RÅDET FÖR HÖGRE UTBILDNING
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Computer Aided Learning for Students in Infectious Diseases

Abstract

There is a perceived need to introduce computer-based learning into medical educational institutions, which still are using traditional teaching tools to a large extent. The overall goal of this project is to improve learning and teaching in the subject of infectious diseases with the aid of computer based learning, to make the students more active and better prepared for the first years of practice. We want both to maintain our present high teaching standards - in a tightening economic situation with reduced teaching resources - and at the same time develop our problem-oriented approach with active student participation.

A central theme in undergraduate medical education is to identify and solve clinical problems through demonstrations and discussions of patient cases. It is often difficult to find an adequate number of patients with representative and important diseases. By using computer simulations of patient cases we can increase problem-oriented learning and stimulate student activity. For this purpose a new software system to simulate patient cases - Infaktiv - is being developed at the Department of Infectious Diseases in Uppsala, in collaboration with the hospital computer education centre, and with the support of the Council for the renewal of Undergraduate Education. It is intended for medical students attending infectious disease courses, and will be evaluated in regular teaching during 96/97.

We also propose to activate student curiosity and stimulate to a global view of infectious diseases by utilizing Internet resources and our own hypertext material. We hope that with the aid of Internet learning each student can pursue his or her individual interests better, without compromising the basic and essential knowledge. A student Home page, consisting of the curriculum, questionnaires for answering clinical questions, forms for sending in criticism, directories of Internet resources, etc. will be constructed.

We believe that our proposal represents an educational development that is inevitable, and already being implemented in several countries. We are convinced it will have a positive effect on student performance in solving clinical problems, and thus will have a long-term beneficial effect on our speciality. Establishing a network of colleagues in our field to promote the use

of computers and Internet resources may also stimulate new ideas and lead to further initiatives in this area.

Report for the project "Computer Aided Learning for Students in Infectious Diseases" *at* the Department of Infectious Diseases, Uppsala University Hospital 1996-1998

Aims

The overall goal of this project was to improve learning and teaching in the subject of infectious diseases with the aid of computer based learning, to make the students more active and better prepared for the first years of practice. We wanted to maintain our present high teaching standards - in a tightening economic situation with reduced teaching resources - and at the same time develop our problem-oriented approach with active student participation.

By using computer simulations of patient cases, problem oriented learning can be increased and student activity stimulated. The specific aims of this project were to use Internet for distributed problem solving, for publication of lecture notes and for making resources on the WWW in the area of Infectious Diseases available to the students. A goal was also to compile our local medical guidelines in hypertext format.

A further aim was to use computer programs to simulate patient cases. Our strategy was to both evaluate commercially available programs (e.g. ILIAD), and at the same time develop and implement our in-house program INFAKTIV.

After each course we conducted an evaluation of student opinions to our efforts, and scored their use of Internet resources before and after the course.

Results

The project was initiated during the fall term of 1996 and continued for 3 years, including 12 courses in infectious diseases for medical students. During each course an introductory seminar and a practical training in Internet medical searches were held. After this continuing supervised Medline searches were held during the course. Web pages presenting the course and the department, and a reference list to Internet resources were provided, and can be found at:
http://www.medsci.uu.se/grundutb/infektion/infektionskurs.htm

A recurrent clinical case presentation was distributed over the net during the project in the form of a weekly question, and was answered by the students via e-mail to the teachers. During this time, a database of clinical cases has been constructed, together with an image repository.

Initially only one clinical assistant was active in the program, but from the spring term of 1997 two assistants have participated in supervising the computer aided training.

The efforts to develop INFAKTIV have continued after the project was terminated. It was not funded by means for the project, but was stimulated to continue because of the enthusiasm generated by the increase in computer aided teaching. A new and better editor has been produced, and more cases have been added. After the project was ended, an agreement with MSD has been reached to develop a net-version of INFAKTIV, which will be operative in the end of 2001.

To reach consensus on interactive case simulations, a seminar was held during one day during the fall of 1996 for the departments teachers, were several cases were discussed. Around 20 approved cases are now included in INFAKTIV.

The students during the courses in Infectious Diseases have used the common computer workshop (Mediatek) of the medical faculty at the hospital. All students have a personal access code and around-the-clock access to the computer hall. I have participated in the steering committee for the Mediatek during the period. At the start of the project, an additional funding of 35.000 SEK was also obtained for acquiring necessary hardware for the department.

Finally our efforts to code our local medical guidelines in HTML format has been completed. This material is foremost meant for guiding our young doctors, but has also partly been available for the students.

Evaluation

- Generally the students have been very positive towards the computer support, which is evident from the comments in the evaluation forms. Interested students have tried INFAKTIV on a voluntary basis. The students have generally appreciated the program, bus some shortcomings have been noted.

- The number of Internet users increases from 78% to 100% during the courses (remember – this was during the early days of Internet use).
- The numbers of users of Medline increased from 78% to 88%, but it was still uncommon to use it frequently. The frequency of use seemed related to the amount and frequency of supervision.
- A majority of the teachers did not use the opportunity to publish their textual or pictorial teaching material on the net.
- Cooperation with other departments in the use of computer aided teaching was non-existent. We have not been aware of similar projects in other parts of the hospital during this time.

Discussion

Some problems have been prominent during the project. Firstly it has been difficult to get scheduled time for computer aided teaching. The course is already very condensed and streamlined. Material presented on the web-sites has not influenced the content of the course to any greater extent. To change any part the whole structure of the course has to be reevaluated. Such an educational re-evaluation has recently been initiated at the medical faculty.

Another problem has been to get the teachers involved in the project. Both lacking skills and lacking motivation has made the implementation difficult. Many teachers have been hesitant to publish their material on the web. They have not been influenced to any greater extent by the available web-based material. Only one teacher (myself) has been proficient in production of web-sites. To increase teacher skills an educational effort is needed, as well as better resources and motivational support.

One further problem has been the lack of necessary infrastructure. During the time of the project there were to few computers for the students (2 for 30 students). There was no screen-projector, no digital camera, no software for intranet solutions, and no web-servers with the capacity to run scripts. We have not had access to advanced developer software for production of net-based teaching material. Most of

these resources have been supplied after the project ended, partly as a consequence of the needs that became evident during the work with the project.

Beside these overall problems, we have also had difficulties in obtaining high quality software for case simulations. The work to construct new cases in INFAKTV has progressed slowly for several reasons, mostly because the quality standard has been set high. Another problem has been to adapt commercial program like ILIAD to Swedish conditions. We have not had access to incidence data for all diagnoses covered in the program. A great effort to collect epidemiological data to support simulations and decision support programs remains to be done.

In conclusion we can establish that the students have been very positive to our efforts to increase the use of computer aided teaching, but the teachers have not been as enthusiastic to the changes. We have lacked necessary hardware and software, and our opinion is that we were a little "before our time" with this project, in that our visions have exceeded our limitations. Resources and possibilities are increasing at a fast pace, and we stand before a profound change in the coming years, when Uppsala Univeristy now is committing itself to providing computer aided teaching on a large scale.

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