H-KNOW Knowledge Management in Building Rehabilitation
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International ULLL; Technologies, Pedagogy and tutoring in distance /blended learning

1. Description: The case study is from the project “Advanced Infrastructure for Knowledge Based Services for Restoring Buildings” (www.h-know.eu). It makes use of the funding programme of Theme 4 - of the 7th Framework Programme of the European Commission. The increasing volume and complexity of work in the construction industry, particularly for the renovation, restoration and maintenance of buildings of old buildings, often belonging to buildings of architectural and cultural heritage, suggested a systematic and sophisticated approach allowing access to advanced and knowledge about the processes and materials of construction in this area. Innovative solutions using collaborative networks of knowledge and involving business partners, SMEs, and research and development (RD) were created and tested.

2. Knowledge Management Model: Concerning the challenges described above the project developed a solution based on ICT with two goals: (1) knowledge and training for SMEs that are innovative and (2) support for advanced development and for ways of networking SMEs and R&D. The system must provide the ability to share, to create and to reuse information and knowledge in an interactive fashion. To meet the needs of SMEs to network innovative knowledge-based, the HKNOW project developed an electronic platform, in which the services of knowledge management were complemented by services for virtual collaborative networks. This management of knowledge allowed an effective combination of an advanced system of provision of knowledge and training with an innovative support system of networking. It responded to the following requirements: (1) Internet-based, (2) usable by SMEs (in terms of costs investment and human resources), (3) ensuring permanent access to specific resources of knowledge and experts, (4) recording the knowledge generated through the work of rehabilitation and structuring it in formats for learning and reutilisation, (5) using open formats supporting cooperation in the rehabilitation process, (6) supporting mobile users’ access to a structure anywhere and at any time. The project used emerging technologies to create collaborative networks based on principles of a service-oriented architecture as an optimal approach. It was intended that the combination of e-learning and knowledge management provides the desired skills for the benefit of all and allows the creation of innovative training.

3. Training of Engineers: The training envisaged for engineers and technicians involved in building rehabilitation imposed certain specifications that will be supported by ICT. The application of these services for the users and for the users’ tasks are defined with emphasis on using proven authoring tools to create learning content that is reusable and can be recomposed. The roles of users can be course organiser, teacher, mentor, learning material or course participant. The tasks performed by the users can be organising a course, managing a course, creating a learning object or a lesson and participating on collaborative learning.

The functions required for the Moodle platform for course creation and use are:
a) Learning Objects/Lessons: create a learning object/lesson; define instructional goal; request specific content/knowledge on a particular topic; compile a learning object/lesson based on specific content/knowledge; adjust a learning object/lesson to the intended audience.

b) Learning group composition: compose learning group; define minimum expertise necessary for joining the learning group (prerequisites); search candidate learning group members; select candidate learning group members; invite members to join the learning group.

c) Course organisation and management: organise and manage course; search appropriate course participants from an existing learning group based on criteria such as availability and expertise; define lessons planned for the course; define course dates and time period; define list of mentors associated to the course; define preferred communication ways and collaboration patterns; define course schedule/flow; notify course participants; enrol participants; enable learning path; allocate access rights; services for collaborative learning; learn collaboratively; use virtual classroom; audio/video chat; share applications.

4. Case Study: An example of the application of the platform is a cooperation between a SME and a R&D that have decided to prepare a virtual course of training for the staff that will apply techniques related with masonry reinforcement. This course is developed in the application Moodle associated with the platform H-KNOW. The SME has trained their technicians and workers to design, plan, implement and test the fixing system over several years. This expertise has been accumulated in terms of enriching the added value of the human resources in different phases of old building restoration. It was decided to use the H-KNOW platform to create a course to train other company technicians or workers on how to use this connecting system. The targeted potential users are other restoration companies, acting as subcontractors or partners, and organisations responsible for managing restoration projects where the system will be used.

5. Critical Analysis: The platform has proved to be reliable for cooperation between organisations involved in building restoration. The three components of knowledge management, of virtual networking and of distance training are a possibility for all stakeholders of building restoration. There is also a follow-up phase that can be participated by SMEs, R&Ds and other organisations related with building and built heritage, interested in taking advantage of the platform. For instance in terms of analysing the life-cycle of a building and the building after restoration, the platform can be an effective support. The follow-up may provide to registered users relevant knowledge for future building restorations. These advantages may be a) information about the performance of materials used; b) comparison between techniques adopted; c) costs of maintenance for the restored elements; d) information about life-cycles of fixing systems, materials and rebuilt elements; e) exchange of information with other related registered users; f) creation of clusters of companies and research institutes; and g) innovation concerning the problems found.