Networked Facilitated Open and Distance Learning in Continuing Engineering Education

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Abstract

Open and Distance Learning in Continuing Engineering Education brings about a set of specific challenges: production and delivery have to take place in a network of providers in order to be cost-effective, and the demands of an audience of professionals and practitioners have to be met. The project FACILE had as a goal to find solutions to these challenges. Active facilitation turned out to be a key factor. The experiences allow us to discuss the role and relevance of different ODL elements and technologies for the specific requirements of CEE.

1. Background

Coping with an increasing pace of world-wide information exchange, traditional Universities of Technology are challenged with an increased need to update and upgrade their graduates' knowledge, increasing competition with market leaders operating in a global market, and increasing specialization.

For Universities of Technology, it will sooner or later not be sufficient any more to provide locally available knowledge to local customers. One way to adapt towards the challenges of a global knowledge market is to apply Open Distance Learning (ODL). Universities of Technology have to team up and build strategic networks to complement their Continuing Engineering Education (CEE) programs by Open Distance Learning. But the Centers for CEE are still at the beginning of this process; they still have to gain experience.

The SOCRATES/ODL Project FACILE (**FACI**litated open distance **L**earning for continuing **E**ngineering education) was a starting point to complement CEE provisions by close collaboration within a network of Centers for Continuing Engineering Education (CCEEs). It provided European Centers for Continuing Engineering Education with the opportunity to enhance the knowledge and skills of their staff on the application of facilitated ODL to their daily work [1].

2. The FACILE project

The SOCRATES/ODL project FACILE (1998-2000) added a dimension of collaborative CEE provisions by facilitated ODL to a network of CCEEs. By exchange of information, exchange of educational material and training modules, and by dissemination and transfer of evaluated and validated training material as well as of the evaluation results, the project made expertise on facilitated ODL widely accessible.

2.1 Joint curriculum development

The project partners (among them 7 CCEEs from different countries) attempted to collect experiences about applying facilitated ODL in different learning situations, especially related to continuing education, and to collect, analyze and adapt existing learning material about facilitated ODL. This attempt did not work out as expected. Thus, the partnership jointly designed a curriculum ("FACILE Staff Training") for managers and teachers at CCEEs. Based on this curriculum, 10 modules covering different areas of facilitated ODL (educational, organizational, financial, and technological aspects of facilitated open distance learning) and its application to CEE have been developed and, after two pilot runs, been offered to learners during spring 2000.

These modules were delivered to the learners by means of facilitated ODL. A web-based learning environment

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developed by the project partner HCI was used mainly for dissemination of the learning materials and other resources. Together with other communication technologies such as e-mail, mailing-lists, a chat-room and audio-conferences, the learning environment also provided a framework for interaction through group workspaces and discussion fora.

2.2 Networking among Providers

Since creating online learning material is very time consuming, dissemination of (perhaps adapted) material of other providers will be a key issue for future online learning provisions. The project FACILE implemented the nucleus for an international network for the joint organization and for the support of distance learners in CEE. CCEE's personnel had the opportunity to gain practice and experiences from applying their new knowledge in FACILE pilot courses delivered to a geographically dispersed audience via this network.

The FACILE project developed transferable products based on the application of generally available technology (e.g. telecommunication through the Internet, video conferencing with ISDN). FACILE concentrated on best practice for the support of distance learners by facilitation of the learning process.

Nevertheless, this could only be a first step in the networking process, and many additional experiences have yet to be gained, e.g. on establishing an organizational, logistic, legal and financial framework for such network activities and implementing successful procedures for mutual transfer activities.

2.3 ODL for Practitioners

The target groups for both FACILE training events were practitioners and professionals in their field (further engineering education for the staff training, engineering for the pilot courses). Many learners came to the course with already a high level of expertise. Motivation was generally high, but did not regard completion of the course itself (as would be the case e.g. with students for whom a certificate is relevant), but the benefit of the course for practical problem solving and development. In short, one could define participation in the course as "need-driven", where, however, the pressure and imminence of the "need" (to develop ODL in the home institution in the case of the staff training) varied widely. Thus, some participants were already involved in ODL, some others only wanted to be prepared for ODL introduction in the near future. Similarly, the familiarity with ICT and the level of mastery of the skills necessary for telematics-supported ODL varied widely.

3. Three types of knowledge and learning

The consequences of this setting and target group are far-reaching. We will outline them here on the basis of three types of knowledge, each connected to a different type of learning and teaching (cf. [2], [3]).

3.1 "know that" (factual knowledge)

This type of knowledge was represented in the modules which, in general, were informative texts. Especially the first pilot course showed that the written online material was, at best, scanned or read once and did not initiate group learning with questions and answers, let alone discussions. The reason is related to the specific target group: practitioners refuse to accumulate factual knowledge for some later purpose. While students are trained to do just that - to put facts "on stock" for some later application -, practitioners have successfully un-learned this way of knowledge acquisition and are interested in facts and information only when relevant for their work. What they put on stock, however, are clues to where and how to find this information once it is needed.

3.2 "know how" (procedural knowledge, skills)

Hands-on experience turned out to be the most valued aspect of the FACILE staff training. In the domain of experimenting with and evaluating of technologies used in ODL, we can safely assume that most of the actual learning process took place. Of course, this kind of learning is highly interactive and requires intensive support and active facilitation.

3.3 "can do" (mastery, practice)

This final step of the learning process, where participants transfer their knowledge and skills to their own practice, supported by a coach or mentor, can only take place when the course coincides in time with a practical problem to be solved by the learner. "Constructed" project work is no sufficient substitute for this kind of learning. In this stage, individual support by experienced practitioners is necessary. Most ODL courses cannot, for organizational reasons, be "open" to such a degree that they would allow for this kind of "just-in-time"-learning, however desirable it would be from an educational point of view.

4. The role of facilitation in networked ODL

Both the pedagogic requirements of CEE and the situation of networked production and delivery of ODL led to a concept of facilitation adapted to this situation.

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4.1 Facilitation in ODL

Typically, "facilitation" in ODL is understood as the support of learner activities at a remote learning site [4]. The facilitator, in such a setting, is the first or only person involved in a course with whom the learners are in face-to-face contact. The role of a facilitator is to ensure communication between faculty and students, to ensure smooth running of technical equipment, to respond to students' questions concerning course administration, learning facilities, but rarely on the subject itself.

In the FACILE project, on-site facilitation was replaced by distance facilitation. While in most ODL courses the role of support, tutoring, coordination and contact at a distance is taken over by the teacher/trainer him/herself, this model did not work out satisfactorily for this new type of networked ODL. The first approach that had been taken in the project was to make the author of each module responsible for its delivery. Different contents areas would be facilitated by different persons. Learners experienced problems with this approach, probably for several reasons at once:

- Each author/teacher brought his/her own concepts and methods of ODL to the undertaking.
- Learners did not know any of the teachers personally and did not have time to get to know (and to adapt to) their differing methods and pedagogic backgrounds.
- The individual authors of the modules were "bound" to the specific contents they wanted to deliver, so that no continuous course activities could develop.

4.2 The role of online material

Having stated that "know-how" is the most important type of knowledge that can be developed in an online course for practitioners, it would result that the contents - being mostly informative texts - of the course modules would be almost irrelevant. Indeed, the participants only referred to the texts marginally in their interactions with the facilitator and the authors of the modules. Online materials were, at best, incentives for discussion. However, it would be wrong to conclude that it does not matter what contents and in what form is put online. Written materials can fulfill two important functions:

If online courses are to *prepare practitioners for "just-in-time"-learning*, the materials should provide the learner with the clues for later information retrieval in a very clear and concise form. They should, for example, lay out what the aspects are that the learner has to take into account when starting out into practice, and give hints to resources where information on these aspects can be found (not in the form of an exhaustive bibliography, as would be the case in an academic paper, but in the form of very well reflected and commented recommendations).

Another function of online materials can be seen in *laying the ground for the mentoring network*. This could be achieved by building contacts between learners and authors/experts. To this aim, the "experts" have to be aware of the fact that they are only a little more experienced than the learners, and that only in very specific fields. In other words: they have to leave behind their role as "teachers" and should not try to "lecture" participants on how things should be done. Instead, their role would be to share their experience in the form of case studies. We suppose that case studies are the more beneficial to learners the less they are "finished" or "polished". It is the unsolved problem, the lack of success, the open question that motivates participation and discussion. At this point, the roles of teachers and learners become indeed interchangeable, as the problems to be discussed are real and not artificially constructed by a seemingly omniscient authority for the learners to solve. Case studies give the learners the opportunity to get to know the author, her competencies and problems, and could facilitate future contact at the time when the learner needs exchange and support in her practical work.

4.3 The facilitator as the "spider in the web"

The (tele-)presence of a single facilitator in the staff training course as it was delivered in its final form turned out to be a substantial factor in providing stability and continuity in this networked ODL environment. The facilitator did not only coordinate students' activities, but also became a mediator between the students and the different authors. While the modules still were authored by different people from different countries, backgrounds, etc., student activities were designed and monitored centrally and over the whole duration of the course. The facilitator's role could best be compared to a "spider in the web", tying together the most diverse persons, interests and activities.

Facilitation has turned out to be the key to success in the FACILE courses. This result is connected to the insight that the most important type of learning that can take place in an ODL course for practitioners is of the "know how"-type. In this type of learning, intensive assistance is necessary. But even more: While motivation for the first type of learning ("know that") is mostly extrinsic (e.g. a certificate) and almost entirely intrinsic in the third type (own practice, professional networking), it can be considered "mixed" in the second type ("know how"). Thus, the facilitator also has to take "motivating" action, not in the sense of reinforcing extrinsic motivation (e.g. by sanctions), but by trying to build a learning group that develops its own social dynamics and commitment.

For the final launch of the FACILE Staff Training, the roles of facilitation and consequences for the facilitator profile have been defined, e.g.:

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- the facilitator is the primary contact person for all the participants and contacts authors and experts;
- the facilitator has to take the initiative e.g. in soliciting questions, contributions or personal information from participants; (s)he elicits questions from participants and acts as moderator between the learning group and the authors/experts;
- the facilitator monitors each participants' activities, e.g. by reminding them of their tasks;
- the facilitator creates a social learning environment - a virtual learning group, using the available technology; (s)he thus has to be technically and socially competent in communication technologies.

In short, the facilitator has to react timely to every input by a participant, triggers self help and group support instead of answers by facilitator or expert, and keeps the team learning going by setting tasks and deadlines, by ensuring information flow among participants, by being supportive and communicative.

5. ICT for networked facilitated ODL

Several ICT were used in the FACILE courses, as mentioned before: besides an electronic learning environment (ELE), these were e-mail, mailing-lists, and a chat-room. The web-based ELE, specifically developed for the FACILE project on Lotus Notes Domino basis, also served as a joint workspace for the project partners.

The ELE offered a whole range of functions for course delivery and communication. The modules (text, graphics and links) were disseminated via this environment, as were contact information about authors and participants. The ELE also offers discussion fora and feedback facilities for online tutors. Mailing-lists and chats were external to the ELE, although dissemination of e-mail to different groups was supported.

The experiences showed that participants accepted the learning environment for distribution of materials, but preferred e-mail and mailing-lists for communication. The ELE's discussion forum function was hardly used, although such a forum offers much more comfort to users, such as access to past discussions and structuring of contributions in threads. We suppose that participants prefer communication via e-mail because this is their everyday working and communication environment. It is not necessary to log into the learning environment each time they want to read or write messages to the course group. While it would be desirable to collect messages exchanged in the framework of an online course in the ELE together with the material they (possibly) refer to, it would be the wrong approach to force participants to use the ELE. Learning environments should adapt to users' needs and habits, and not the other way around.

Technically, it would therefore be desirable to integrate mailing-list communication into the ELE in such a way that postings and replies are distributed via a list-server and simultaneously stored in the discussion forum of the ELE, thus enabling both modes of access (much the same way as in free discussion servers such as yahoogroups.com). In addition, automatically generated reports about activities in the learning environment, distributed via e-mail (as implemented in the project partners' workspace), are necessary as a service to participants: it is a reminder to log into the learning environment and, at the same time, allows them to reduce logins to those cases where it is worth while. In training busy professionals, every chance has to be taken to help them save time. It is known that online courses, especially when communication is intensive, take much more time to complete than foreseen by either teachers or students.

Networked ODL as in the FACILE project, where contents originate from different institutions and authors, requires a learning environment that makes it easy to import and adapt learning material from different sources.

Information about participants of online courses is often limited to the presentation they give of themselves at the beginning of the course. A mode of representation of online discussions where contributions are grouped by their authors - together with personal information - could be a means to create a "dynamic profile" of the participant which would be of interest not only for the facilitator, but also for other participants in view of future contacts and networking.

Conclusions

The FACILE project has shown, especially in the second staff training course, that the double role of the facilitator - both (technical, organizational, personal) assistance and motivation - requires a high level of skills of technical, organizational and, maybe first of all, social nature from the person who is in charge of facilitation. Facilitators have to be professionals in their specific field, and in any ODL development attention has to be paid to developing facilitation competencies in the persons who are to play this role.

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