outlines
- grading procedures, information about assignments and instructions for completing them
- course announcements and reminders from the instructor

These features provide structure and help to keep learners “focused and on-task”

Best practices for course design included providing clear guidelines and expectations for students.

The courses have to include lecture materials with the multimedia links, additional graphics and animations, as well as video lectures.

Integrated self-assessments provided students with immediate feedback. It must be helpful for reviewing the content and stimulating higher order thinking. The immediate feedback have to result in higher scores in the final assessments.

Flexible modular structure of the new content will consent to introduce interim mastering eAssessments for quality control of skills and knowledge which in turn enhance the modelling of the individual optimized learning pathway.

### **eScience modules for doctoral students**

eScience approach for the doctoral students will be supported with the special module and methodological guidelines. It will contain different resources for structured doctoral programs:

- guidelines for the organization of the learning process;
- links to the resources in the field of sustainable management,
- search and referral system for conferences and other events and resources;
- portfolio system for postgraduate students.

## **eLearning Modules in SUNRAISER**

The eLearning modules must have following structure.

1. Main site with the general information about the course and some kind of instructions how to use these resources- The objectives of the course, goals, competences must be pointed also out. To place the information on the main site you can use the tool “Course page”
2. Syllabus of the course with the calendar –week plan and links to the materials placed in the site. It must be clear for the students what part of the course is available online and in what form (Presentation, video lecture, practice, etc.) it is done. They have to understand how much time is necessary for learning the material with the available resources. Tools: Lesson
3. Structured lectures, based on the textbooks and additional materials. Tools: Lessons
4. Practical part – examples of the task solutions. Tools: Lesson or links to the other webpages.
5. Tasks for the practical works Tools: Assignment.



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6. Tests for self-control Tools: Quiz
7. Additional materials, such as video lectures (your own or something from WEB that can be used for your course Tools: Lesson
8. Additional materials: presentations, better with some comments, so that the students can understand them better. Tools: Lesson
9. The tool Lesson allows to create pages, subpages and link them. You can also include links to the assignments, questions, tests in this tool. So, the students have the structure of the course and know in what sequences they have to work.
10. Tools Feedback and Reports must be included to have a feedback. You can see the number of visits, what parts of the course are viewed, etc.
11. The glossary activity module allows participants to create and maintain a list of definitions, like a dictionary.
12. Workshop activity. Students submit their own work and then receive a number of submissions from other students which they must assess according to the teacher's specifications. (They may also assess their own work if the teacher requests this.) Text may be typed directly into Moodle's editor, or files of any type may be uploaded, as long as others have the software to view them. See Using Workshop for details of the phases involved. The teacher can decide whether to show or hide the identities of the students to each other when assessing is taking place.