CASE-STUDY EXPERIMENTS OF THE KNOWLEDGE PRACTICES LABORATORY (KP-LAB)

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KP-Lab (Knowledge Practices Laboratory) aims at developing theories, tools and practical models in teaching and learning, as well as digital applications, by the use of university students. Thus, this paper focuses on how the KP-lab is applicable in the Academic World. It not only presents these products, but also describes the key elements of a multimedia product course which conforms to a novel learning approach called trialogical approach on learning. It emphasises the use of flexible technological solutions to support both learning and teaching. Also, a collaborative learning environment, i.e. Shared Space tools, has been developed in KP-Lab. It is based on emerging technologies such as semantic web, web 2.0. Furthermore, the use of the technology and its support for the trialogical approach on learning is presented.

The trialogical approach on learning, implications on support requested from technology

There is an increasing demand for knowledge practices in learning and work which would take into account the changing nature of work and the emerging technological solutions to keep contact with others, share information, and collaboratively organise work, contacts, and so on (see e.g. Gutterman 2008, Mayer 2008). Work has become not only increasingly collaborative, but also interdisciplinary, and it emphasises creative aspects of knowledge practices. Therefore, investigating and applying knowledge practices that enhance the ability to cope with current and emerging changes in work life using the emerging technology is a salient issue. In this paper, the notion of learning has been expanded beyond mere individual or social aspects of learning into a collaborative object-oriented approach on learning, this is the trialogical approach on learning. Before moving into the case study and the Shared Space tools, a brief look on the theoretical background is taken.

Trialogical approach on learning underlines the importance of processes where students are able to concentrate on collaborative, long-term efforts for developing shared objects. Rather than examining processes within individual minds ("monological" approach) or on social interaction between people ("dialogical" approach), it concentrates on collaborative, "object-oriented" processes ("trialogical" approach). This comprises of interaction where individual students participate on collective and collaborative processes through common tangible objects of activity (Paavola & Hakkarainen 2005; Muukkonen, Lakkala & Paavola in press; see also Bereiter 2002). In other words, the trialogical approach aims at developing pedagogical models and tools for organising learners' activities around shared objects, such as texts, conceptual artefacts, or practices that are created for some meaningful purpose or reason. It is important to notice that within the trialogical approach, also individually performed activities and social interaction serve the sustained processes of developing concrete, shared objects collaboratively for subsequent use (see Paavola, Engeström & Hakkarainen, 2008). Moreover, another aspect of the trialogical approach on learning is the reflection on learning, which is directed towards the examination of artefacts, social practices, and processes (i.e. shared objects). These represent advancements in knowledge, rather than focus on improvements of personal understanding or social interaction as such (Lakkala 2007, 2008). These practices should be technology supported. Thus, it is not the technology alone but the combination of supporting technology and appropriate learning practices that provide the ground for trialogical approach on learning. According to Lakkala et al. (2005 and 2008), from the pedagogical design perspective it is important to acknowledge that

this design is indirect, and it focuses on organising the preconditions for the learning setting, which is not able to causally determine the learning results.

How can technology support the trialogical approach on learning?

The technology is needed to provide a space where collaboration can be organised for joint development of some concrete, shared knowledge objects having a meaningful purpose. However, in order to enable the collaborative organising of work around shared objects for sustained meaningful development, many other needs have to be addressed. This includes for example, awareness features that allow users to know who has been doing what, when and in relation to which practices and objects. It also requires the shared objects to be annotated and linked to other objects and/or tasks to enable a holistic view on these collaboratively developed activities and objects. Without any overall view on the relations, it is difficult to reflect on what has been acquired and produced in relation to early envisions. As mentioned above, reflection on learning which is directed towards the examination of artefacts, social practices, processes around the shared objects is an important aspect of the learning practices. To provide grounds for perceiving the meaning, and to create meaning of the objects and tasks, these have to be context related. The contextualisation and meaning-creation can be supported by enabling users to tag/annotate the objects and tasks, comment directly on the objects, or start discussion about the objects directly in the context of the objects.

Different work processes additionally require a view on the process of the work. Being able to see the previous work, current work and envisioned work, as well as to assign responsibilities to different tasks is a substantial aspect of the organisation, division and collaboration management in a joint long-term shared goal activity. To enable the users to develop their practices, the tools used need to be flexible for the users to modify and to customise them for addressing the emerging needs arising from their work. Furthermore, the long-term knowledge-creation processes where shared objects are developed in a sustained way does involve continuity and building on the individuals' and collectivity's previous efforts and achievements, as well as society established knowledge base and expertise. Making possible this long-term use which allows combining the individuals' and collectivity's previous efforts and achievements, the tools used have to enable integration with existing tools in a way that users are able to intertwine their previous contacts, works and topics into the current and emerging work and topics. I.e., the tools should be open and flexible enough to allow combination and information transfer between the existing or emerging open source, and free ware tools that are commonly employed by the users.

The first developed version of Shared Space tools was designed to support some of the above-mentioned needs and requirements. However, before presenting the Shared Space tools and its use in the multimedia product case study course, the course itself will be described.

Setting of the course Multimedia product

The course multimedia product is a Media Engineering course mainly for the second year students in the international Degree Programme in Media Engineering (Bachelor level studies) in EVTEK University of applied sciences, Finland. The duration of the course is full spring term, comprising more or less 5 months. The course has three laboratory hours in a week where students working with their projects have an opportunity to ask questions, receive help, or just to reflect upon their project with two teachers. Thus, the course has no lectures in the traditional sense.

The goal of the course is to provide an opportunity for the students to use and extend their skills on the design of a multimedia product or service in an authentic situation, not being left on their own without support for the process. Student teams use their knowledge of design methods and theories as well as usability and management approaches in new design situations with actual clients. The students produced deliverables are the project documents and the end

product that is taken into use by the client. Two teachers conduct the course together; a principal teacher responsible of the overall course organisation and an assisting teacher taking care of technical assistance. The course includes weekly laboratory sessions where the students, first, choose their project and the team, and later on work on their project work, receiving guidance and recommendations from the course teachers. Moreover, the student teams themselves arrange additional meetings for the team and with their client. The students are provided with various professional multimedia tools for creating the team designed multimedia products.

During spring 2007, the first version of Shared Space tools (SSt) was used for supporting the collaborative design process. One space was administered by the teachers to organise the joint course activities, and each team created its own space for coordinating their project process as well as sharing and elaborating knowledge related to it. (For more information on the course see Lakkala, Muukkonen, & Sins 2007).

Shared Space Tools and support for the learning practices

The first version of the Shared Space tools was designed to support some of the above discussed requirements and needs. In this first version the following functions and features were available and used in the multimedia product course: The tool provided three different views into the content, tasks, and users, firstly the content view for the content, secondly the process view for presenting the process of the work, and thirdly the community view where the members of the space can be detected.

In the content view the users are able to work with and create different kind of content items (i.e., files, links and wiki-pages) and tasks. These can be linked with two types of links, either hierarchical links or relational links. The links can be named by the users by using an existing vocabulary of concepts which describe different kind of relations. Consequently, users can create their own concepts for describing the nature of the relations between content items (objects) and tasks. The content items can be tagged/annotated by the users to enable categorising and assigning a meaning to the content. The tagging can be executed by selecting from existing vocabulary or by users defining their own tags. The content items and tasks can be filtered according to different criteria to enable concentrating on particular parts of the content for certain task or phase in the work. Users can use an integrated wiki to collaboratively write their reports or other documents. The wiki-pages created are automatically presented as content items in the content view. The users can comment on the content items they have in their content view directly onto the object in question (see figure 1).

In the process view the users are able to organise and modify their tasks in a timeline (sort of GANTT-like visualisation) and assign responsibilities to different tasks. The community view presents all the members of the particular shared space and the main information of the members which is the name that the members have created, modified, or have as their responsibility.

As aforesaid, the core issue of trialogical approach on learning is work around shared objects. This type of work is prominent in the multimedia product course, namely the student teams worked together on a shared object which in this case was the media product that was supposed to meet their clients' and end-users' requirements. Furthermore, the work brakes into smaller shared objects as design process tend to do. During the course, the students produced the final products on the basis of intermediate shared objects. Such shared objects are, for example, the multiple mock-ups of the product to be designed and developed, deliverables the students write together, client meetings they have to plan, execute and report, integration of the graphical user interface and code, and so on. One of the most challenging joint activities which the students face is to be able to come into a shared understanding with the client of their and end-users requirements for the product.

The Shared Space tools supported this kind of work around shared objects by providing a space that integrates the tasks, the different objects the students are working with, enabling to

link and tag the tasks and objects to express their relations and meaning to the over all work that has to be achieved (see figure 1). Furthermore, the students and the teacher could comment directly into the items, which support the organising of the joint work and the need to reach a shared understanding of what should be done, how to divide and combine the work and what challenges still lay ahead. The commenting was found to be a good feature by the students and teachers since it allowed better means to share knowledge directly onto the object and enabled easier discussions not only between the team members, but also between the students and the teachers. Although the visualisation of the comments was heavily criticised, it was found usable and has been taken into account in the further development of the Shared Space tools.

The linking and tagging received diverse feedback from the students. Some of the students found this way of perceiving the relations between shared objects and between objects and tasks a good way of organising the future work of the project and for seeing the causal connection between different iteration phases, as the others had severe problems of sifting from the conventional folder view into a relational concept map-like view. The noticing of the iterations and the connections of the iterations to the previous work has been a challenge in the previous courses. It is promising to see that the new pedagogical practices and the use of the Shared Space tools may provide means for the students to grasp the meaning and importance of the iterations. The challenge to swift into thinking through concept map-like view promoted self-reflection in the students in such a force that some of the students are now investigating how new students this year will perceive this different manner of presenting relations in a concept map-like view. Tagging which in the first version of the Shared Space tools was not directly connected to the content items received criticism that it is not easy at all to understand. Therefore, this feature has been changed according to the feedback from the field.

The possibility to assign responsibilities to tasks and shared objects promoted the students to take more responsibility on the joint work. This task arose through the use of the process view where the students were able to see their current status in the work in relation to what had been executed already and what yet remain unaccomplished. It could be said that the former aspects promoted engagement into the teamwork and growth in the students' agency to work in a long-term project.

Nevertheless, the use of the integrated wiki did not succeed. It seemed that the openness of the course setting where the students had to manage their project by themselves receiving help and support only from the teachers, was not at all sufficient structure for giving scaffolding for the students to organise their deliverable writing collaboratively by using the wiki as the writing tool.

The learning aspect of the long-term knowledge-creation processes, where shared objects are developed by building on the individuals' and collectivity's previous efforts and on societally established knowledge base, remained somewhat a challenge. The face-to-face discussions with the teachers, especially with the teacher responsible for technical assistance enabled to share his experiences about team collaboration and made possible for students to work with real clients. In addition, the students were able to employ the knowledge from previous courses into their project work although the tool as such provided only limited support to share, link, and store this knowledge for further use. The commenting possibility provides some means for the teachers to share their knowledge, but the first version of the Shared Space tools did not support the access rights giving, for example, to the clients in an easy manner. Neither did it support integrating the contacts the students had to experts in the field nor did the tool support integrated personal spaces from where relevant parts of personal knowledge could be reused in the project work in question.

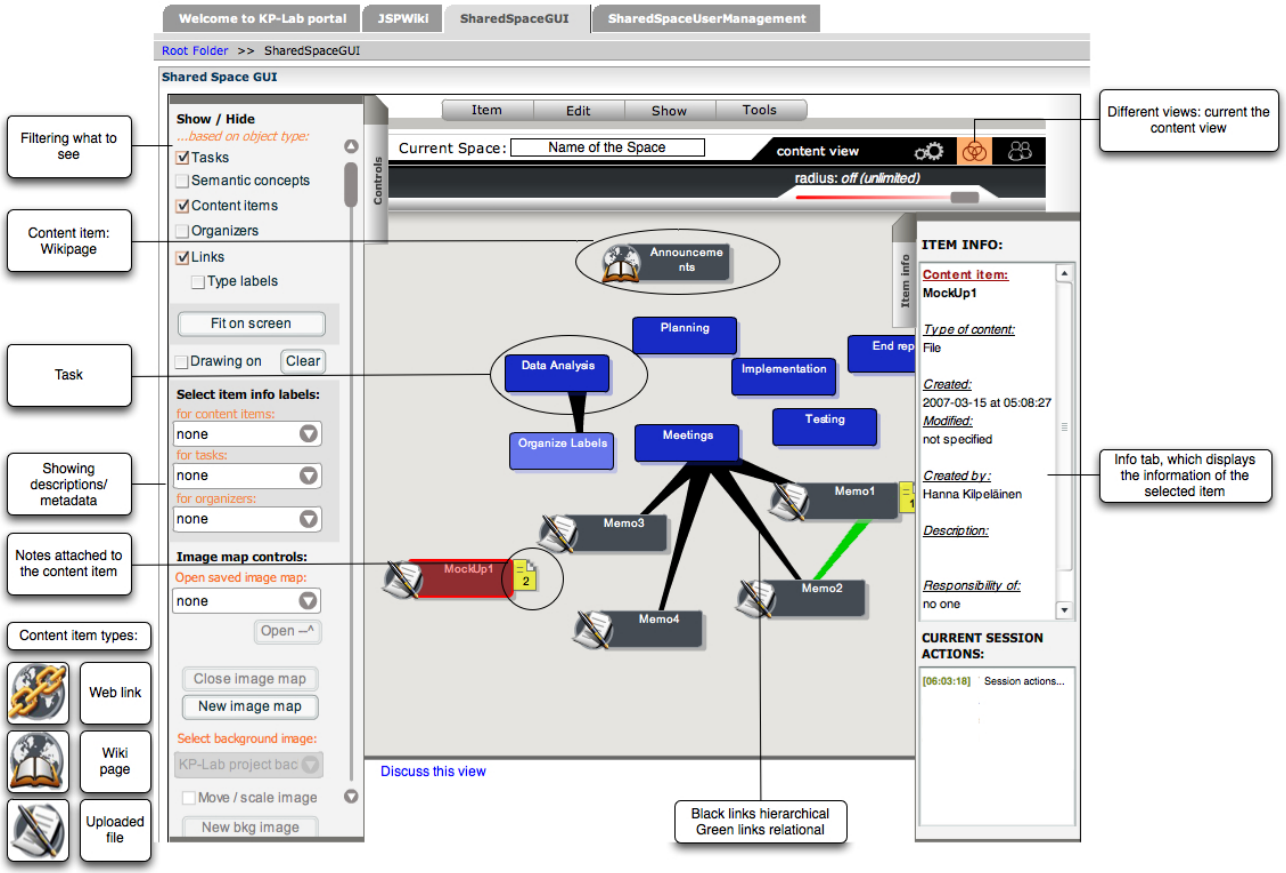

Figure 1. Content view displaying some functions and features

Benefits and challenges identified

In a nutshell, Shared Space tools provide support for organising work around shared objects and visualise relations between objects and tasks, as well as enable better means for reflection on iteration. Partially, though, Shared Space tools were used in students' habitual way of just storing files and other material for completing the final product. However, teams used the process view functionality to plan and organise their joint design process. Furthermore, the Shared Space tools allowed the students to take an overlook at their working progress and take more responsibility in the planning and finalising the work in time. Some students took actions to introduce improvement ideas, such as the clients should be allowed access to the space to test the demos or prototypes of the design product or its components and deliver their comments and feedback to the students. In addition, needs for awareness features, permitting the participants to keep track of each other's working progress was requested, as well as a need for sophisticated searching functionalities, allowing various criteria to be used in searching. In similar manner also a need of chatting tools facilitating virtual communication was raised. Maybe the most interesting finding was that the introduction of Shared Space tools enabled students to better vision affordances of such tools for collaborative designing, compared to the participants of another similar course without an experience of Shared Space tools (Lakkala, Muukkonen, & Sins 2007). Subsequently to the capability to vision affordances for collaborative tools, some of the students have search independently in the current academic year freeware tools with similar features as the Shared Space tools has to use these other tools in other projects they are currently working on.

The feedback provided by the students has already been used in the improvements of the Shared Space tools that were released in March 2008.

Conclusion

It can be said that the first version of the Shared Space tools already provided support for such knowledge practices which is described by the trialogical approach on learning. However, despite the improvements that have been implemented into the current version of the Shared Space tools, unanswered challenges remain. One of such is the possibility combine and integrate the existing and emerging freeware application to the use of Shared Space tools. This would increase the engagement to use Shared Space tools since significant amount of users previous knowledge and habituated practices exists in these other tools. Furthermore, the users practices and knowledge develop by using the tools. Thus, being able to incorporate these emerging practices into the use of Shared Space tools is important. At the moment such tools are for example, the following: Google sites, Google Docs, Google Calendar, Google Groups, Google Reader, Zoho, Flicker, YouTube, Facebook, etc. These tools are also well discussed in teacher and learning communities, for example, in the following communities Infinitive thinking machine (http://www.infinitethinking.org/), and Classroom 2.0 (http://www.classroom20.com/), Web 2.0 in education (http://web20ineducation.wikispaces.com/)

An interesting topic to ponder on is how to design the future Shared Space tools flexible enough so that the emerging technologies can be integrated by the users into the Shared Space tools. Another perspective is how the emerging practices that form around these new technologies can be used to enhance the knowledge practices.

References

Bereiter, C. (2002). *Education and mind in the knowledge age.* Hillsdale: Erlbaum.

Classroom 2.0. The social network for educators using collaborative technologies. Retrieved 3rd of March 2008 from: http://www.classroom20.com/.
Flicker.

Facebook. Retrieved 3rd of March 2008 from: http://www.facebook.com/.

Google Calendar. Calendar application. Retrieved 3rd of March 2008 from: http://www.google.com/intl/en/googlecalendar/tour.html
Google Docs. Create documents, spreadsheets and presentations online. Retrieved 3rd of March 2008 from: http://www.google.com/google-d-s/intl/en/tour1.html.

Google Groups. Retrieved 3rd of March 2008 from: http://groups.google.com/.

Google Reader. Keeps track of websites. Retrieved 3rd of March 2008 from: http://www.google.com/intl/en/googlereader/tour.html

Google Sites. Google Sites to centralise all types of information and share your site with just a few people, your entire organisation. Retrieved 3rd of March 2008 from: http://sites.google.com/).

Gutterman Jimmy (2008). **"**New Release 2.0 on Next-Generation CRM ... and a New Installment of Our Facebook Application Platform Report". In *O'Reilly Radar*. Retrieved 3rd of March 2008 from: http://radar.oreilly.com/archives/2008/02/new-release-20-on-nextgenerati.html.

The Infinite Thinking Machine (ITM). A community to help teachers and students thrive in the 21st century. Retrieved 3rd of March 2008 from: http://www.infinitethinking.org/.

Mayer Marissa (2008). "Google Health, a first look". *Official Google Blog*. Retrieved 3rd of March 2008 from: http://googleblog.blogspot.com/2008/02/google-health-first-look.html.

Muukkonen, H., Lakkala, M., & Paavola, S. (in press). "Promoting knowledge creation and object-oriented inquiry in university courses". Submitted to Ludvigsen, S. Lund, A., Rasmussen, I. & Säljö, R. (eds.). *Learning across sites: New tools, infrastructures and practices*. Pergamoen Press.

Lakkala, M., Lallimo, J., & Hakkarainen, K. (2005). "Teachers' pedagogical designs for technology-supported collective inquiry: A national case study". *Computers & Education,* 45(3), 337-356.

Lakkala, M., Muukkonen, H., Paavola, S., & Rämö, E. (2007, August-September). "Pedagogical Design for Trialogical Approach on Learning". In S. Schrire (Chair), *From dialogical learning to trialogical learning: Knowledge practices in higher education and teacher training*. Symposium conducted at the 12th Biennial Conference for Research on Learning and Instruction (EARLI), Budapest, Hungary.

Lakkala, M., Muukkonen, H., & Sins, P. (Eds.) (2007). *D 8.2: Summary of research on KP-Lab courses and technology in education*. *Research designs, pedagogical models, use of tools, and results of the first KP-Lab studies*. A report for the European Comission, KP-Lab Project, IST-2004-27490.

Lakkala, M., Ilomäki, L., Kosonen, K., Paavola, S. & Muukkonen, H. (2008). "Exploring the applicability of trialogical design principles for examining knowledge practices in education". In Morch, A. Moen A. & Paavola S. (eds.) *Knowledge Practices and Trialogical Technologies. A manuscript submitted for publication.*

Paavola, S. & Hakkarainen, K. (2005). "The Knowledge Creation Metaphor – An Emergent Epistemological Approach to Learning". *Science & Education* 14(6), 535-557.

Paavola, S., Engeström R. & Hakkarainen K. (2008). "Trialogical approach as a new form of mediation". In Morch, A. Moen A. & Paavola S. (eds.) *Knowledge Practices and Trialogical Technologies. A manuscript submitted for publication.*

YouTube. Hosts user-generated videos. Includes network and professional content. Retrieved 3rd of March 2008 from: http://www.youtube.com/.

Zoho. A suite of online web applications geared towards collaboration. Retrieved 3rd of March 2008 from: www.zoho.com/.

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