

# SCAFFOLDING PROFESSIONAL DISCOURSE THROUGH THE MAP-IT COGNITIVE TOOL

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## Introduction

ICT based educational inventions for tomorrow should be inclusive – they should be accessible both for Digital Novices and Natives and provide solutions for the improvement of learning culture as a whole, not just knowledge, skills and competences of learners. In higher education, policy-driven efforts to increase access result in expanded communities of learners who rarely experience the motivating atmosphere of professional debates during their formative years.

In training on the job, mentoring for innovation is a process of confrontations: traditional and new values, content and methodology are contrasted. Through mentoring, learners interpret and, if convinced, accept and acquire a new knowledge. When constructing a blended learning environment for a pre- and in-service training course at Eötvös University, we have included Map-It, a new visual knowledge mediator software and found it useful both for experienced, young ICT users and middle-aged newcomers to e-learning.

## Mentoring for innovation

The EU funded research and development project, Knowledge Practice Laboratory Project (KP-Lab, [www.kp-lab.org](http://www.kp-lab.org), 2006-2011), is currently working on the elaboration of new models for professional skills development based on this concept of triological knowledge creation. Map-It is one of the cognitive tools designed to support learning around the advancement of shared objects in a blended learning environment. Knowledge is not transmitted but collaboratively formulated and developed by using mediating tools, signs, and artefacts. (Paavola and Hakkarainen, 2004) In this context, technology provides for flexible tool mediation so as to facilitate knowledge-creation processes. KP-Lab tools add value, align with cultures, reduce costs and mentoring time, and are easy to implement.

In *triological* learning, discussion – negotiation of solutions for disciplinary problems with mentors and mentees participating as equal partners of a knowledge creation process is of utmost importance. Learning always involves collaborative knowledge creation, not just an interaction between learner and teacher ("*dialogical*" approach), or learning that occurs within one's mind ("*monological*" approach). When learning groups are large, scaffolding professional discourse in a way that ensures an optimal interaction between personal and social levels and the elicitation of individual and collective agencies (Scardamalia, 2002) is a demanding task. Since the knowledge-creation metaphor involves transformation of social practices through collaborative activities, it also calls for the elaboration of boundary crossing between various activity systems, i.e. heterogeneous communities with different types of agents and artefacts (Lipponen et al, 2004) and the *cross-fertilisation* of various knowledge practices.

In many pre- and in-service university courses, innovation (the ability to "invent for tomorrow") is one of the key skills to develop during the teaching process. However, the increase in the number of students at face-to-face courses and the need for equally effective e-learning options to provide equal access for distance learners makes it increasingly difficult to provide *personalised professional scaffolding* (mentoring), a method inevitable for the successful development of innovative skills and abilities. (Harasim, 1993, Hiltz, 1986) As the learning community includes life long learners (in-service trainees) with limited ICT skills as well as experienced users (Net Novices as well as Net Natives), flexible tools are needed that offer a range of uses to accommodate a variety of skill levels and learning needs. *Social presence* created by highly effective e-learning solutions operated by capable mentors was proved to be a key feature of success for both populations. (Kárpáti and Dorner, 2008a) In educational and professional knowledge practices there are three recurrent problems:

- lack of students' adequate knowledge creation and ill-defined problem and situation managing skills
- teachers' own individual professional experience based learning
- professional organizations' ongoing tacit knowledge explication issue

In order to foster knowledge creation, involve teachers' knowledge and experience, and explicate tacit knowledge in organizations, tools are in a central place of knowledge mediation. Tools mediate the activities and at the same time people are generating the knowledge artefacts (Hakkarainen, 2007).

The Hungarian KP-Lab team has selected Map-It to scaffold the mentoring discourse because it can be used offline, as a planning and regulation tool for disciplined debate by the mentor, as well as an online discussion environment by mentees and their mentor as a team. Our sample included an undergraduate, a graduate and a post graduate group of learners:

- 23 undergraduate students (age range 20-23, average to excellent ICT skills, course taught: Cultural Studies),
- 11 PhD students (age range: 22-25, excellent ICT skills, course taught: "ICT in Education)
- 8 primary school teachers (age range: 22-25, poor ICT skills, course taught: "Collaborative Teaching Methodology") and training lasted 2 semesters (from September 2007 to June 2008).

The triological approach to collaboration facilitates individual initiative for developing shared (material and cultural) objects, resources and social practices and provides models and tools for sustained collaboration. Therefore, we invited participants in all three groups to create knowledge objects (in Cultural Studies, Facebook pages introducing local culture for foreign students as an intercultural dialogue, in the PhD course, a wiki on social connotations of educational research terminology, and during the in-service course, a new pedagogical model for Multigrade village schools. (Kárpáti and Dörner, 2008b)

Participants were tested for ICT skills and competences (to reveal if skills are related to successful Map-It use) through the ICT Competence Inventory developed for Calibrate, an EU-funded project to pilot an international, innovative web application. (Kárpáti and Blaimire, 2008). A motivation questionnaire, complete with items that assess professional self esteem and collaborative skills, was introduced before and after the experimental teaching project with Map-It. To evaluate the quality of collaborative work, students were assigned four tasks per semester (8 tasks during the academic year) and portfolio assessment by peers and mentors was used to evaluate their quality.

As triological learning concentrates on the interaction through common objects (or artefacts) of activity, we increased peer support and review in all the three groups and used Map-It for collaboration both online as a discussion support environment and offline, for note taking. (Paavola and Hakkarainen, 2006). In this respect, Map-It is a "futuristic" tool as it develops communities of practice, characteristic for Web 2.0, where sustained co-operation is the central feature of internet use. In a discussion environment, shared conceptual objects or artefacts can be modified flexibly and systematically, different versions and combinations developed and shared.

### **Map-It – a new cognitive tool for mentoring professional discourse**

Map-It is a visual, knowledge mediator discussion mapping tool. According to design principles of the KP-Lab project, shared objects are jointly created, transformed, used and referenced by participants of the knowledge creating process. Feedback is provided by mentors both on individual and group level. The central idea of Map-It is to generate written shared objects based on an oral conversation and functions are intended to facilitate the contribution and interaction between participants and created objects.

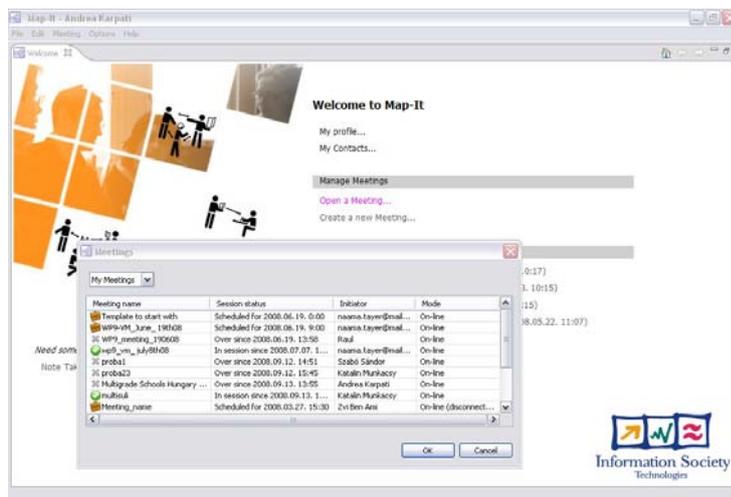


Figure 1: The welcome page of Map-It

The Map-It tool is not only a simple discussion mapping application, but a semantic tool that can interact with other applications, for example, a shared learning and knowledge managing environment. (In KP-Lab, a virtual learning environment called Shared Space is developed in parallel with Map-It.) Users of a VLE may link their Map-It discussion results (notes) and the map of the debate to their virtual learning space. During debates, the map develops as participants enter their comments to topics of discussion. The threads of the discussions may be interpreted as a visualised forum, but the main difference from widely used web-based forums is that the threads of the discussions are created in real time as the participants join the meeting and contribute to the discussion of current topics.

### *Preparing and managing Map-It for discussion*

After installing, we have to give some personal information, like name, institution, country and email address. Also we should search for friends, classmates, colleagues for further collaboration. After finishing the initial settings, we may start to prepare for a discussion.

The preparation is very simple; we have to give a name to the meeting, the time and the time zone. In the next stage, we have to set participants from a name list. Only invited participants can access the whole generated discussion map after the meeting finished. In the preparation phase the creator of the meeting may attach files, documents, pictures and web sites relevant to the meeting. In this phase, the creator may decide whether the participants will get an email about the meeting session, or not.

All the tasks can be performed in a window, where we can see separated blocks. Every block has a unique function: agenda; participants; central shared map of discussion; shared files, documents, web resources and highlights; the contributor's submitting block with some additional functions and a draft-creating block for collecting ideas and preparing for next contribution; and the floor control window, where participants can see when they can submit their contributions.

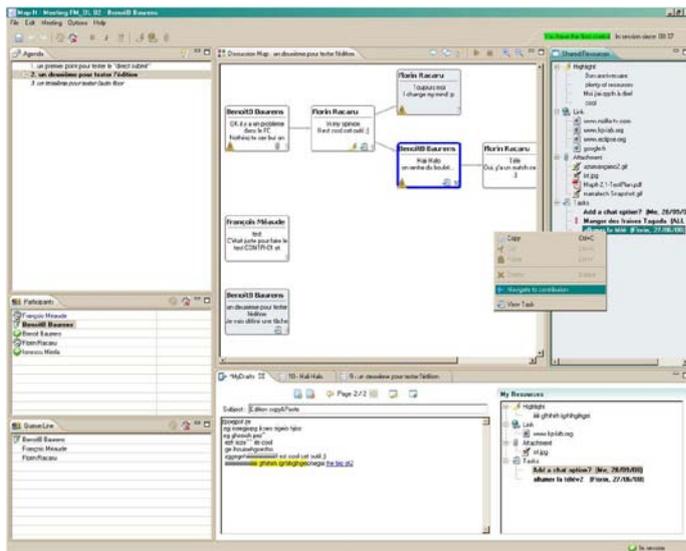


Figure 2 Map-It working window with blocks

Managing of the meetings is relative easy. The initiator of the meeting creates a virtual space, defines the agenda and the time of the meeting, and the other participants may join the session from any location if a client application is installed on their computer. There is a floor control system to organise the sequence of contributions, so participants can ask for the floor control in order to start a conversation or reflect on others' contributions. Only one person can contribute at a time. Participants can attach files, documents, pictures and web references (with URL), and can also highlight their own texts and/or texts submitted by other participants before. These texts appear in a central, shared window, next to the mapped discussion, so participants may see how ideas evolve and what other participants add to the discussion threads.

After finishing the session, the initiator of the meeting can generate the meeting minutes as a pdf, Word or HTML file and share it through a web based or other traditional form with the participants and other stakeholders. The meeting minutes include the date, time zone, participant list, agenda and contributions in a linear format.

### *Mapping of discussions*

The main purpose of the tool is mapping a meeting in the form of a multimedia document that features the sequence of contributions, not only the texts and comments but also an audio or video recording of the meeting session, with text files and images used and web sites visited during the discussions. The map of the conversation, graphically recorded by the tool, represents the flow and the directions of the contributions of various participants, and can be used as a reliable reference after finishing the conversation. In fact, it is this combination of the map, its contents (textual contributions, links to URLs, attachments, etc.) and a map-based, conveniently accessible audio/video recording, what can be seen as the "Map-It-generated comprehensive minutes" of the discussion.

The discussion map helps to reconstruct – also for non-participants – major occurrences of the session, shows exactly who contributed what and when, which contribution elicited more reactions. It also reveals the flow of ideas and indicates “dead alleys” or heated confrontations during the meeting. The map is synchronised with the oral (and eventual video) recording of the session and facilitates the recall of any given segment.

Once contributed, an utterance cannot be deleted. This protection feature prevents note takers from modifying already recorded meeting sessions and ensures reliable feedback.

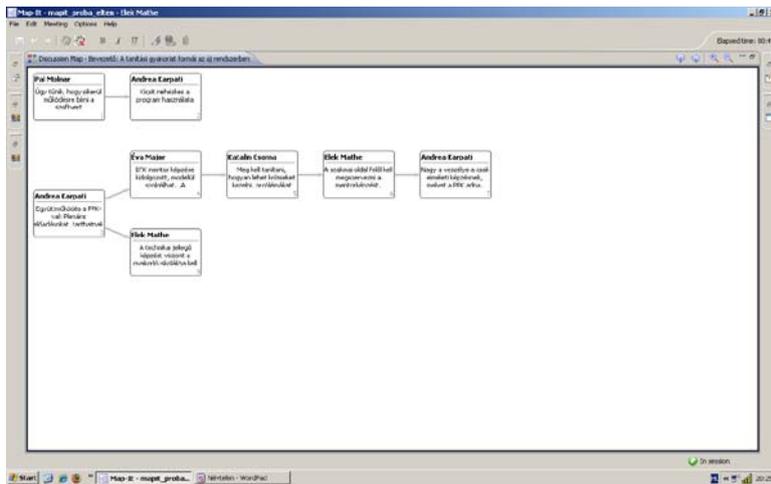


Figure 2: Discussion map generated during the PhD course

### *Not a mindmapping tool – but it has mindmapping functions*

Map-It is not a mindmapping application, though its visualisation features suggest that it can be used also for mindmapping sessions. Mind maps are created by one person at a time and cannot be elaborated on a group of users simultaneously in real time. Map-It, however, can be used by the whole debating community to prepare, manage and support online and offline discussions. It gives a constantly changing visual picture of the discussion and thus provides a “moving map of a group of minds”. As the mapping of contributions is recorded in real time, the participants can see immediately expressions of thoughts, files and highlights submitted by contributors. In this way, the contributor’s knowledge will get into the group’s collective knowledge both verbally and through a graph, thus facilitating visually inclined learners to understand a train of thoughts. While mind maps focus on one topic only, Map-It can be used for the discussion of as many topics as the organiser of the meeting finds suitable.

### *Audience*

The tool is best suited to professional development. During the Hungarian pilots, professors and students could easily use it for brainstorming project topics, monitor discussions and organise preparation of assignments, for semi-oral exams, etc. Other KP-Lab research teams are experimenting with it in workplace environments, primarily in multilevel company meetings, where the participants are company leaders, managers and employers.

In the Map-It discussion environment, shared knowledge objects are not only written contributions and reflections that are produced during a professional debate, but also files, documents, pictures and web site references uploaded in the discussion environment before the start of the debate that can serve as indicators of the quality of participation. Highlights of texts provided by others during the debate as well as remarks attached to previous utterances reveal the depth of understanding and involvement. These objects appear in Map-It in the common area, near the map of the whole conversation that is created in the process of the debate by a note taker (offline mode) or by all participants (online mode), and accessible to all participants during and after the discussion. Conversation is scaffolded by an agenda that creates a framework for the discussion. These features are especially important in any learning settings, including on-the-job training.

### *Use of Map-It in undergraduate and post graduate university studies and in-service teacher education in Hungary*

- *Collaborative knowledge construction:* participants can write and insert their contributions during the learning session immediately to the conversation map, or prepare their notes beforehand and copy their notes, pictures, etc. to enrich the collective learning space. Discussion is saved to create collective memory for further reference. Indeed, this possibility of creating “drafts” of contributions beforehand (especially before the discussion starts, when each participant gets prepared for it) is one of the pillars on which Map-It builds its approach to enable an easy map feeding in real time, during the discussion. The aim to impair to the least possible extent the attention that the participants need to devote to the oral discussion (and not to “registering” it, in writing, in the map) dictates this solution, which also has an important pedagogical dimension: The learners are motivated to think in advance of the discussion-to-be, of their own as well as of

their fellows' expected contributions along the discussion, adding an important layer to the knowledge creation process.

- *Documenting oral, face-to-face discussions: mentors act as note takers who summarize, highlight and share* important contributions and reflections. The meeting minutes serve as a useful learning resource.
- *Brainstorming session* for learning projects: we used the tool for managing brainstorming tasks in the classroom. Students were invited to prepare and upload supporting documents that contribute to the main issues and reflect on each other's ideas and collected material. The discussion map helped identify best ideas that are worth a follow-up.
- *Collaborative distance learning*: we used Map-It as a platform for distance learning for teachers who entered a professional development course with very limited ICT skills. This application is user friendly and contains a range of learning support functions (like commenting on submitted documents and organisation of learning dialogues and debates.) We started using Map-It with every participant online and face-to-face at the same time, to study its features and get some practice in Map-It use. With the help of mentors through Skype or phone (used simultaneously), the second meeting was online and "voice to voice" while from the third meeting onwards participants could get into the discussion area from their villages and experienced how the heat of a professional debate helped them fight isolation and burnout.
- *Collaborative writing* was experimented with in the PhD course where the appropriate use of professional terminology is one of the most important skills to acquire. Participants uploaded conference abstracts and corrected as well as commented on each other's work in the discussion area. The text generated could be used as an exploration of a scientific issue as well as an exercise in collaborative authoring.

## Results

As the tool is based on the triological learning paradigm characterised by work around shared knowledge objects by a team of mentors, mentees and other professionals with relevant expertise for a learning task, we managed to *increase learning motivation, improve collaborative skills and increase self-respect of learners as capable professionals at the same time.* (Pre- and post hoc motivation and self esteem surveys and assessment of collaborative tasks were used to evaluate performance.) Map-It was found useful also as a flexible mind mapping application that visualises threads of discourse in relation to predefined thematic areas.

In future experiments, we intend to integrate the tool with open source educational software like Moodle, class LMS portals, e-portfolio systems, and Web 2.0 applications like Google Docs, Sites as well as social networking sites like Facebook. Our objective is to create *a network of personalised learning* environments that can, at the same time, accommodate large number of participating students - a solution that all universities that are obliged to accept an ever-growing number of learners must invent for tomorrow.

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