The technical students' feedback from the course issues on enviromental health

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Abstract— **This paper presents the environmental health course, which has been developed for technical students, and analyzes the students' feedback on the course and their interest in environmental health. In general, the students' were very interested in the topics of the lectures.**

Keywords; students, course; feedback; environmental health

I. INTRODUCTION

Nowadays, environment health questions area also an important part of an engineering's work. Therefore he/she also needs teaching in this area. WWW materials and courses to support teaching have been developed at the Tampere University of Technology (TUT) Laboratory of Electrical Engineering and Health (LEEH) already for a few years. (Due to structural changes in TUT in 2008, LEEH is now known as Environmental Health, EnH). Since 1993, the research team has studied the application of hypermedia and hypertext methods on different education and decision-making situations (for example, electrical network book, harmonics book, electric power engineering book, transformer book, production and consumption of electricity book, and an applet for solving arithmetic problems). The interactive WWW based education in electrical engineering has also been developed at TUT. Two courses have been developed *Electric Power Engineering Virtual Course and Environmental Issues of Electric and Electronics Industry*. All these courses are runs under a learning environment developed by LEEH [1] – [2].

EnH has continued to develop web-based learning solutions, for example, *Electric Power Engineering Virtual Course, and Environmental Issues of Electric and Electronics Industry*. EnH has also run several virtual courses during the past few years. Some of them have replaced traditional courses and some have been arranged simultaneously with traditional courses. These courses include *Electric Power Engineering Virtual Course*, and *Environmental Issues of Electric and Electronics Industry*. One virtual course, *Electricity, Electronics and Environment*, has also been carried out in colleges. Usually, the courses have also contained three traditional lectures [3] - [4].

During 2004-2006 LEEH had the three-year-long *E-Girls – Towards technology* project, launched at Tampere University of Technology in 2004. The aim of the project was to increase the number of female students in technology by making it easier for them to find their way, in particular, to the fields of electrical engineering and electronics. The project created an Internet-based web course, *Electricity, electronics and environment*, for senior secondary school students, but it also became a section of a university level study program at Tampere University of Technology [2]-[4]. In addition, in the autumn of 2006 the course was accepted as a part of the instruction of the Faculty of Technology at the University of Vaasa [5] – [7].

A. Aim of the paper

The aim of this paper is to present the environmental health course, which has been developed for technical students. In addition the aim was to analyze the students' feedback on course, and their interests regarding environmental health.

II. DESCRIPTION OF THE COURSE

A. Students

The course is developed for students in the energy and environment technology area. The aim is that they participate in the course during the second year. They don't need any background information. Also students from other degree programs can participate in the course. Last year 54 students participated in course.

B. WWW-material in Moodle

The EnH used the Moodle learning environment to distribute material to students. The course *Environmental Health* also has its own Moodle pages. On the homepages of the course is a short description of the course, news about the course, and material about the traditional lectures. In addition there is a list of the participations of the course.

Fig. 1 shows the home pages of the course. Fig. 2 shows an example of the course news of the course. The teacher can also add news to Moodle. All students as well as other teachers of the course can also get also e-mail when new news has been published. So they don't have to go Moodle to read the news. It is also possible to add different discussion topics to Moodle.

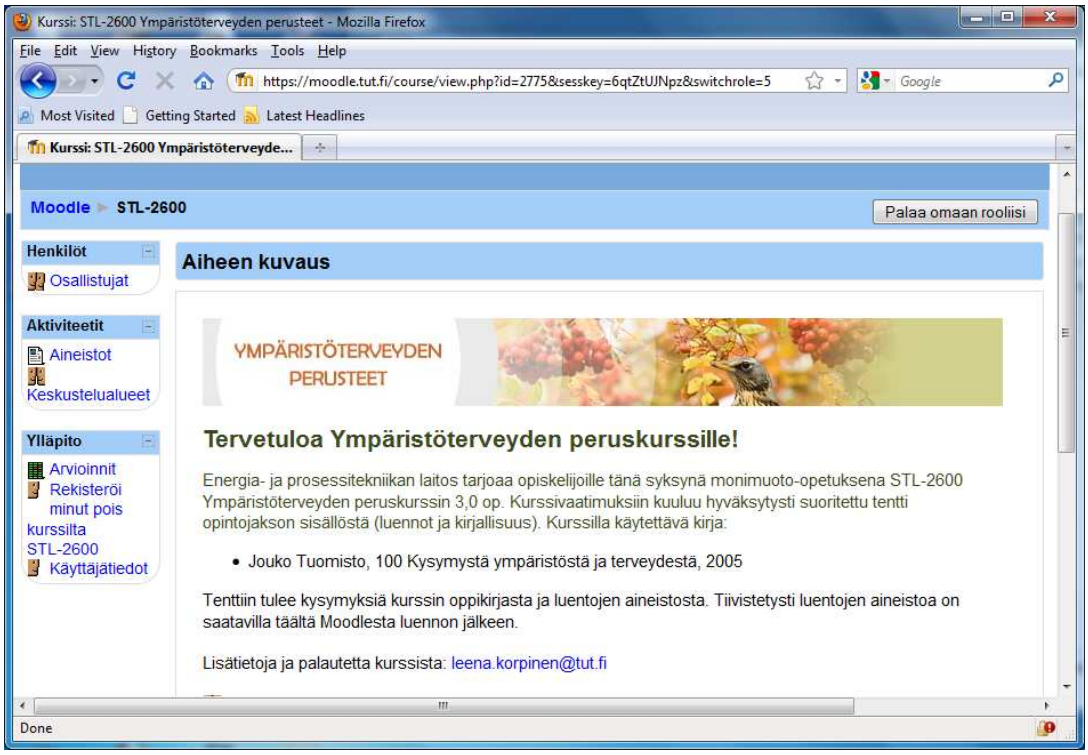

Figure 1. The homepages of the course in the Moodle.

Fig. 3 shows the material from the lectures, which students can take from Moodle. There is information from the lectures on pdf-files, which includes powerpoint slides from the lectures or www-links to material, which the teacher has used in the lecture. Fig. 4 shows pages of the participants.

C. Lectures from issues of Enviromental health

The course included six two hours lectures. The topics of lectures were as follows:

1.Presentation of course and introduction to enviromental health
2. Epidemics, pandemics and travel
3. Health questions about the energy area
4. Health problems caused by chemicals
5. Health questions and developing of technology
6. Environment and psychological well-being

Lectures 1-3 and 5-6 were given by the professor, and a visiting teacher gave the lecture 4. The visiting lecturer is expert in chemicals in occupational health. Fig. 5 and 6 show an example of the material from the lecture.

Lecture 1 included the following issues: 1) Examples of environmental health questions, 2) risk evaluation and management, 3) examples of risk management 4) the precautionary principle, 5) examples of precautionary principle and 6) own responsibility regarding exposure (e.g., exposure to chemicals).

Lecture 2 contains the following issues: 1) Concepts of epidemiology, 2) epidemiology from infections, 3) examples of common transmission routes of microbes, 4) examples of common transmission routes in Finland, 5) examples of epidemics worldwide and 6) risks, which during travel.

Lecture 3 contains the following topics: 1) A comparison between the health questions of different energy productions 2) health questions from emission of particles, 3) health questions from the ionizing radiation, 4) health questions from exposure to electric and magnetic fields, 5) examples of research at TUT.

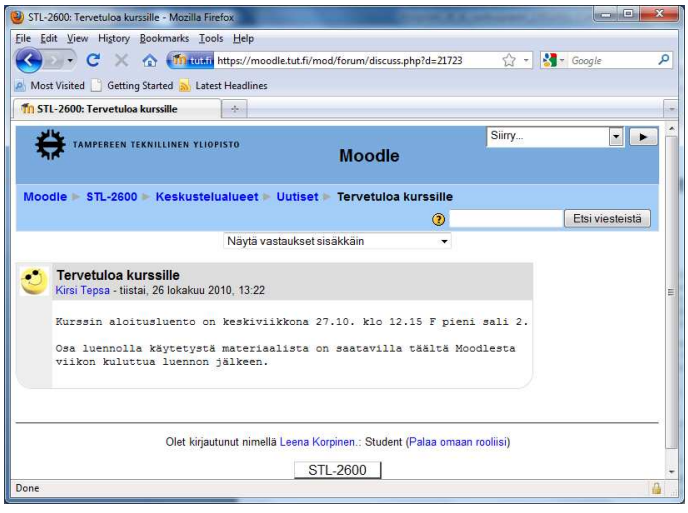

Figure 2. An example of the news in Moodle.

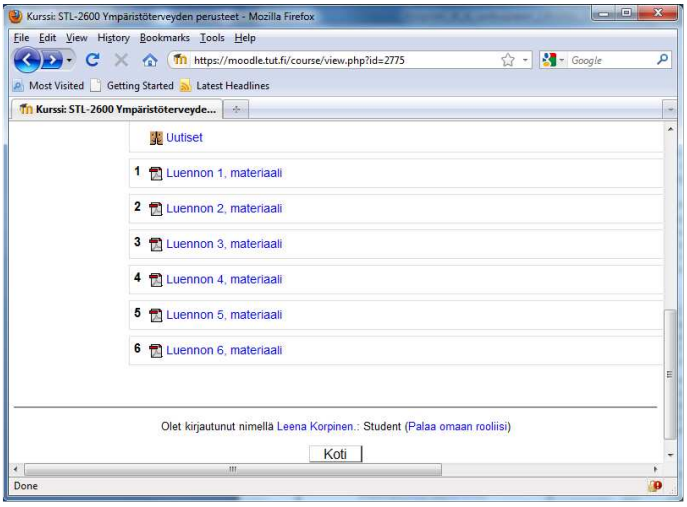

Figure 3. The materials of lectures in Moodle.

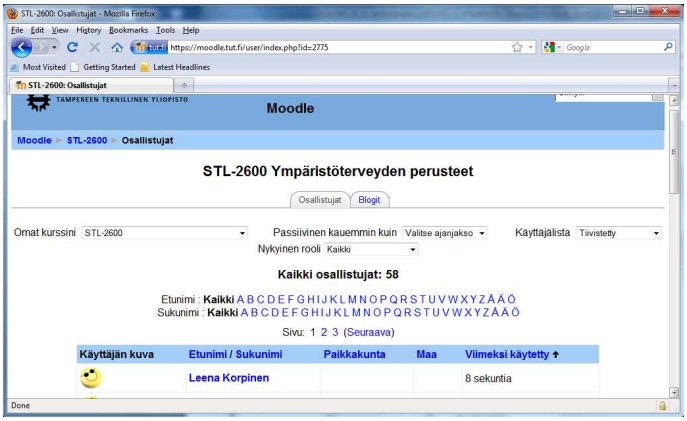

Figure 4. The example page of a list.

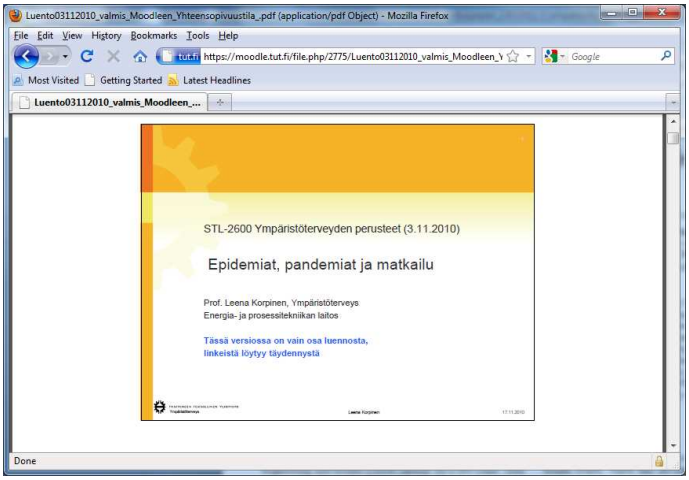

Figure 5. An example of the lecture material. The topic is epidemics, pandemics and travel. The material also includes the text “this version only includes part of the material. You can find more material form www-link.

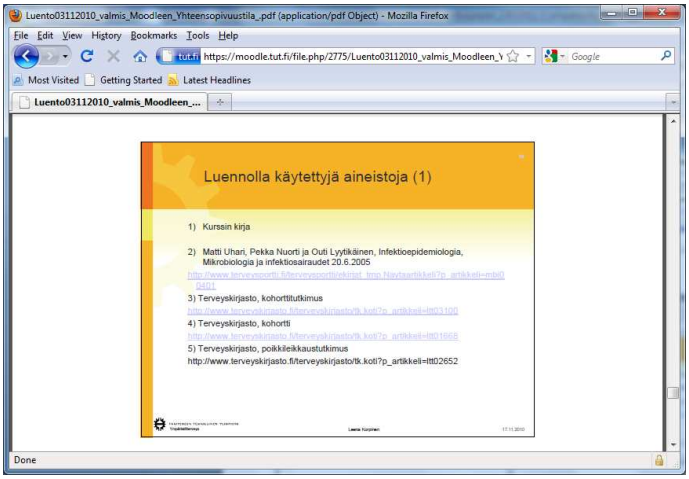

Figure 6. . An example. At the end of the material of the lecture is a list of links so the students can get more information.

Lecture 4 contains the following topics: 1) Essential chemicals 2) alcohol, 3) tobacco, 4) particles in urban air 5) drugs. In addition the lecture includes information on public health, the development process of cancers, cancers and different occupations, occupational diseases, acute risks, and occupational accidents.

Lecture 5 contains the following topics: 1) Ethical perspective of the development of technology, 2) examples of ethical questions of a researcher, 3) health perspectives of mobile devices and ergonomics, 4) examples of researches on mobile devices at TUT, 5) health perspectives of mobile devices and exposure to radiofrequency electromagnetic fields, 6) examples of implanted devices and electromagnetic fields.

Lecture 6 includes the following topics: 1) The significance of nature on urbanites and its influence on psychological well-being, 2) the influence of exercise on psychological well-being, 3) the influence of environmental noise on health, 4) environmental noise and stress, 5) an example of students’ well-being, 6) stress and its management.

III. REALIZATION OF THE COURSE

The course was carried out so that first teachers gave lectures. Then they uploaded their material to Moodle. In addition, students read the course book “100 questions about the environment and health (Jouko Tuomisto)” in Finnish. Then student take the exam, which includes questions from the lecture and the book.

In the first exam, there was also a feedback inquiry for the students. The inquiry includes the same statement “the topic of the lecture was interesting.” in all the lectures. The alternatives were: I absolutely don't agree, I don't agree, I don't know, I agree and I fully agree. In addition there was question “I attended, partly attended or did not attend to the lecture”.

IV. FEEDBACK FROM STUDENTS

The students answered the statement “The topic of the lecture was interesting to me”. Table 1 shows the number of the answers.

TABLE I. THE ANWERS TO THE FEEDBACK INQUIRY

Lecture	Participated	Partly participated	Did not participate/ answer	Did not participate/ no answer
1	15	9	10	7
2	17	6	12	6
3	11	7	14	9
4	14	7	14	6
5	10	5	16	10
6	11	4	16	10

The Fig. 7 shows the results of lectures 1 to 3 from all the students, and Fig. 8 shows the results of lectures 4 to 6 from the all students.

The Fig. 9, 10 and 11 show the results of students, who participated lectures. Some students answered only they had been to the lecture or attended part of the lecture.

Fig. 12, 13 and 14 show the answers from students’ that had only participated in part of lectures.

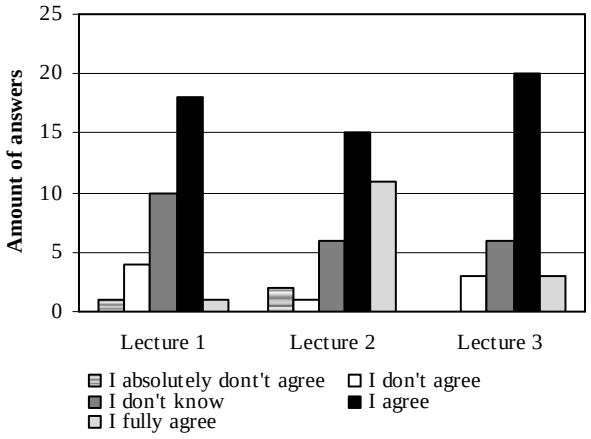

Figure 7. Results from the all students’ answers (Lectures 1-3).

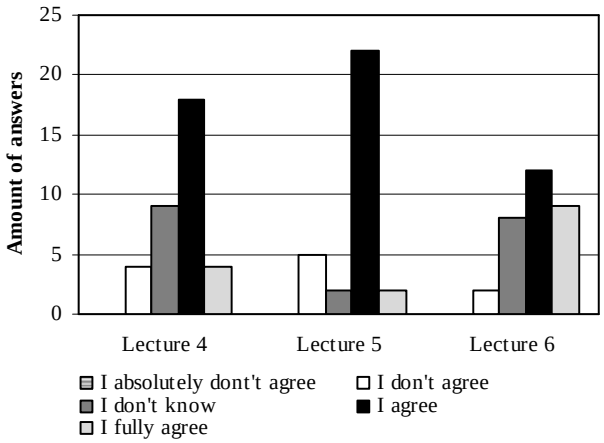

Figure 8. Results from the all students’ answers (Lectures 4-6).

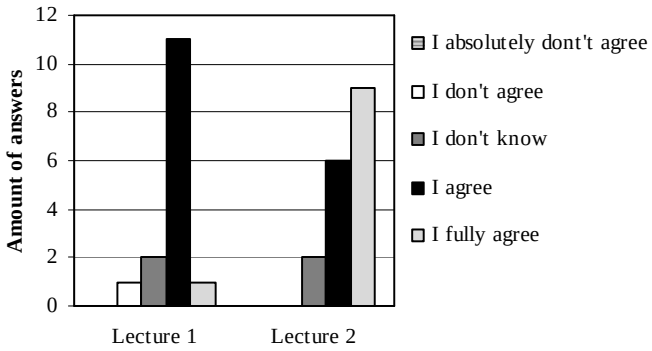

Figure 9. Answers for lectures 1 and 2 (Students that participated in lectures).

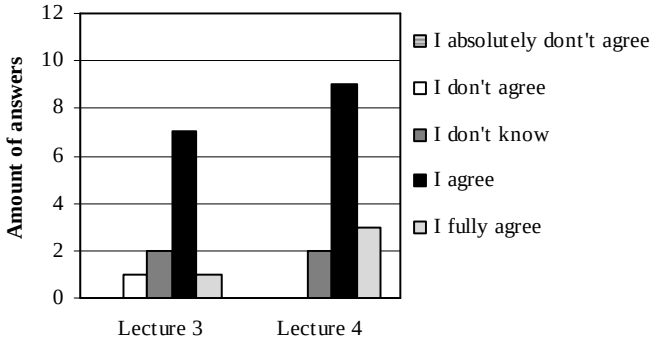

Figure 10. Answers for lectures 3 and 4 (Students that participated in lectures).

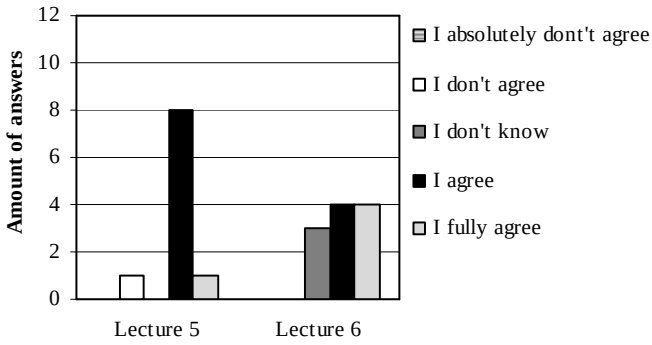

Figure 11. Answers for lectures 5 and 6 (Students that participated in lectures).

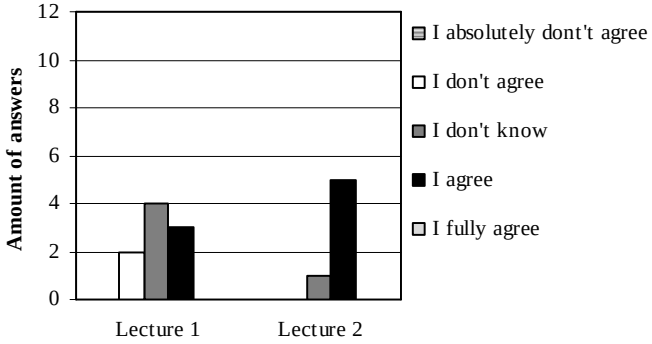

Figure 12. Answers for lectures 1 and 2 (Students, that participated in part of lectures).

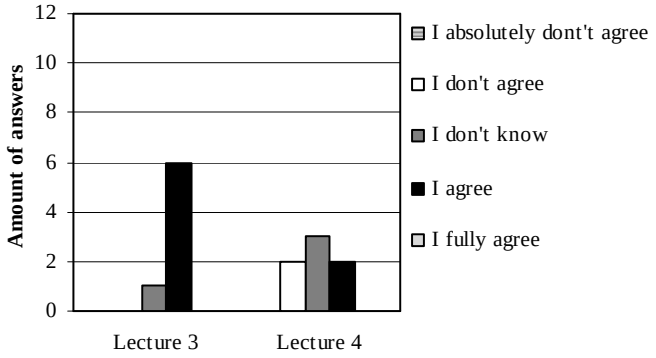

Figure 13. Answers for lectures 3 and 4 (Students, that participated in part of lectures).

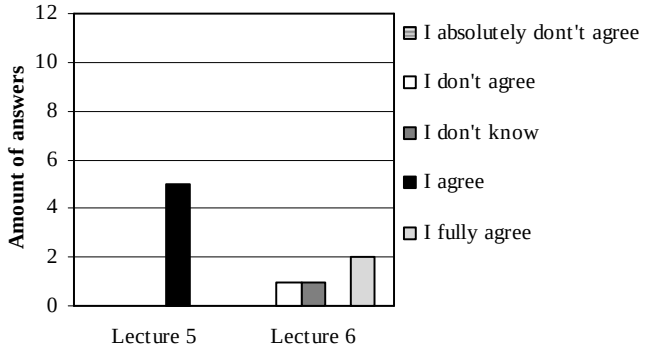

Figure 14. Answers for lectures 5 and 6 (Students, that participated in part of lectures).

V. DISCUSSION

The Environment Health course could be organized well. Moodle is a good system for giving lecture materials to students. Environmental health started as a vocational subject in 2008, so it is still quite new. At the same time, the environmental health course started. It was somewhat difficult to find out which topics of environmental health the technical students were interested in. Therefore, the feedback inquiry includes the statement "the topic of the lecture was interesting."

In all data, which includes the answers from all participants from first exam, all topics were more interesting or not interesting. Lectures; "2. *Epidemics, pandemics and travel*" and "6. *Environment and psychological well-being*" had quite a few answers "I fully agree". On the other hand, the lectures: "1. *Presentation of course and introduction to environmental health*", "4. *Health problems caused by chemicals*" and "6. *Environment and psychological well-being*" had quite a few of the answers "I don't know". Perhaps it influenced to results, that in all data there were also persons, who don't participate to lectures.

If we analyze the result of the students, who participated or partly participated, then there were many answers such as "I fully agree" or "I don't know". It is difficult to say, which topics is most interesting, but .e.g., the lecture "6. *Environment and psychological well-being*" was also interesting, which was little surprising. It is not very technical topics.

However our analysis was only based on data from one course and one exam, so we need more data, if we want more information.

VI. CONCLUSION

In conclusion we can say that, technical students are interested in the many topics regarding environmental health. It influenced the results, if the student has participated in the lecture of course or partly participated. Some topics are difficult for a student to evaluate if the student has not participated. However, in the future it would be useful to collect more data from different participants of the course (participated in lecture, partly participated in lecture, did not participate in lecture) and try to develop teaching methods for different participants

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