

Instructors' choices for a WWW-based course-support environment

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In 1997 the Faculty of Educational Science and Technology at the University of Twente made the decision to start using the Web for course support. This was the start of a faculty-wide implementation. In the first year we started working extensively with our instructors, particularly all of those responsible for the first-year courses. Twenty courses required for all students and several senior elective courses are now using their tailored-made Web-based course-support environments. In addition, during the 1998–99 academic year all of the second-year courses were adapted to be delivered with their new course-support environments. In this paper we describe how a broad range of instructors, not only those who volunteer or have an initial interest in using WWW-based course support, but also those who are required to do so as part of a faculty-wide change process work through a design process based on rapid prototyping to evolve tailor-made WWW-based course-support environments. What are the options instructors choose for these environments and how popular are various types of options (for example, shared workspaces, WWW boards for computer conferencing, etc.) for course-support environments? Trends and implications in the set of options chosen by instructors in our faculty are discussed.

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1. Introduction teleTOP at the University of Twente

The University of Twente in The Netherlands has national and international reputation in the field of telematics, the combination of information and communication technologies. Not only is there an extensive amount of research being done in the area but also the application of telematics applications to the teaching and learning process, what is called 'tele-learning' [1] has a high priority. The most ambitious of the tele-learning initiatives at the University of Twente is the *TeleTOP* project in the Faculty of Educational Science and Technology. The overall goal of the project is to stimulate the innovative and appropriate use of telematics for learning purposes within the faculty in

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order to make the educational delivery more efficient, more enriched, and more flexible.

To achieve these goals, a special system has been developed by a professional team of educational and technical designers and developers. The main reasons to build the TeleTOP system upon a Lotus Notes database were at that time a combination of requirements to have a system which was (a) all users only should need a browser to use the system, (b) the system would concentrate on communication and organization within a course, and thus (c) would not ‘replace’ existing good teaching, but add on to it in terms of flexibility, efficiency and enrichment. The combination of these technical and instructional requirements and the experience already gained with modifying Lotus Notes databases for (the support of) education made it a logical step to build a system ourselves. The system is database-driven and Web-based and uses a variety of telematics applications, ranging from e-mail and Web pages to shared workspaces. The system generates WWW-based environments that are meant as course-support environments for the instructors and students and not as replacements for face-to-face sessions and textbooks. Contact between instructors and students is still one of the essential aspects of a learning process (see [2] for a further description of the educational and technical requirements for the system and how they have been realized).

However, no matter how elegant a system is, instructors must use it. Reasons that instructors in higher education do not make use of computer-based resources to support the instructional delivery of their courses are well known (see for example [3] and [4]). With respect to WWW-based environments, most current usage in mainstream programs in higher education is voluntary, and although there are an extensive number of examples of such voluntary use, there are many more instructors who are not making use of any of the instructional possibilities of telematics. There are relatively few examples of efforts to engage all the instructors in a faculty in the use of telematics applications in their courses. Merlic and Walker [5] describe the *Virtual Office Hours* environment at the Department of Chemistry and Biochemistry at the University of California as one such example. Another is the TeleTOP Project at the University of Twente.

The decision (made by the faculty administration) to involve all courses in a re-design process—both pedagogically and to include use of telematics tools and WWW sites—involves the challenge of working with a wide variety of courses and instructors. To do this we have developed a WWW-based decision-support tool which we use as part of a rapid-prototyping process designed to maximize instructor involvement in the re-design of his or her course. Our situation has also given us an excellent opportunity to study what instructors actually want and use when given the possibility of a wide range of WWW-based tools and suggestions for using those tools. In the next section we describe the rapid-prototyping process.

2. Supporting instructors in the decision-making process when designing a WWW-based course-support environment

WWW-based environments to support all of the first-year courses in the Faculty of Educational Science and Technology were ready in a definitive form at the beginning of June 1998. How did this come about? At the beginning of the preparation period, a weekly instructors' session began in the faculty. These sessions were voluntary, and well attended. During the first two months of the sessions, instructors were introduced to a way of thinking about their courses, in terms of a matrix in which the rows are standard components of courses (course-organization aspects, face-to-face sessions, self-study and practice activities, projects and major assignments, testing, and general communication) and the columns relate to three motivations for change in each of the components (to make the component more efficient for instructors and students, to enrich the component, to make the component more flexible for different types of students). Links to examples of how telematics applications could support each category of change were demonstrated and discussed.

After several months, instructors were encouraged to consider their own courses and make a list of re-design options which could be facilitated by a WWW-based course-support environment tailored for their own particular courses. Following that, one-hour individual instructor sessions with the instructors of each of 25 courses were organized (all the first-year courses and a variety of other courses). The primary goal of these sessions was to use the especially made TeleTop Decision Support Tool (DST) [6] in order to interact intensively with the instructor whose course was being re-designed, trying to identify which WWW-compliant tools and associated pedagogical approaches are most likely to be acceptable and interesting to the particular course of the instructor and his/her way of teaching. For each of the course components a number of questions were asked relating to ways that a WWW site could be used relative to that component. Links to examples, primarily from courses already using the WWW in our own faculty, were provided for every question. Immediately after the last of the questions in the DST was completed, a WWW page was generated for the instructor summarizing the choices that had been made, and providing the example links for those choices so that the instructor could further consider them via the use of an ordinary WWW browser at his or her convenience. This site generated by the DST served as the product of the first round of rapid prototyping.

The second goal of the DST session was to respond to the instructors' reactions with ideas and suggestions, as well as to skip suggestions which did not seem like they would be comfortable for the instructor. The tool made it easier for instructors to make decisions with regard to making (some of) the components of their own courses more efficient, enriched and/or flexible in their new WWW-based learning environments. The instructor needed to decide what he thought was appropriate for his or her course. Twenty-one sessions, one per course, were

organized according to this approach, with one or two instructors participating and the authors carrying out the interview with the support of the DST at each session. A follow-up visit in the instructor's office one week after the DSST also occurred, to walk through the first site from their decisions with the DST, and make a second round of refinement of those decisions. Following this, a first prototype version of a course site tailored to the instructor's choices was generated, through the use of the TeleTOP database system. This process was repeated in the same period during 1998–99 for all the second-year courses.

The next step for the instructors was to come together every week and practice with these prototype environments. The *Wednesday sessions* in which this occurred became an important part of the implementation process. Instructors had the chance to work together and exchange ideas. A few months later the instructors again went through the process of using a second WWW-based decision tool, choosing a final set of options for their course-support environments. As a result of this rapid-prototyping process, instructors not only are closely involved in the design process of the WWW sites that will support their courses, but also develop competency in handling those sites and the associated telematics tools and applications. The results of the process are tailored course-support environments, and also the creation of a sense of community among the instructors and a heightened level of awareness and literacy throughout the faculty with regard to the handling of telematics applications, network issues, and the instructional integration of telematics applications into regular courses.

Instructors thus had an extensive opportunity to try out a large variety of telematics tools and applications over the course of the rapid-prototyping process. What options have they actually chosen? In the following section, a summary of the options eventually selected by 25 courses in the first year cycle is given (see also [7] and [8] for discussions of two of the courses in detail).

3. Designing a course environment: the options chosen

During the second round instructors could make a final list of options for their course environment. Table 1 gives an overview of the options selected by the instructors for their environments.

In a similar session as with the DST, the instructors were asked to choose a final set of options, using another decision support tool, the DST II. Figure 1 shows a portion of the DST II, with the overlay screen showing the example available from the link associated with a particular question.

The options *Newsflash*, *Roster*, *Course Information* and *Email Centre* were chosen by all instructors and thus are being strongly advised as the basic environment for the new round of courses being tailored during the following academic years. The other options were chosen in various combinations by the instructors. Instructors with specific needs could get more tailor-made options. Figure 2 gives an overview of the percentages of the instructors who used

Table 1. *The options chosen for the WWW-based course-support environments*

Component	Options	Description
General course information, self-study, lectures and support	News	A place for up-to-date information
	Roster	This is an important part of the environment and the ideas behind it. Here, instructors can put their study materials, assignments, sheets, notes and feedback related to the lectures and students can enter their own work.
	Student administration	An overview is given of all the students who submitted material via the WWW site during the course, organised per student.
	Quizserver	This option enables easy-to-make (self) tests.
	Course information	A course description can be put here. This can include course goals, organisation, assigned texts, etc.
	Email	In the mail-centre addresses of individuals and groups can be found. Mails can be sent from here.
Communication	Discussion	The discussion area can be used for asynchronous discussions.
	Question and answer	Same as the discussion area, here with the focus on question towards the instructor.
Group-work	Chat	Synchronous communication.
	GroupWare	An easy-to-use file management area, for collaborative work.
	BSCW	An advanced file and communication management area, for collaborative work (http://bscw.gmd.de/).
	Presentation	Presentations and other products can be presented in this area.
	Glossary	Area where concepts can be explained. Relations with other areas can be made clear as well.
Resources & others	WEB links	Resources: pages on the WWW
	Multimedia	Resources: in the multimedia database.
	Publications	An overview of interesting literature for the course.
	Slides	HTML slides can be made and presented in this area.
	Search	A search centre: within the course environment or the WWW

each of the above options (Table 1). These numbers are based on the first 25 courses, of courses being offered in the first year that the TeleTOP course support environment was used. Some of the new options (such as *administration* and *publications*) are not concluded in this analyses.

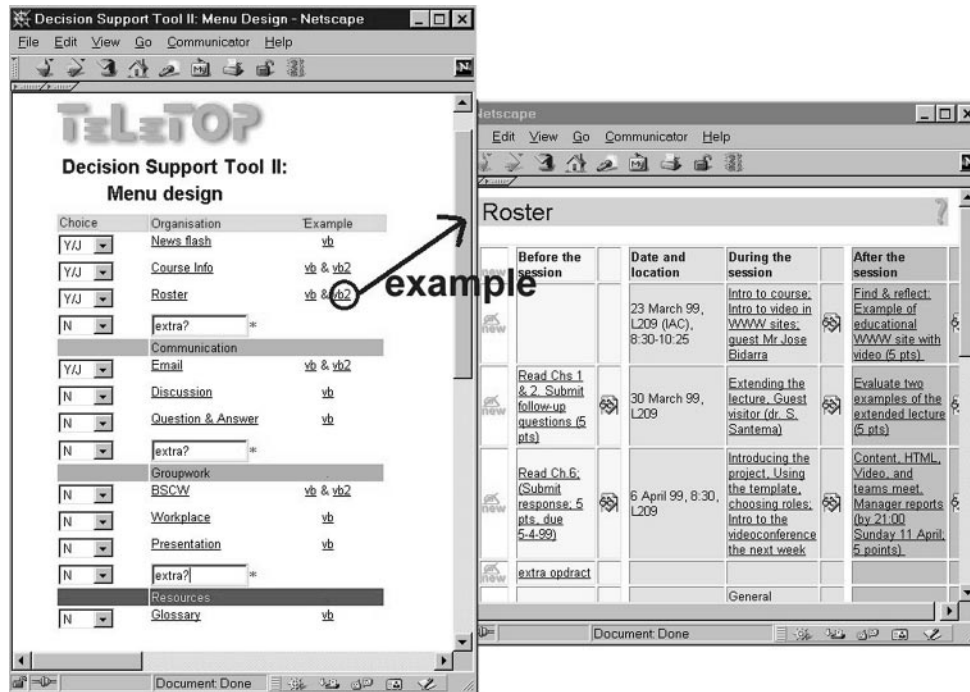


Figure 1. A screen dump of the WWW-based decision-support tool II: questions and examples.

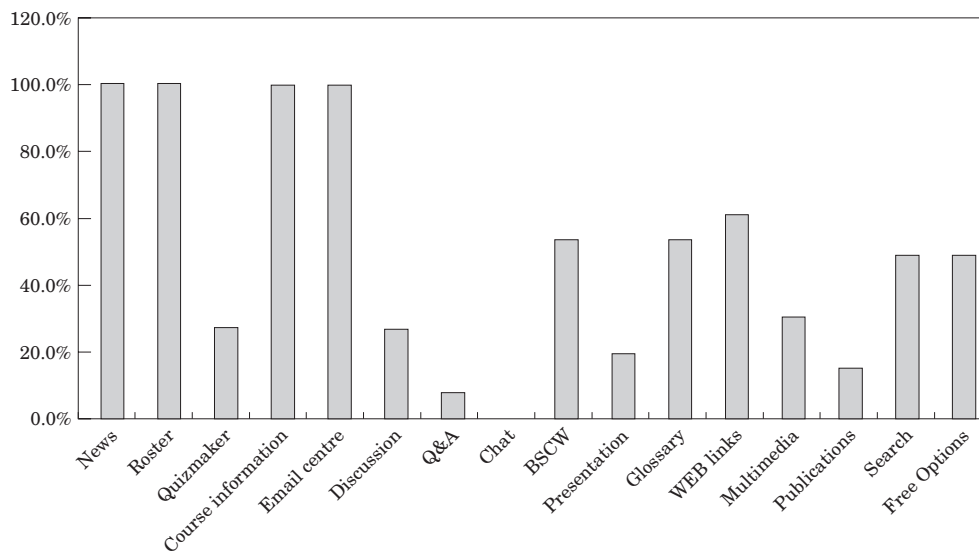


Figure 2. Percentages of instructors choosing various options (N=25).

4. Using the course environment

In our approach we tried to let instructors think about the design of their support environment themselves. The principle of instructor choice has led to a large variety of pedagogical and organisational decisions in the courses, but consistency is maintained for the students through the overall user interface. We have standardized the lay-out and the use of options through a common way to indicate the basic information about a course's objectives, content, assignments, and evaluation methods; and through using common techniques for inputting and downloading material into and out of the system. Figures 3 and 4 illustrate some of this variety, and consistency via the rosters of a course oriented toward self-study of computer-related skills and a course oriented around complex theoretical material.

Figure 3 is a screendump of the 'Roster' (schedule) of the Principles of Computer Use course. The roster gives an overview of the skills that should be learned through self study by the students. By carrying out the tasks that




Roster				
Before the session	Date and location	During the session		After the session
Computer + software beschikbaar?	20/8: INTRO dt L209	College: Introductie en aanwijzingen		Zelfstudie
Computer + software beschikbaar?	30/08/99 5+6u gr1-3 L209 7+8u gr4-6 L209	College: Introductie en aanwijzingen		Zelfstudie
Win95/98	01/09/99 1-4u L102	Practicum: Win95/98		Zelftoets Win95/98
Computer + software beschikbaar?	03/09/99 dt: 2u L209	College: voor dt'ers die niet aanwezig waren op de introductiedag 20 aug		Zelfstudie
	03/09/99 dt: 5u L209	College: ICT		
Win95/98, E-mail, WWW, Word, Powerpoint	03/09/99 dt: 6-9u L107+L109	Practicum: Win95/98, E-mail, WWW, Word, Powerpoint		Zelftoetsen Win95/98, E-mail, WWW, Word, Powerpoint
E-mail, WWW	08/09/99 1-4u L102	Practicum: E-mail, WWW		Zelftoets
Word	09/09/99 5-8u L102	Practicum: Word		Zelftoets
Word (vervolg)	15/09/99 1-4u L102	Practicum: Word (vervolg)		Zelftoets

Figure 3. The roster of *Principles of Computer Use*, a course for self-paced development of skills in the use of a standard application packages.

Roster					
	Before the session	During the session		After the session	
Date and place	Selfstudy	Notes and assignment	Submitted assignments	Follow-up assignment	Submitted assignments
25.March.98 L-213		session 1 notes (Introduction)		Selection of Chapters for Presentation	Your Choices
2.April.98 L-213	Preparation for session 2	session 2 notes (Ch.1&2+Art.1)	Presentation of Group 1	Behaviorism, Cognitivism, Constructivism	Your Definitions & Comparison
23.April.98 L-213	Preparation for session 3	session 3 notes (Ch.3&4+Art.2)	Presentation of Group 2	Test: Phases of Systematic Design Models	
7.May.98 L-213	Preparation for session 4	session 4 notes (Ch.16,17,19+Art.3)	Presentation of Group 3	Discussion: ITT	Submitted Assignments
20.May.98 L-213/ IAC	Preparation for session 5	session 5 notes (Ch.21&22)	Presentation of Group 4	Extending Glossary	Your Entries
28.May.98 L-213/ IAC	Preparation for session 6	session 6 notes (Ch.10&11)	Presentation of Group 5	Instructive Programme Based on Gagné & Briggs	Your Reflections
4.June.98 L-213	Preparation for session 7	session 7 notes (Ch.12,13, &14)	Presentation of Group 6	Discussion: Media Debate	Your Comments
11.June.98 L-213	Preparation for session 8	session 8 notes (Art.6&7)	Presentation of Group 7	Discussion: Objectivism vs. Constructivism	Your Critiques
25.June.98 L-213	How to be prepared for the exam	Tentamen		Evaluation of the Course	Overview of Your Evaluation Results

Figure 4. The roster of *Instructional Theory II*.

are listed in the column ‘What to do before the (self-study) sessions’ students were given instructional materials relating to basic computer-use skills, such as sending an e-mail. Many students had no need for such basic help; thus students could select for themselves what they needed. In the next column, assignments during a (self-study) session, students can find the study materials and tasks associated with each of the application packages, to practice in their own time. Also links to self-tests are provided, so that students can test their skills. The students’ knowledge of the application packages is examined by two tests carried out individually and in the computer laboratory of the faculty under supervision. These tests require the students to put together the different skills that they have learned to carry out various tasks under a timed and supervised condition.

Another example is the roster of a more-theoretical course: *Instructional Theory II*. Figure 4 is a screendump of the roster in that course.

In this course eight lectures are given in a period of almost four months. From the results of class discussions and evaluations of the course, the goal of an interactive and open course design to emphasise strong connections between the student and the instructor appears to have been well met [7]. In the roster

the instructor made available his session sheets, additional web links and other resources. Following each contact session the instructor asked his students to submit a small assignment, which was immediately posted to the course site when submitted by the student via the site. Students particularly appreciated the large amount of external links that were accumulated in the course site to examples offering additional insight relating to the theoretical material in the textbook for the course.

5. Conclusion

The TeleTOP rapid-prototyping approach, supported by two versions of a WWW-based decision-support tool, is a manageable and effective way to involve instructors in the re-design of their courses, and at the same time in skill development at handling WWW-based tools and environments. The options chosen by the instructors build upon their existing ways of teaching, but extending these, primarily through opportunities for the students and the instructor to efficiently communicate and for students to add new resources to the course sites as follow-up assignments between face-to-face sessions. We believe this approach, building upon the instructional methods already familiar to the instructor, is a useful strategy particularly when instructors who would normally not consider making use of a WWW environment are involved. The approach also works for instructors already experienced with WWW environments as well. For more information, see <http://teletop.edte.utwente.nl>

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