

DESIGNING FOR BLENDED LEARNING: THE OIKODOMOS EXPERIENCE

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Abstract

This paper introduces the pedagogic model of the OIKODOMOS Virtual Campus, a pedagogic research project developed over the last two years by a consortium of four Schools of Architecture and Urban Planning and two educational technology groups. The pedagogic model developed for this project derives from the design studio teaching that constitutes the backbone of design education. It is based on the collaborative design and implementation of blended on-line and on-site learning activities. A technological platform has been created specifically to support the learning model developed for the project. Learning Outcomes have been collaboratively designed by participating schools to facilitate the evaluation of student works.

Keywords - Virtual campus, Blended-learning, Constructivism, Virtual Design Studio, Elearning, Architecture

1 INTRODUCTION

OIKODOMOS (<http://www.oikodomos.org>) is a pedagogic research project financed by the Lifelong Learning programme (2007-2009) carried out by higher education institutions and research centres from Belgium, France, Slovakia, Spain, Switzerland and the United Kingdom. The goal of the project is to create a virtual campus to promote the study of dwelling at a European scale integrating on-line and off-line activities (blended learning). With this purpose, we have developed, implemented and tested a pedagogic framework which focuses on the learning activities which are carried out in the on-line environments specifically created for the project as well as in the courses and seminars taking place at participating institutions. Also, community representatives and local authorities in the participating countries have participated in the project's activities making a substantial contribution to them.

1.1 A virtual campus to promote housing studies

Van Dusen [1] has defined a virtual campus in the following terms: "The virtual campus is a metaphor for the electronic teaching, learning, and research environment created by the convergence of several relatively new technologies, including but not restricted to, the Internet, World Wide Web, computer-mediated communication, video conferencing, multimedia, groupware, video-on-demand, desktop publishing, intelligent tutoring systems, and virtual reality." In this definition, the focus is placed on the technology that allows the creation of a "virtual" learning space. For the BENVIC study (www.benvic.odl.org), dedicated to analyze virtual campuses implemented at five European universities, a virtual campus "refers to a specific format of distance education and on-line learning in

which students, teaching staff and even university administrative and technical staff mainly 'meet' or communicate through technical links." [2] According to this definition, a virtual campus is a surrogate of the traditional university, which facilitates communication between members of the academic community (teachers, students, staff).

However, there are other definitions contained in the BENVIC report which stress the unique characteristics of a virtual campus, those that go beyond the reproduction of existing academic structures and practices in a virtual environment. Thus, for example, a virtual campus can be understood as a "dynamic entity that permits the creation of a community dedicated to training and education" [3] and as a flexible learning environment which facilitates access to education to different kinds of learners. In this sense, a virtual campus can be seen as something in-between a virtual class and a virtual university: a space of research, communication and collaboration among institutions and people committed to share ideas and resources to transform education using information and communication technologies. Accordingly, the purpose of the OIKODOMOS virtual campus is the creation of a space of collaboration among schools of architecture and urban planning where they can design and implement innovative learning models in the field of housing studies which overcome the boundaries between formal and informal education, promoting the interaction between academia and professional organizations and seeking the participation of citizens and adult learners.

1.2 Blended learning: reconceptualising the relationship between teaching and learning

The pedagogic model of the OIKODOMOS virtual campus is based on blended learning. In the simplest sense, the term "blended learning" refers to any combination of face-to-face instruction with computer-mediated instruction. More generally, it is also used to refer to any combination of media, pedagogic methods, and theoretical and practical works. Heinze & Procter [4] have described blended learning as "the effective combination of different modes of delivery, models of teaching and styles of learning". The vagueness of these definitions raises some doubts about the usefulness of the term to convey an identifiable model of education.

For Garrison and Vaughan, the real significance of blended learning lies in its potential to transform education, since "(it) questions conventional practices and the belief in the lecture as an effective approach to engage students in critical and creative thinking and learning" [5]. Furthermore, they contend that "Blended approaches to educational design recombine concepts that were previously considered contradictory, such as collaborative-reflection and asynchronous-community" [6]. Therefore, blended learning represents "a fundamental reconceptualisation and reorganization of the teaching and learning dynamic, starting with various specific contextual needs and contingencies (e.g., discipline, developmental level, and resources)" which conveys "rethinking and redesigning the teaching and learning relationship" [7].

2 PEDAGOGIC FRAMEWORK

The blended learning approach adopted in OIKODOMOS combines on-line learning activities carried out in on-line environments specifically developed for the project with seminars and design studios taking place at the participating universities. Housing studies developed in the two-year project have focused on three issues: life-long dwelling, housing for diversity and effective housing. These topics have been addressed in an interdisciplinary manner, combining architectural and urban planning subjects. Learning activities around each theme have taken place in the virtual environments, in design studios at the participating institutions, as well as in the joint workshops carried out each semester at a different institution. Community representatives, local authorities and housing experts have participated in these activities

2.1 OIKODOMOS Learning structure

In recent years, the design of learning activities which can be used independently or brought together into sequences have been encouraged by the set of specifications evolved by the IMS Global Learning Consortium [8]. Learning Design is the name of one of the specifications, but is also a more general term used to describe a process which gives attention to student centred learning, putting the student at the centre of the learning process. In the latter context, as used in this paper, learning design emphasises careful attention to the selection and ordering of learning resources, the choice of Learning and Teaching processes and ensuring an evaluation of the effectiveness of the learning

process is completed. The use of *learning sequences* stresses more the process of learning than the learning content; they emphasize the interaction between learners rather than between learners and content; and they foster the use of multiple tools in different environments to carry out learning activities [9].

The pedagogic model of OIKODOMOS adheres to these basic tenets of learning design. The learning activities carried out in the OIKODOMOS Virtual Campus are based on a simple conceptual structure (Fig. 1). A “Workspace” is the learning space created by a group of teachers who decide to develop joint learning activities around a particular theme over a specified period of time. It is composed of “Learning Activities” which, in turn, are made up of “Tasks”. Tasks can be single or grouped in sequences. Sequenced tasks can be constrained to a single Learning Activity or cut across different ones. This learning structure is flexible and neutral enough as to support different kinds of activities – from the collaborative development of a project to course assignments– which can be carried out by students working individually or in groups, and by schools working independently or in collaboration with others.

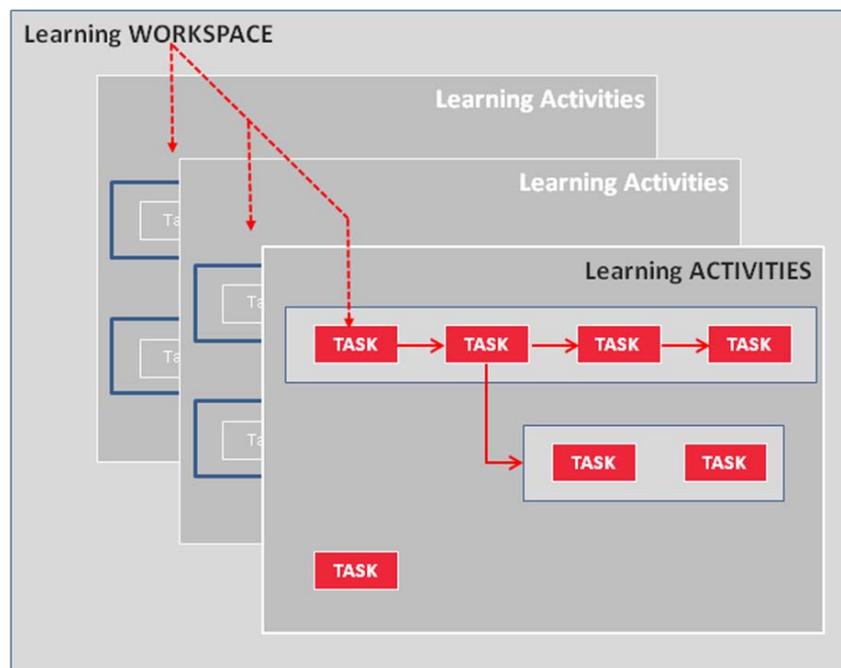


Fig. 1. Structure of the learning activities

In order to achieve an effective combination of on-line and off-line activities, different strategies were adopted. For instance, a Joint Workshop took place each semester at one participating institution. The host partner put forward a design project in their region which would be carried out in the design studios, physical and virtual, during the semester. Before the Joint Workshop, students from participating schools performed some preparatory learning activities in their respective courses whose results were shared in the shared virtual environment –the OIKODOMOS Workspaces presented below. The outcomes of the on-line learning activities were also presented and discussed during the Joint Workshop and they were further developed at the partner institutions as follow-up activities (Fig. 2).

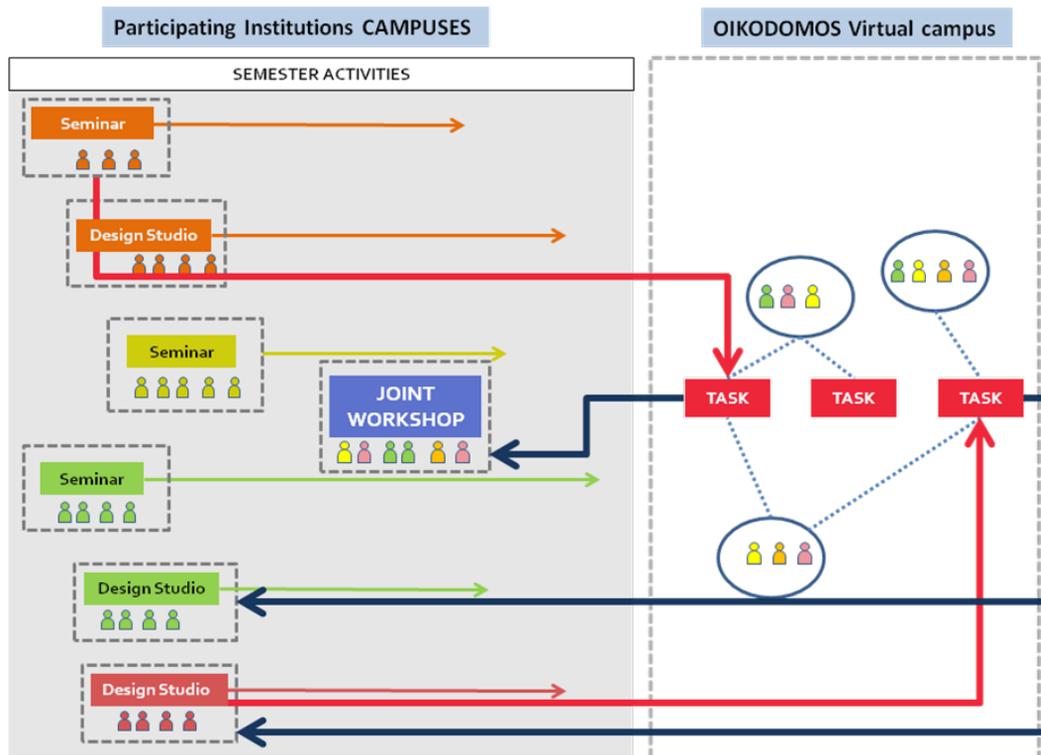


Fig. 2. Blending off-line and on-line learning activities

Designing and implementing a learning model based on the collaborative construction of tasks requires strong coordination from the teachers. They need to jointly define the topic of the learning activities, agree on the descriptions of tasks and learning outcomes, and be aware of their respective timetables.

2.2 Constructivist pedagogy and collaborative instructional design

During the latter part of the last century Constructivism came to the fore as one of the most widely known, and possibly adopted, models for the development of learning. Constructivism recognizes that whenever we engage in the process of supporting learning we are never 'writing on a blank slate'. The learning and teaching processes should recognize the scope of student's prior learning and seek to not only build on them, but to bring about change or transformation of their pre-existing knowledge. Student's knowledge base may be supplemented by the addition of factual information, but learning which involves a deeper understanding or development of creativity usually requires refinement of their existing knowledge structures.

The Design Studio is a well-established methodology in architectural education which embodies a creative environment in which students are supported in developing their design projects. Learning occurs as students develop a project through its design phases: identification of the problem, sketching, developing a solution, analyzing results, and presenting a final project to be critically assessed. Teaching staff provide guidance which offers students the opportunity to expand their existing knowledge base and evolve new understanding through pragmatic engagement with the task in hand supported by expert input. As Schön contended, in the context of a Design Studio designing can be considered "a conversation with the materials of a situation" [10] in which the expert guides the apprentice in the process of reflecting-in-action "on the construction of the problem, the strategies of the action, or the model of the phenomena, which have been implicit in his moves" [11]. Constructivist based learning is thus at the core of Design Studio work.

In OIKODOMOS we have applied the constructivist model to our learning design. Learning activities are the result of a reflective dialogue among the teachers who participate in their design. The design and implementation of sequences of learning activities requires a shared vocabulary that encompasses and somehow reduces the differences of teaching practices at different schools in different countries. All the efforts and the progress made with the Bologna reforms notwithstanding,

there are still many differences between higher education institutions across Europe which range from organisational matters through to approaches to tutoring and to the teaching of design.

The pedagogic model underlying the design studio was taken as a backbone for OIKODOMOS. Unlike many eLearning projects, OIKODOMOS was not constrained to teaching online some basic concepts, leaving the practical work for the face-to-face activities, but ventured in the development of distributed blended design activities to be carried out both on-line and on-site

2.3 OIKODOMOS ICT Platform

At the outset of the project, it had to be decided which ICT platform would be used to support the learning activities of the virtual campus. After reviewing some of the existing learning environments, we came to the conclusion that they were either too much focused on managing the pedagogic activities (e.g. Moodle) or too restrictive in the modelling of the tasks (e.g. LAMS). Therefore, we decided to create the OIKODOMOS platform to support a pedagogic model focused on learning activities which are collaboratively created and dynamically developed by a group of learners.

The OIKODOMOS platform (Fig. 3) consists of two environments: Workspaces and Case Repository. The first one supports project-based learning activities, such as the development of a project – architectural and/or urban- in a collaborative manner. The second one is a digital repository of housing case studies, which is constructed also collaboratively by learners. Each environment has a distinct technological infrastructure so that they can be used independently. They can also be jointly used during some of the learning activities (for example, generating in the Case Repository a report from the analyzed cases and using it as an input to a learning process in Workspaces).

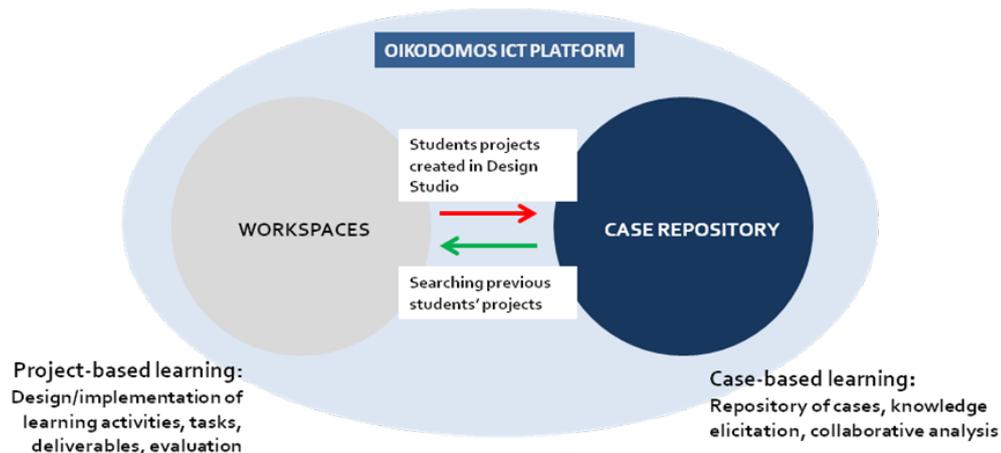


Fig. 3. OIKODOMOS platform

OIKODOMOS Workspaces (Fig. 4) is not meant to be a learning management system, but an environment to support the collaborative design and implementation of learning activities in a straightforward and intuitive way. It enables groups of learners from different institutions to create and manage learning processes made up of sequences of tasks which are organized under learning activities. Learners can be grouped in multiple ways to carry out specific tasks, individually or in teams. The outcomes of a Workspace –descriptions of learning activities and tasks, students' results– are stored in a repository to be re-used afterwards in other Workspaces. This stock of outputs from learning experiences can contribute to the transfer of knowledge with subsequent learners.

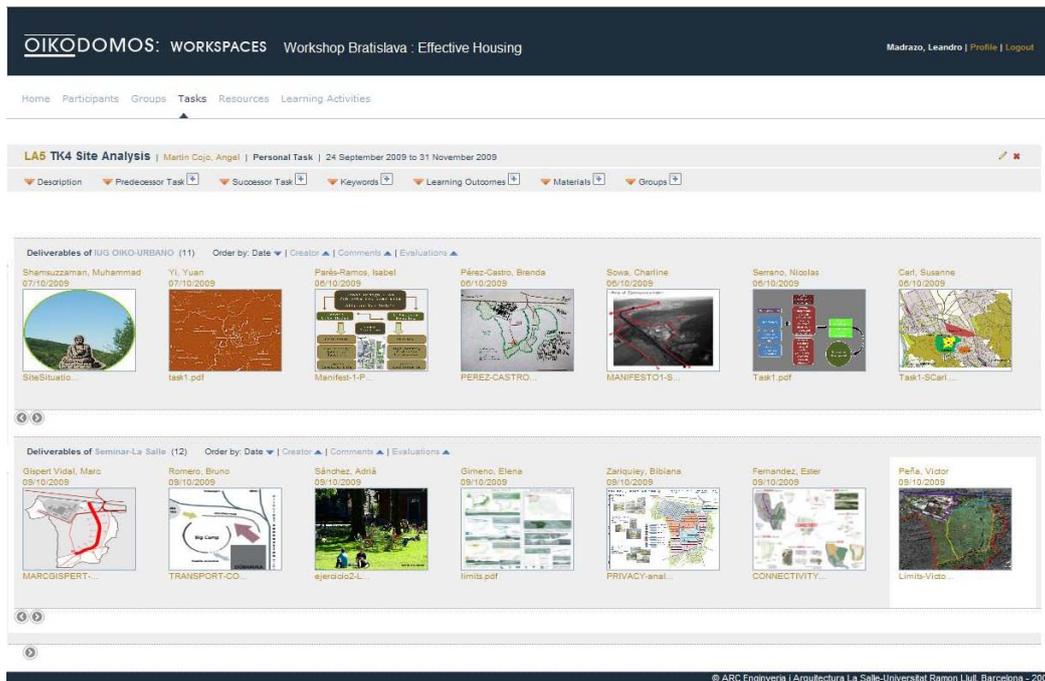


Fig. 4. OIKODOMOS Workspaces

The OIKODOMOS case repository (Fig. 5) is a further development of a previous repository created in a previous project, "Housing@21.eu" (www.housing21eu.net) carried out under the auspices of an Erasmus Intensive Program from 2003 to 2006 [12]. The existing repository contained over 300 documented cases, created by students from five European Schools during the activities of the program. As a first step to upgrade the existing repository, the content was thoroughly reviewed: irrelevant information was removed, and English texts were edited and corrected. Then, following a usability test and a technical evaluation of the existing environment, a full-fledged repository was designed and programmed.

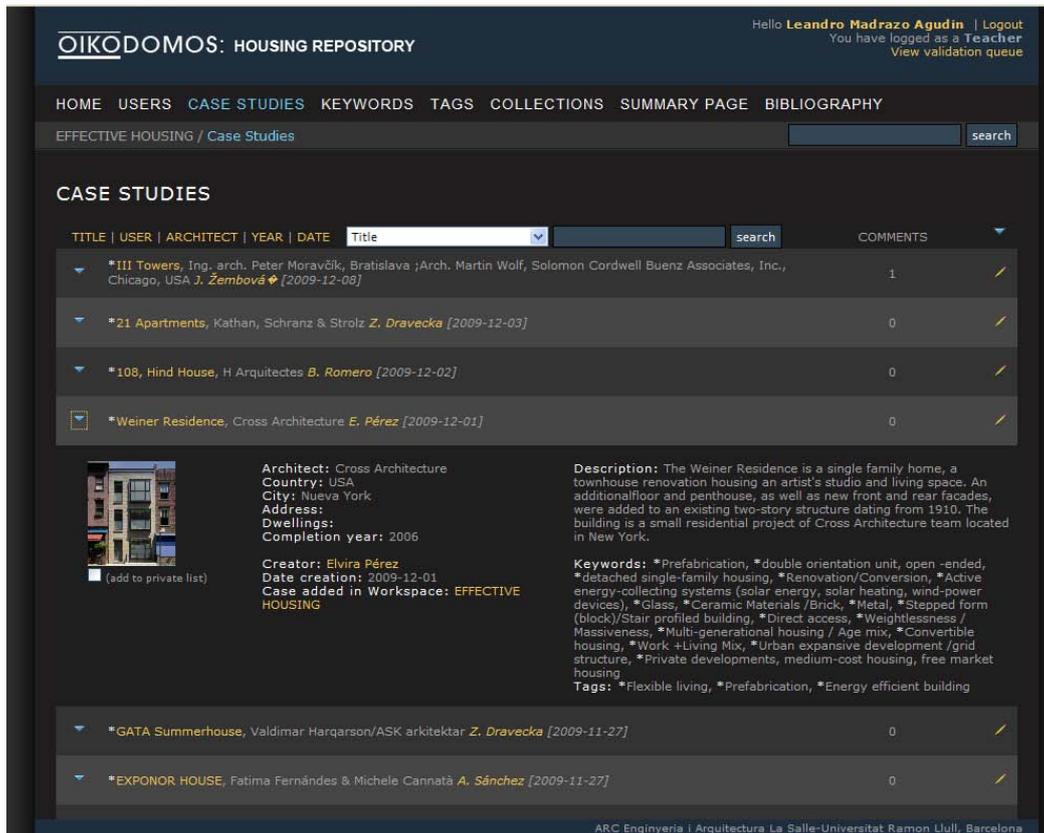


Fig. 5. OIKODOMOS Case Repository

3 PEDAGOGIC IMPLEMENTATION: DESIGN STUDIO

During the two-year project activities, three design projects were proposed in conjunction with a housing theme as the context where learning activities would be developed by participating schools, both individually and in collaboration. The projects were located in the region of the school responsible to host a Joint Workshop. They were developed during one semester in blended design studios taking place both in the virtual space and in the participating schools.

3.1 Blending physical and virtual design studios

Virtual Design Studios (VDS) emerged in the mid 1990s following the widespread use of web browsers which facilitated the exchange of information and communication between students from distant architecture schools. A virtual design studio setting makes the design process necessarily explicit. The need to express and communicate ideas to other peers in the context of a VDS engages students in a conversation which supports reflection-in-action [13]. In parallel, teachers in distant locations can participate in the project reviews and critiques.

In the organization of a Design Studio –traditional or virtual– there are three main components to consider: a design theme, a site for the project and the knowledge construction resulting from the teaching/learning processes. In a traditional design studio –constrained to a physical location– these three elements are treated as a unity. In the context of a VDS, however, these three elements – replicated by the number of instances of the Design Studio located at the participating schools– give rise to a matrix of multiple interrelationships resulting from the exchanges among cultures, disciplines and pedagogic experiences.

The teaching & learning processes implemented in the OIKODOMOS VDSs combine on-line and off-line learning activities, carried out collaboratively in synchronous or asynchronous ways using different ICT tools. At the outset, participating partners need to agree on the workplan of the design studio development: timetable, stages, dates, outcomes and evaluations.

A Virtual Design Studio has to cope with the processes knowledge, data and communication management. According to Devetakovic, "Design activity on a remote project site is one of the main challenges of VDS. It requires significant enlargements of the VDS knowledge-base (...) and introduces new aspects in domain of knowledge codification procedures" which convey the transformation from tacit (subjective, individual) into explicit (codified, formally expressed, systematic, articulated) knowledge" [14]. Within a traditional design studio this process of transformation is limited to the communication teacher/student and student/student within the class: the teacher delivers his or her experience through personal contact by commenting on students' designs which are also subjected to the scrutiny of other students in open debates.

In the implementations of VDS in the OIKODOMOS virtual campus, these knowledge explanation processes resulting from the communication between design studio participants have been enhanced in various ways. At the outset, teachers agreed on the learning outcomes associated with learning activities to be conducted in the design studio. These learning outcomes were made explicit in the rubric which teachers and students would use to assess the students' work presented in OIKODOMOS Workspaces. All participants –students and teachers– can add comments to the students' works, thus facilitating the exchange among schools and disciplines. In this way learners adopt a new role as commentators and reviewers, which is one of the important pedagogic assets of the virtual campus. These reflections influenced the subsequent learners' actions: teachers could define new tasks in the design process based on the evaluation of the work done by students from the different schools, and students could apply in the subsequent work what they learned from their peers (a relevant design issue, an effective form of representing a design). Structured, topic or site oriented research and design, mediated by the OIKODOMOS Workspaces, supports the informal education of other possible participants interested in the design issue, outside the actual partnership.

3.2 Design studio implementation: the Bratislava Joint Workshop

The third OIKODOMOS Joint Workshop –dedicated to the theme "Effective Housing"– was aimed at the planning and design of an urban and housing development in a suburban area of Bratislava: Dúbravka Big Camp. The site was selected in close cooperation with local representatives in order to obtain the involvement of the local government, experts, practitioners and citizens. The project scope was chosen to accommodate both urban and architectural issues so that both Architecture and Urban Planning schools could participate and, eventually, collaborate in the design studios.

The workshop took place during one week in October 2009. Six weeks before it started, preparatory activities were carried out at the participating schools, working alone and in collaboration. The outcomes produced in this period were presented and discussed in the workshop. After this concluded, follow-up activities were developed during the courses and design studios in the participating schools, individually and in collaboration. The collaborative learning activities were carried out using OIKODOMOS Workspaces.

A. Preparatory activities

From the outset, the specification of common learning activities, the sequence of tasks and the definition of corresponding learning outcomes, were essential to establish a base for the collaboration among partner schools who shared a Learning Workspace dedicated to the workshop theme. Six learning activities were identified to be developed during the semester: from Perception and Data mining, through Urban analyses, Urban concepts, to Architectural analyses, Architectural concepts and Final presentations.

The host partner –Bratislava Faculty of Architecture– prepared the site analyses and description of the development program and made them available for distant partners through the Workspaces environment. Participating teams were able to discuss the design issues -e.g. program requirements, site conditions- via videoconference using Skype for audio/video links in conjunction with Teamviewer for the shared presentations. Additionally, professional broadcasting was provided by a scientific television crew and streamed online to be accessed via a specified web link.

Effective housing design was proposed as the common design theme. An "effective housing design" stands for a creative design which respects the principles of sustainable development in a specific natural, cultural and social environment, and which reasonably utilizes natural sources, human knowledge and available technologies with the main objective of creating optimal living environments. Satisfying all of these requirements represents a permanent and open challenge for architects and planners, and it is nowadays a matter of debate in professional circles. Effective housing can create

an environment humane to its users and society. The terminology of effective housing design, however, has not been very much explored. Therefore, research into the topic of effective design was one of the tasks included in the preparatory learning activities. In parallel, students formulated their visions for the development scenarios of the proposed site. OIKODOMOS Workspaces was the collaborative learning environment where these pre-workshop activities were carried out.

B. On-site Joint Workshop

At the beginning of the workshop, students from each of the four participating institutions presented a summary of the work done at their school during the preparatory phase. The group had to first to discuss the collective work done at their school, bringing out the most important ideas and to presenting them in a concise and effective manner to the workshop participants. The goal of the learning activity carried out in the Joint Workshop was to develop urban concepts for the proposed site. Seven mixed international student groups were to develop a concept for the Big Camp area supporting the idea of self-sufficient residence, with mixed functions of living, amenities, working, sports and free time activities. The results were presented and commented during the final presentation with the participation of local government representatives. Video of the event was streamed online through the web link to “shadow” participants of the workshop – the students from partners institutions who had stayed at home. The outcomes produced by students are a contribution to the future urban study in the area.

C. Follow-up learning activities

The Learning activities continued after the workshop at a distance, exploiting the OIKODOMOS Workspaces for asynchronous collaboration and videoconferencing for synchronous learning activities. As each partner school followed their own learning activities, new tasks were formulated and connected in sequences, some of the outcomes produced by students at one school becoming inputs for a task developed by another school. Thus, for example, they were asked to comment on the works developed by their peers or to integrate in their projects some significant issues identified in the projects from other students. Online distant critique was applied during the final presentations.

4 DESIGN OF THE INTENDED LEARNING OUTCOMES

Initial discussion between the partner schools indicated that they were generally similar in their overall conceptual approach to the Learning and Teaching (L&T) processes used within their discipline. In common with the findings of TUNING [15] aims and competences were frequently used as a basis for defining their students learning, but there were significant variations in the way these were articulated. In particular, as one of the partners was a school of Urban Planning, generic competences were similar but specific topic focused learning outcomes were largely different. There were also differences between all schools in their understanding and use of educational language, and in the scope of topics covered.

Collaborative work concerned with the first two OIKODOMOS Joint Workshops had led to a mutual understanding of educational language which was used to underpin the design of the final Joint Workshop. Taking the lead from the Bologna process [16], the partners agreed to adopt the use of Intended Learning Outcomes (LOs) as a basis for defining what students would learn in the Joint Workshops and associated activities. Bloom’s [17] taxonomy was used for reflecting on the level of students learning activities and guiding selection of the appropriate verbs used for writing the LOs. Starting from the aims of tasks, a set of LOs appropriate to the scope of L&T being discussed were developed. These started from initial proposals which were followed by several cycles of feedback and refinement. Following an aligned approach to the design of L&T [18] in conjunction with agreeing LO’s partners were also asked to review the scope and requirements of student assignments. Once the LO’s had been finalised, they were embedded within the Workspace as a list from which partners could select and assign those appropriate to their learning activities.

4.1 Reviewing assignments and assigning marks

One of the early discussions was concerned with the contribution which OIKODOMOS activities would make to the students marks. Harmonisation of the schools curricula to the extent where students could be awarded marks by professors in other institutions, in conjunction with the other project activities, was not possible within the timescale of OIKODOMOS. It was agreed that all summative assignments would be graded by local professors, that the Joint Workshops would contribute the

same number of credits within each partner school, and that collaboratively the professors would provide grades and feedback across schools for formative purposes.

The Workspaces environment was the interaction space for students and staff during and around the Joint Workshops. For the final workshop an evaluation rubric was collaboratively created by teachers from participating schools to be used for assigning the scores to the assignments uploaded by students (Fig. 6).

S		A	B	C	D	E
LO1	The student will be able to construct a clear and, functionally correct conceptual housing design which is integrated with the other functions of a given site or problem.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LO2	The student will be able to apply design methods appropriate to housing and urban development design issues (perception of the assignment, site, neighbourhood interconnections...)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LO3	The student will be able to apply compositional skills on the level of a basic dwelling; expression of strategic development pre-scenarios of the analysed site	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LO4	The student will be able to demonstrate and discuss notions of composition and urban/architectural design	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LO5	The student will be able to define the issues affecting the actual design of residential architecture (following the new social structures, globalisation, materials...)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LO6	The student will be able to makes appropriate use of different representation techniques (verbally, textual and graphic-digital and analogue) in order to communicate the ideas (concepts and design proposals) in an effective manner.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LO7	The student will be able to demonstrate team working skills through personal contribution to a joint presentation	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
LO8	The student will be able to demonstrate basic management skills (time management, synthesis, adaptation to the audience...)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Fig. 6. Example of a rubric used in the Workspaces

Students could also provide comments on their peers work whilst staff had the facility to both mark work directly into the rubric and add associated comments.

Before using the rubric there was some discussion between partners about the grading of assignments. Standardisation within schools can be difficult to achieve and it is more so between schools from different countries, cultures and disciplines. This work is in its early stages but the results from the last implementations of the learning activities have provided a good basis to take the discussion further.

5 CONCLUSIONS

Designing and implementing this shared pedagogic framework –the pedagogic methodology coupled with the learning platform– during the two years of project activities has been a meaningful pedagogic experience: it has contributed to fostering communication and exchange among teachers and students from different schools, to engaging teachers in a collaborative process of designing learning activities and learning outcomes, and to set up a common base to define and evaluate learning outcomes. Altogether, we have initiated a virtual campus which is meant to be a space for research and exchange among learners committed to pedagogic innovation in the field of architecture and urban planning. This pedagogic model has proved to be flexible enough to enable collaboration between different learners and learning styles, integrating on-line and on-site courses across different disciplines, within a shared space structured into open sequences of learning activities. The technological platform developed for this project supports the blending of project-based and case-

based learning. Provisional responses from students and staff indicate the platform is easy to use and supports the learning and teaching processes as intended. Further developments of the platform should focus on the storing and eliciting processes which would enable subsequent learners to continue with the knowledge construction processes initiated in previous activities.

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