

Using the Net to Teach about the Net: An Experience in Giving Web-based Courses

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Abstract

The paper gives an overview and comparison on two different courses in Computer networks. Although the audience and the contents of both courses were different, they had several things in common. The students in both courses were adults with a definite, but slightly different, computer science and networking background. While in the first course the participants came from more than twenty different nationalities and its running was distributed in twenty different countries, the second one involved participants from a single country. The topics of the “multinational” course were confined to IP addressing, routing and troubleshooting in IP based networks. The second one was actually a general course in Data communications.

The intention of the article is to present the overall experience of teaching this type of courses in a web-based environment. It enumerates the possible problems that might be encountered during the courses. The discussion and the subsequent conclusions are focused on the comparative study concerning the outcomes and the results of the two courses.

Introduction

For a teacher that has had a long practice in teaching, it is still a challenging experience to teach the same topics in a distant education course. The instructional demands in the course development and the course delivery are quite different. The fear from doing something completely new is always present. The doubt if the technology will fulfill the expectation is high and many uncertainties about the students knowing how to use the technology exist.

There is no other way to confirm or deny these doubts, than to actually start teaching such a course. If the first course is in the field of computer networks, it can make the teacher more relaxed. It is expected from the students that have background in networking and computer science, not to have problems in using the technology. They have studied how technology works and know more about it than other ordinary students. Therefore, the time devoted to solving problems with the technology should be minimal. However, the examples described show that although that is true in many cases, there are still exceptions to this rule.

In the following two sections the two teaching experiences will be presented followed by a section that tries to find the similarities and differences between them and to emphasize the lessons learned through teaching these courses.

A Pre-course for CEENET Workshop

CEENet Workshops

The Central and Eastern European Network Association (CEENet) was established in 1994 with the objective to co-ordinate international aspects primarily of academic and research networking in the region of Central and Eastern Europe. It involves 20 countries starting from Estonia in the north, Slovenia in the west, Macedonia in the south to Mongolia in the east.

Arranging annual workshops about the Internet is one of the activities of the organization. The workshops were at first mainly financed by the Open Society foundation, and later other organizations joined. Several participants from each country in the region are educated each year. The lecturers come from the participant countries as well as from the United States and Western Europe. The official language of the workshops is English, although this is a native language to none of the students. Being the mostly used language in the Internet community, made its choice inevitable.

The workshops included two tracks: one on Network technology and the other on Internet services, until 1998 when another track on distance education was added. The new track introduced the first distant pre-course in 1999. This proved to be a success and the next year it was followed by the other two tracks.

The pre-courses were developed to introduce the basic concepts previously taught on the face-to-face meetings. The intention was to save more time for the advanced topics and for hand-on-experience work, as well as to reach larger audience. In addition to this, the pre-courses were helping the selection process for the participating students. Usually each country included twice as much students in the pre-course than the financing allowed being present at the real workshop. The best students were selected to continue with the face-to-face lectures and practical exercises.

The web-based environment, called WebCT was used by all three tracks, as advised by the distance education track that has had experience with it.

The Network Technology Track

The audience on this track consists of adults that have been using Internet services for a long time, but had little knowledge about how to establish the network infrastructure that will help in delivering services to the users. They were usually network administrators of small organizations or members of the team responsible for the academic and research network in their country. Their background was mostly in computer science or in telecommunications.

It was natural to assume that these students would have no problem using the WebCT platform. However, it was decided that it is necessary to devote the first two weeks of the course to learning the WebCT environment. This was also an opportunity to test student's abilities to communicate in English language. Help from the distant education track was indispensable in doing this.

The participants, coming from the Central and Eastern European countries, had not very good connections to the Internet. The bandwidth for many of them was a scarce resource and the equipment they were using had not so good quality.

The topics taught on the Network technology track were:

- IP addressing and how to make addressing plans
- Basics of routing and routing protocols
- Serial communications
- Troubleshooting the network
- Advanced topics (different each year)

The designers of the pre-course (three persons from three different countries) found convenient to use the pre-course to introduce the students with IP addressing, basics of routing and simple tools for troubleshooting IP based networks.

For the regular lectures, the power point presentations were used as a visual add to the lecture. These kinds of presentations don't include enough information for the on-line learners. Therefore, their transformation into html pages with more pictures and explanations was necessary. The html pages were incorporated into the content module provided by WebCT.

When designing the distant course it is important to motivate students by giving them assignments where they can test the knowledge they have acquired. There is always a question whether the assignments should be done by a group of students or individually. The experts from the distant education track suggested that group assignments are usually more motivating and more learning beneficial than individual ones. Therefore, the students were divided into groups with 6 to 7 students per group and group assignments were designed. All communication tools provided by the WebCT environment (discussion bulletin board, private e-mail and chat) were included in the course. The groups were made in such a way that all the students in the group were coming from a different country. However, it was taken care the time zones for these students not to be an obstacle in their communication.

Three quizzes with multiple choice questions were designed to test student's knowledge. To make students familiar with the quizzes a self-test was included, too.

The assessment of the student work was based on the knowledge of the English language, the quality of the assignments submitted, the activity of the student in the group work and the points earned on the quizzes.

The whole course went completely distant without a single face-to-face meeting.

Lessons Learned the FirstYear

The operation of the pre-course went rather smooth. Although all the students were coming with the networking background and have been using the Net for quite long time, we found very rewarding the first two weeks that were used for the students to become familiar with the WebCT and to start communicating with each

the communication ceased. When planning the next year pre-course there was a consensus on keeping these two weeks devoted to WebCT into the curriculum. Even more, a tutor was assigned to each group for the next year pre-course. The roll of the tutor was to stimulate the discussion in the group and to try to “waken up” some of the students.

The group assignments proved successful in the way that they provoked more communication. However, when assessing individuals it was hard to make a difference, especially for the members of the same group. Therefore, it was decided that the next time besides the group assignment, there should be also several individual assignments.

The mostly used communication tool was the discussion bulletin board followed by the private mail. The chat was somehow inconvenient for these students leaving in different time zones and doing their regular work.

The selection process went without major complains. The participants at the face-to-face workshop were motivated and engaged students eager to add more knowledge to the one they acquired during the pre-course.

A Data Communication Course for Secondary School Teachers

Education program for Computer Science Teachers

The lack of Computer science teachers in High schools in Sweden has inspired the creation of the program for additional education for teachers that already have a degree in some other area. The program comprised of 12 courses and a final work. There were 30 teachers coming from different schools spread all over Sweden, from Karlskrona in the south to Payala in the north. They were supposed to do their regular jobs while receiving this additional education. The only way this could have been done was through distance education courses. WebCT was used as an environment through all the courses. All of the schools had rather good connections to the Internet and many of the students had a connection from home, too.

It was anticipated that two face-to-face meetings (one at the beginning and one at the end of each course) are necessary. The meetings were organized in such a way that the first meeting for the course that starts was in the morning and the last meeting of the course that ends was in the afternoon on the very same day. The examinations were supposed to be written ones and to be conveyed by the supervisors at each of the schools.

The Data Communication Course

The Data Communication course was in the second year of the program and the students have already had experience with distant education courses. Besides the course content and the common communication tools, three individual assignments and one group project was included in the course. The appropriate course book was also chosen for the course.

Although the first face-to-face meeting was supposed to help the students to navigate through the course, they felt this was unnecessary after so many courses

taken using the same environment. This group of students knew each other very well. They have even developed special relationship during previous courses. Therefore, the groups needed to be reformed according to their personal relationships. The second face-to-face meeting was a week before the exam and it was used for answering many questions and explaining problematic topics. The communication for the exam was done via regular mail service.

The assessment took into account the individual assignments, the group project and the exam.

The Problems during the Course

Although the students have had other courses using WebCT environment, it turned out that they have not learned all the possibility that WebCT offers. For example, instead of submitting the assignments through the WebCT, they were sending them as attachments to the private mail. Not all the students participated in the discussions. They used private mail so extensively that the number of messages in the private mail was larger than the one on the Discussion bulletin board. They were also using the book and printed materials much more than the on-line course content.

The first face-to-face meeting proved completely unnecessary, since the previous course was not already finished and the interest of the students for the new course was rather low. However, the second face-to-face meeting was very successful.

Comparative analyses

To be able to compare the two experiences, the similarities and differences for both courses need to be observed. The following table enumerates each of them.

Similarities	Differences
<ul style="list-style-type: none"> • Both courses are for students with computer science background • Both courses are using the same WebCT environment • Both courses have included assignments and group assignments as a part of the assessment • In both cases there is a motivation on the student part for a success 	<ul style="list-style-type: none"> • One course is completely distant, while the other is mixed • One course includes students from different nationalities that don't know each other, the other includes one nationality group closely related • A part of the curriculum in the first course was the distant education environment, while the second one has omitted this part • The connectivity for the students in the first course was not as good as for the students in the second one

The outcomes of both courses lead towards the following conclusions:

1. The introduction of the part devoted to learning the distant education environment proved to be very successful in the first course and it was lacking in the other one. Hence, it is very important to include it, even if there is impression that the students know or claim it to know.
2. The motivation of the students, the choice of the WebCT environment and the design of the course in both of the courses contributed to their success.
3. The bandwidth and the equipment used had no influence on the success of the course.
4. The international, not closely related group can some times prove more collaborative than a single nationality closely related group.
5. Face-to-face meeting, added with a proper timing to a distant education course can certainly improve the quality of the course.

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