A VISION FOR DISTRIBUTED MODULAR PLATFORMS

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Vision

Human capital can be defined as abilities, knowledge, and skills embodied in people, and acquired through education, training and experience. Recent empirical studies by the OECD and the European Commission have shown that investing in human capital is a successful strategy for individuals in terms of employment and earnings and for the countries concerned in terms of aggregate productivity. We are already witnessing an acceleration of the rate at which knowledge is becoming outdated. People can no longer be sure of using the same methods and the same tools during their entire life. "Life long learning" or "life long experience" are fashionable terms that already describe our present but all the more our future. [1] [2] [3]

In our vision we want to create a fundament for developing modular platforms. These should support learning from Elementary School, through vocational training or university education until Life Long Learning (LLL), spanning and offering services over the corresponding European Institutions. Thus this becomes a (necessary) basis for realizing the Bologna Process [1].

In the sequel we will briefly introduce the concept of distributed modular platforms, and we will present some experiences at our university as well as the collaborative model for developing such platforms.

Modular Platforms

In most European universities a highly diversified number of platforms has been established, and is in use, both for teaching and research. While for a long time pioneering was necessary they were highly tailored to needs and occasions. Little exchange of ideas, concepts could even be observed within university departments, even less so between departments, let alone cooperation regarding the creation of service functions, or of making them available across platforms between universities.

Meanwhile it is widely accepted that not only would the costs of platform development, or of service extensions/ maintenance, compare badly to cooperative tool design for the purpose but new trends in e-learning and teaching (as have been arising throughout Europe) would straightforwardly suggest a both cooperative and integrated development of platform services for common use throughout the EU. The integration refers to different service levels, from teaching and learning contents down to middleware, distributed operating system and communication hardware. (Last but not least this trend is highly stimulated by European funding programs.)

In order to provide for content sharing and service support for cooperative and development and use of platform services, as much as for developing such services under reasonable costs we have to envision a cooperative effort between universities across Europe that combines skills from the educational realm down to the platform development and maintenance.

From his viewpoint it is obvious that standardization is a compulsory part of the cooperation, in particular for interface design, for managing metadata and content (e.g. LOM [4], SCORM [5], IMS Learning Design [6], EML [6] [7], OKI [8], etc.).

Moreover, novel educational concepts or perspectives in e-learning or teaching require novel service structures like on-line support of cooperative virtual classroom work across universities. (This will be further addressed in another contribution to this conference.) An *efficient and customized support* for such applications could be realized by ***integrative development of service functions and modules***.

In order to lay the ground for the coordinated installation of both novel e-teaching/ learning concepts and their realization through appropriate distributed platform services will have to take into account the given situation in the participating universities regarding e.g. the

- integration of user data bases (i.e. HIS systems an German universities)
- development and storing/ archiving of sharable content
- local system support for ECTS (European Credit Transfer and Accumulation System; see e.g. http://www.hrk.de/138.htm) [1]
- connection to distributed publication servers
- establishing and handling different cost-efficient knowledge and information structures [9]

Also the information technological as well as institutional policies of the involved universities have to be integrated.

We will elaborate how these constraints can be satisfied in a modular platform approach. At any rate modular platform basis systems would be designed and developed in a cooperation between partners involved thus creating the fundament for the specific interfaces to the local e-learning modules.

In this way a large community (of developers and potential users) is created that will serve as a meaningful critical mass for utilizing the final product, not only for the institutions involved but also for further locations. A schematic summary of our view is given in fig. 1.
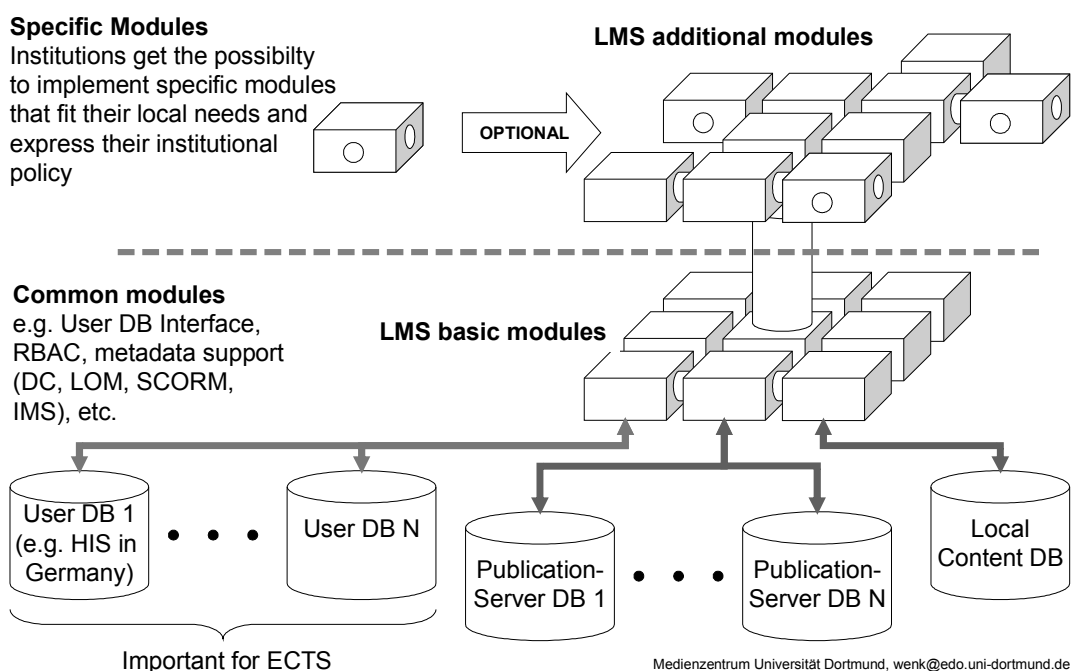
Sketch of the Modular Platform

Specific Modules
Institutions get the possibilty to implement specific modules that fit their local needs and express their institutional policy

LMS additional modules

OPTIONAL

Common modules
e.g. User DB Interface, RBAC, metadata support (DC, LOM, SCORM, IMS), etc.

LMS basic modules

User DB 1 (e.g. HIS in Germany) · · · User DB N

Publication-Server DB 1 · · · Publication-Server DB N

Local Content DB

Important for ECTS

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Fig. 1

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Experiences

The media center at the University of Dortmund has developed the *EWS (Electronic Work Space)* learning platform. Through its simple basic structure it has soon come into wide use, at our university as well as in a large number of schools in the region. At our university EWS is used by more than 8000 persons (faculty, students, staff).

The experience in developing, running, and maintaining services in EWS has been extremely helpful,

- for the ongoing development of new modules

- for the training users and getting them involved

- for envisioning novel services and new forms of cooperation among users.

During the past years quite an amount of class modules and content from e-learning projects was developed, for export over the Internet. We have been creating a procedural and a process model for solving this content management problem. However, frequently the content has been deposited in a format which does not really lend itself easily (to say the least) to exchange between institutions, or to metadata indexing. In our approach the content is automatically transformed into a standardized exchange format, and labeled with metadata. In this way we allow for efficient module migration at minimal costs, for easy, elaborative, and explorative reuse of content (with the enhancements to be beneficial for the while distributed community thus providing for novel forms of collaboration.

Collaboration

Developing a distributed platform for collaborative use should be designed as a cooperative effort. So the first thing is to select partners fort he purpose of designing, developing, and implementing basic modules of the platform (Learning Management System (LMS)), and of testing it a the locations involved.

The process is comparably fast, due to both combining resources from a common LMS, and to synergetic effects. It is summarized in Fig. 2.

Except for contributing their skills and experience, the partners also make use of previously developed software components (as far as they can be integrated into the new platform). Last, they propagate the extended and extensive use of the novel services at the location.
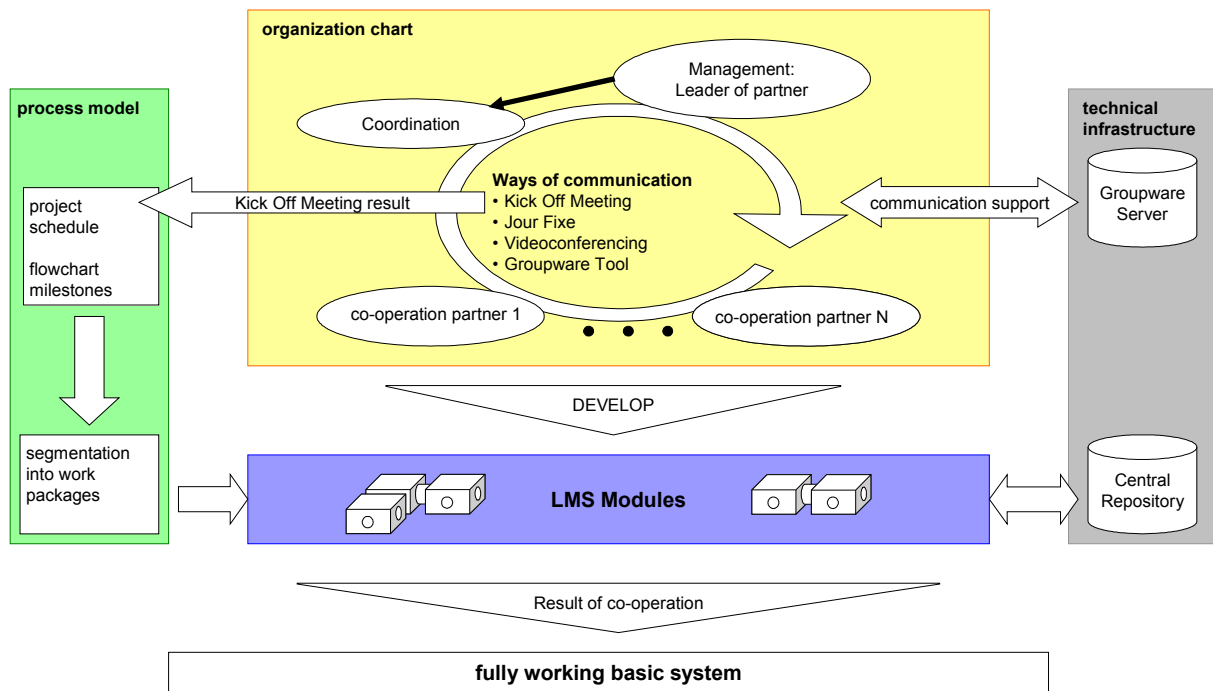
Fig. 2

The LMS organizational model is a flat hierarchy, containing a *coordination agency* and a *board constituted by representatives of the project partners*. In a kick-off meeting the project structure an d mile stones are defined. This process model will be segmented into work packages to be assigned to project partners. Then the developers meet on a regular basis. (These may indeed be organized as video conferences thus minimizing costs and organizational overhead.)

The project status will be monitored by the coordination agency. The communication structure is supported through servers running collaborative tools. Not only can documents be exchanged in this way: they could even be collaboratively created or edited.

The mile stones of each project partner include development stages of LMS software modules. These will be stored in a central, or even distributed, repository such their status is available to all participants, and all users (developers in earlier stages) can test the interoperational quality of the modules.

The LMS software is made available to all interested parties beyond (Open Source). In this way an ever larger community will not only use the LMS but again contribute to its further improvement.

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