

# Re-engineering University Services to Manage ICT in Education

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**Abstract:** Integrating ICT is a hot topic in higher education, in the Netherlands, especially at the University of Twente, the only residential university in the Netherlands. The University of Twente (UT) is profiling itself as a “Telematics University”, a university where telematics applications (or ICT) support, enrich, and improve current education and provide more flexibility in course delivery. Two examples of instructional support for instructors are available at the University of Twente. The first example shows the way a faculty is supporting its instructors in a large-scale project, the TeLeTOP project of the Faculty of Educational Science and Technology, in which all first-year courses are re-engineered so that education becomes more efficient, more enriched, and more flexible via innovative and appropriate applications of telematics, particularly WWW-based tools and environments. The second example of instructional support can be found at the University’s Educational Centre. The Educational Centre is strongly involved in staff development and innovation projects at the UT, not only in the field of ICT in teaching and training, but also in student-centred education and curriculum development.

## 1. INTRODUCTION

The University of Twente (UT) is a mid-sized, residential, university with technical and social sciences. The University of Twente has an excellent ICT infrastructure, including low-cost dial-up facilities for both students and staff.

The University of Twente is profiling itself as a “Telematics University”, a university where telematics applications (or ICT support, enrich, and

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improve current education, and provide more flexibility in course delivery. Profiling itself as a telematics university has several causes. Most apparent is the external pressure for change being exerted by government policy to increase the possibilities for lifelong learning, by industry's need for university graduates who are skilled in using information and communication technology in their future profession, and by the media's increasing attention to ICT. All these are contributing to a gradual change in thinking about education and the ways in which not only information technology, but also especially communication-related technology, can be used in educational settings. Universities are not the only educational providers. Private institutions and on-the-job training are competing more and more seriously in the education market. To survive in this market, universities have to provide the same (and even better) academic programs and courses for students to obtain the necessary competencies, including professional and communication-related skills.

Many examples of educational ICT exist. Instructional use of the World Wide Web is the most obvious and universal. All it takes is an enthusiastic instructor, some knowledge of how to put text and additional images on the web, and a simple version of a "course on the web" is accomplished. With some additional knowledge, it is possible to integrate more interactivity, such as discussion lists, simulations, and feedback possibilities. This can grow to an adequately integrated course environment where students and instructors can communicate with each other before, during, and after lectures.

Lectures? Are they still needed? The University of Twente believes so. In its vision of ICT use in education, the UT declares that it is not its intention to move towards a virtual university where students can sit at home, take some courses, "surf" the electronic environment, and then collect their diplomas without having seen any instructors or fellow students. Contact between the instructor and the student, and stimulating contact among students, are important in the learning process. Students should not only have the opportunity to discuss the learning material with each other and with experts, but they also need to develop socially through direct face-to-face contact. This is of utmost importance for the student to become a professional. For instructors, this means a twofold change in their profession: their roles change from instructors to guides or coaches of the learning process, and they have to learn how to use ICT-applications. Students must also learn how to use these ICT-applications and experience a new way of learning. Self-regulation and self-discipline will be increasingly important.

Both instructors and students will have to adapt to the change. This does not mean that every instructor should use ICT in all of his or her teaching.

For some courses, traditional teaching may be the most effective, and, for some instructors (and students!), traditional teaching will be the most convenient. This article will focus on the instructors' side of the story and especially on those instructors who are willing to change their courses by basing them on ICT. Starting to use educational ICT means a high-impact change for instructors. But instructors cannot accomplish this change on their own. Naturally, some instructors have time (or are willing to make it) to learn the necessary ICT skills and have the insight to offer a new programme with the good didactical skills necessary for teaching various kinds of students; these are the pioneers. But most instructors do not have the time to discover this on their own. They need support. This support can be very basic, such as a short course on how to make a web page, or it can be more extensive, such as learning how to use shared workspaces or how to make interactive assignments.

What follows describes two examples of support for instructors at the University of Twente. The first is the way a faculty is supporting its instructors in a large-scale project, the TeLeTOP project of the Faculty of Educational Science and Technology, in which all first-year courses are re-engineered so that education becomes more efficient, more enriched, and more flexible via innovative and appropriate applications of telematics, particularly WWW-based tools and environments. This TeLeTOP method will be discussed, and results provided from its evaluation.

The second example of instructional support can be found at the Educational Centre of the University. The Educational Centre is strongly involved in staff development and innovation projects at the UT, not only in the field of ICT in teaching and training, but also in student centred education, curriculum development and other areas. Since 1996 the Educational Centre has been supporting both individual instructors and groups of departmental staff on how to use ICT as an educational aid; the current period will continue at least until 2001.

## **2. CASE 1: TELETOP, FACULTY SUPPORT FOR INSTRUCTORS**

"TeLeTOP" stands for the "Tele-Learning T.O. Project", where "T.O." is the Dutch abbreviation of the faculty's name, "Educational Science and Technology". This project is focused on extending the faculty's profile through integrating ICT into its courses for more-flexible learning. Since the project's start in the second half of 1997, TeLeTOP has identified its major task as preparing its faculty's first-year courses for a dual cohort of students: regular and part-time.

To understand the ideas behind the project requires some information about the (ICT) history of the faculty. Up to 1997, several pioneer instructors had already been using ICT in their teaching for some years. Some used a web page and e-mail for general information about the course and for feedback on students' work; others built complete web-based environments for overall course support. In 1997, the realization occurred that the faculty has pioneered enough and there had been enough pilot projects. Therefore, a group of instructors was asked to develop a plan to move the use of ICT to a higher level. In addition to the belief that there had been enough (or maybe too many and unstructured) pioneering activities, several other reasons emerged to do this. Most important was the decision to expand the faculty's teaching activities. Next to the regular campus-based students (whose number was declining), the faculty was aiming at a new target group: part-time students with a job who are located throughout the country. Another reason was the fading technological profile of the faculty. The faculty's name, "Educational Science and Technology", implies a certain profile that was not being embodied in everyone. The faculty hoped that a large-scale project using ICT in education would resolve this (and from the indications of student numbers it seems that it worked).

In 1997, the group of instructors who were asked to develop a plan to bring the use of ICT to a higher level proposed the TeLeTOP project, which was started in the same year. Its overall goal of the project was defined as:

"To systematically support the professional development of its staff in terms of potential applications of telematics in their teaching, and to further support the re-design of all of its courses so that they become more efficient to experience, more enriched, and more flexible via innovative and appropriate applications of telematics, particularly WWW-based tools and environments."

The objectives of the TeLeTOP project in its first year (1997-1998) were:

1. Re-design and re-vision of 21 courses, support for the instructors of these courses as they prepared to teach them making use of telematics applications, and a positive attitude from these instructors toward the experience;
2. Development of an efficient working strategy for the TeLeTOP team, the TeLeTOP Method;
3. Development of staff awareness of, and experiences with, telematics applications for different pedagogical purposes, relating to efficiency, enrichment, and flexibility enhancement.

(For a more extensive overview see the TeLeTOP web site at <http://teletop.edte.utwente.nl>.)

The overall goal, as well as the first-year objectives, quickly revealed that supporting the faculty's instructors is at the heart of the project. Central in this approach is a Decision Support Tool (DST) that was designed especially for the project. The DST is described in several articles (see for instance Fisser & de Boer, 1998 and Collis & de Boer, 1998), so only the main ideas in this article are summarized here. The primary goal of the DST is to interact intensively with the instructor whose course is being re-designed, trying to identify which ideas and approaches are most likely to be acceptable and interesting to the instructor's particular course, given his or her teaching style.

This implies that an instructor must be aware that his or her course is being re-designed, that the course will be web-based, and that interaction with students will change. These concepts should be more or less clear before the instructor's first DST session. In order to achieve more awareness, the TeLeTOP team organised several information and hands-on sessions. The information sessions provided an overview of the project, its goals and procedures, with time for discussion between the TeLeTOP team and instructors. The hands-on sessions were more practical. Instructors learned, for instance about html and html editors and about how to convert MS Word documents and PowerPoint presentations so that they can be presented on the Web. Next to these sessions, workshops with specific themes were organised; these workshops dealt with didactic issues and tools like Quizmaker.

During this process the first session of the DST began for individual instructors with a one-hour appointment.

During this first session the TeLeTOP team member explains its goal, next introducing the DST. The DST tool is designed to support a structured interview, enabling both instructor and team members to make decisions in a structured and organised way. With the help of the Decision Support Tool, the current practice and strengths of different course aspects are examined and aspects that can be made more flexible and extended by telematics are identified.

Taking a specific component of a course, "General Course Information", the instructor is asked, for instance, if he or she would prefer a roster in his or her Web-based supporting course environment. Some instructors do not have a clear idea of what has been asked and they might want to see an example, which the DST then provides. After the example, the instructor understands more clearly the meaning of a roster and its

functionality. This enables the instructor to reply in a more considered way to the question.

Similarly, all course components are discussed by the instructor and the team members. The questions of the DST are discussed and examples are used to clarify what is meant by the questions. Within a few days after the DST session, the TeLeTOP team makes a first prototype of the course, based on joint decisions. After the development of this prototype, two members of the TeLeTOP team visit the instructor in his or her office, and conduct a walk-through of the first prototype of the course WWW site, further discussing the ideas and reactions of the instructor.

(Adapted from Fisser & de Boer, 1998)

From the above description, it can be seen that the whole process of re-designing courses demands much time and effort from the TeLeTOP team *and* the instructors. To facilitate this, the TeLeTOP team consists of a chair, the Director of the faculty's computer laboratory, and five full-time educational technologists. In addition, there are three persons employed in TeLeTOP with technical responsibility: a full-time Webmaster, a part-time Webmaster, and a full-time database specialist. Graphic design specialists and multimedia specialists from the computer laboratory are available to the project, as are members of the faculty's technical help desk. A secretary supports the team. In addition to human resources, technical facilities are available (well-equipped working area, a portable projection device, multimedia computers equipped for desktop videoconferencing a Silicon Graphics WWW and video server, an Oracle database environment, etc.).

In practice the five educational technologists are available full-time for instructional support. From extensive evaluation of the project's first year, it appears that instructors know how to find them and appreciate this kind of support. Even though the DST is regarded as a useful tool, direct contact with the team members is regarded as necessary for this ongoing process.

In conclusion, support for instructors is needed. The TeLeTOP team managed to support instructors in re-designing all first-year courses. Much effort has been put into technical *and* personal support. Re-designing a course is not only "putting a syllabus on the web"; it means a different approach to teaching and learning. Instructors have to change their role from instructor to guide or coach of the learning process, and they have to learn how to use ICT applications. The first evaluation results of the project indicate that both the faculty and the TeLeTOP team are fairly positive about the ongoing process. Problems and obstacles mentioned by the instructors

are not disregarded, but used in the second year of the project to improve support for instructors.

### **3. CASE 2: THE EDUCATIONAL CENTRE, CENTRAL SUPPORT FOR INSTRUCTORS**

Since 1996, the University of Twente has established a central support point (the ICT Support Point – ISP) to stimulate the use of ICT in learning and teaching. Traditionally, this kind of central support is positioned in the Educational Centre. The Educational Centre of the University of Twente usually plays an important role in major changes in the university's education. The Centre is strongly involved in staff development and innovation projects at the UT, not only in the field of ICT in teaching and training, but also in student-centred education and curriculum development.

The ISP has developed several strategies to stimulate faculties, schools, departments and individual instructors to start using ICT in learning and teaching.

1. An inventory was made of all faculty activities and policy-making concerning the use of ICT in learning and teaching (Van Geloven, 1998).
2. Every year, a “show and tell” conference is organised, where instructors demonstrate good practice of ICT to other instructors (Van de Kamp & Pouw, 1997; Van de Kamp et al, 1998).
3. A web site has been developed, not only showing examples of the use of ICT in learning and teaching, but also pointing towards links to similar web sites at other universities.
4. Every instructor initiating ideas or questions about the use of ICT in his or her teaching at the ISP gets all the help and information he or she needs.
5. A network of faculty people working on ICT in teaching and learning (about 15 persons) has been established; the network now meets regularly every six weeks, discussing new developments, good practice, governmental and university policy on ICT in learning and teaching, etc.
6. Workshops and training sessions are being organised for instructors, for instance on videoconferencing and on computer- supported collaborative work.
7. The ISP is actively involved in countrywide networks in order to keep in touch with parallel developments in other Dutch universities. The ISP is also actively involved in a few international networks.
8. The ISP has an advisory role in university policy (concerning ICT in learning and teaching) development.

Compared to the situation in the beginning of the ISP in 1996, we may conclude, that

- ICT in teaching and learning is now a policy issue in most of the faculties;
- all faculties have developed projects concerning teaching and learning;
- support enquiries at the ISP are growing rapidly since summer 1998;
- we expect that within a few years most of the faculties will have a strong policy on ICT in teaching and learning and that nearly all instructors will be using it in some way.

The high cost of ICT is one major concern that might influence future success. Another issue is the very limited time available for developing teaching and training in general. We do not expect that technology problems will limit the development of ICT in teaching and learning.

Up to now, in most of the faculties, we have seen many fairly small projects, usually concerning only one or two instructors. However, though we have learned much from all these projects, we now need to investigate more substantial projects. The TeLeTOP project (case 1 in this paper) is perhaps beyond the scope of most of the other faculties now, but some more coherence between individual instructors' projects should be established. This is the only way to deal with growing ICT costs where education budgets are decreasing rapidly. The university is now planning a few bigger projects to cope with these issues. We not only create larger projects, but we also link ICT projects with other educational developments; the major change is the development of a Major-minor curriculum within the next few years.

#### 4. CONCLUSION

Both examples show that it is necessary to support instructors in various ways. Not only is guidance at the individual or departmental level needed; sometimes it will also become necessary to offer assistance at the project management level. Without the necessary support, education will probably not be improved or enriched. Therefore, services offered at university or faculty level should be re-engineered and optimised to offer the best support for instructors. The question remains whether this support of instructors should be located centrally or within an individual faculty.

As demonstrated by case 1 (the TeLeTOP project), support located within the faculty itself has great advantages, especially related to availability and direct contact between instructors and the team. In *this* particular faculty, this top-down approach has proven successful.



On the other hand, central support has advantages too. With a central overview of what is happening in all faculties of the university, “re-inventing the wheel” can be prevented and experiences can be mutual exchanged. We advocate the idea of having a central support office like the ISP, combined with local ICT-specialists within the faculties. Discussions, meetings, and exchanging experience will be important in the ongoing process. But discussions and meetings are not enough.

If the university wants to profile itself as a “Telematics University”, more effort is needed. Synergy between existing projects should be realised, central support of instructors should remain available, communication between all levels at the university will be needed, the development of a common electronic environment may be proven necessary, public relations within the university and with the rest of the world is crucial. But most important is that we keep on doing what we are doing best: *practice what we preach*, using ICT in teaching and learning in such a way that both instructors and students will benefit, enriching our instruction and making it more flexible.

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