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# Using learning technology to deliver a distance-based MSc in Epidemiology

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The EPP course website is at [www.lshtm.ac.uk/cal/epp](http://www.lshtm.ac.uk/cal/epp), where you can find out more about the course, and download the prospectus or the admission form.

The authors are no longer working on the EPP project, but specific enquiries (other than admissions) can be directed to the distance learning co-ordinator for LSHTM John Ackers, email [John.Ackers@lshtm.ac.uk](mailto:John.Ackers@lshtm.ac.uk)

**E**pidemiology: Principles and Practice (EPP) is a Postgraduate Diploma and Masters course offered by the London School of Hygiene and Tropical Medicine (LSHTM). The course materials consist largely of computer-assisted learning (CAL) on CD-ROM, together with some paper-based units, workbooks and readers.

The course has been running almost 3 years, with a total intake of about 300 students. To date 9 students have already graduated from the MSc, with a further 20 expected this year. Our students come from 38 different countries, with about 30% based in the UK.

Tutorial support is provided by email and web-based conferencing.

The course was developed and is run by LSHTM, but delivered via the University of London's External Programme. It is the first distance-based Masters course within the External Programme to use CAL materials.

## **Course structure**

The course has 4 compulsory core study units, totalling 600 study hours. A student completing these can sit the Postgraduate Diploma, or may continue to the full MSc.

The core units are as follows:

- Fundamentals of epidemiology
- Statistics with computing
- Practical epidemiology
- Research planning & scientific reporting

Of these, the first two are computer-based and the other two paper-based. To complete the MSc, the students must complete 6 advanced study units, making up a further 600 hours of study. There are 2 compulsory units, using a combination of computer and paper based materials:

- Study design: Writing a grant application
- Statistical methods in epidemiology

The other 4 units are chosen from the following:

- Epidemiology of communicable diseases
- Epidemiology of non-communicable diseases
- Advanced statistical methods in epidemiology
- Genetic & molecular epidemiology
- Additional units from the other 2 paper-based DL courses (*Infectious Diseases & Health Systems Management*)

The students have 2-5 years to complete the MSc or 1-5 years for the Postgraduate Diploma.

## **Study materials**

Each study unit is comprised of 'sessions', each of which is equivalent to a lecture in face-to-face teaching. These sessions are either computer-based or paper-based. Each study unit may be accompanied a workbook of practical exercises, and a reader and textbooks to which the session will refer. There are

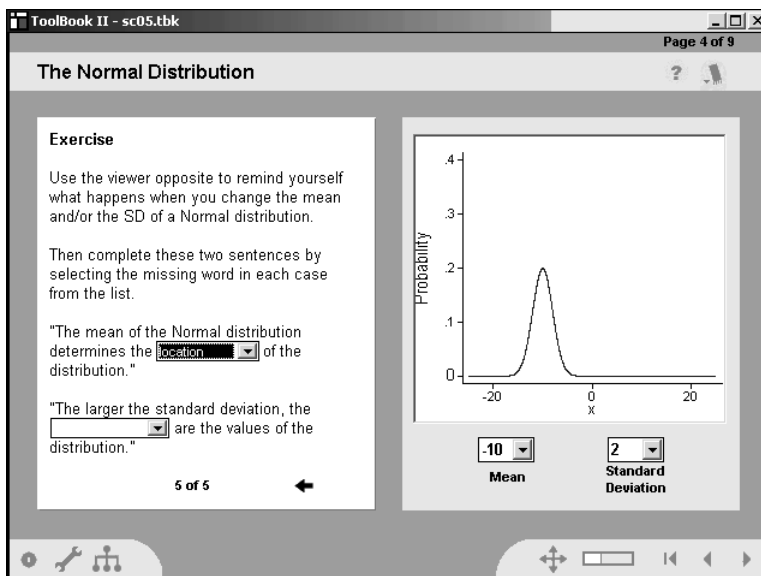


Figure 1

also a number of tutor-marked assignments (TMAs) that the student can complete and return to LSHTM for marking (these are not formally assessed).

All sessions have learning objectives, clearly stating what the learner should expect to be able to do after completing the session. The text was written using clear and simple English (since many of our students are not native English-speakers), in a 'familiar', non-intimidatory style, also taking into account cultural differences.

Each study unit contains all the learning materials required to achieve the learning objectives. As such, the study units form comprehensive self-tutorials, but as we shall see later, students also have recourse to email and conferencing for further support.

### Use of CAL

The aim of making certain study units computer-based was to exploit the interactivity that this approach allows. We included exercises to test students' understanding of the concepts, with discursive feedbacks that explain *why* they got the correct or wrong answer. The CAL also allowed for flexible navigation within and between sessions and study units.

Figure 1 shows a screen from one of the "Statistics with Computing" sessions. The student can manipulate the diagram on the right by varying the mean and standard deviation. In this way they can explore the behaviour of the Normal distribution, and use their findings to complete the exercise on the left. In the exercise they choose the missing word from a list of options, and receive an explanation of why that is the right or wrong choice.

### *It is not only a long distance affair*

Although developed for the purposes of distance learning, the materials have also been used in a face-to-face setting. The computer-based sessions are all available on the LSHTM internal network, where they are used as supplementary or replacement materials on certain courses. They are also used extensively by students for revision. The modular nature of the course means that individual sessions can be used to target specific areas that students find difficult.

### *Use of conferencing*

Another important aspect of the course apart from the course materials themselves is the use of online conferencing. This allows students to express their understanding of a concept and receive feedback on which to base a re-evaluation of that understanding. This allows for a much richer form of interaction than that which is possible between a student and a computer program.

Conferencing provides a way for students to communicate with their tutors and with their peers, providing a number of benefits. Importantly, it counters the isolation of distance learning by putting students in touch with others who share the same difficulties and frustrations. It provides a medium for tutorials, seminars, and other academic discussion. It allows all students to benefit from a question asked by a single student. Finally, it creates an online "community of practice", of people working together to further their common understanding of a subject.

### *Choice of conferencing system*

We had certain constraints when choosing a conferencing system. Through an initial survey of LSHTM alumni in 1998, we ascertained that our target audience did *not* have affordable & reliable web access, though almost all had access to email. Therefore we needed a system that would provide the benefits of online conferencing while still allowing participation by email.

At the time the only solution on offer was *WebBoard* by O'Reilly (now Avika). This is still in use on the course today, but it is now 4 years old and continuing reliability problems and difficulties in administering the system mean that it is time to consider upgrading or changing to a different system.

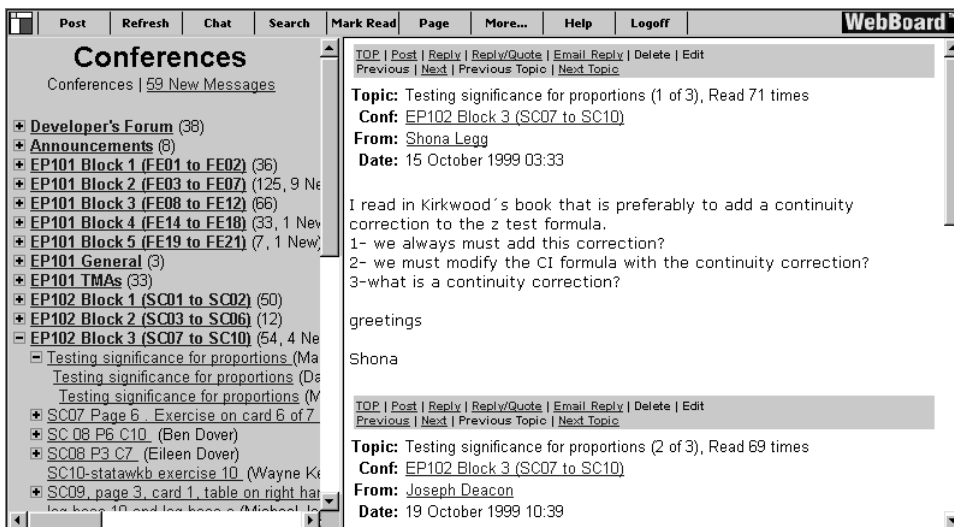


Figure 2

### The WebBoard interface

Figure 2 shows the WebBoard interface, as seen by a student who has web access. The conferences are listed on the left, showing a range of different topics covered. On the right are the messages that have been posted to the opened conference. The system 'threads' messages together by topic, so that discussions can be read naturally as they develop.

Email-only users are able to post messages to these conferences by sending email to a special address, and they receive a daily digest of all the messages posted in each conference. In this way they do not miss out on any of the discussion, though the fact that they receive the emails chronologically, rather than in a threaded form, means that it is less easy to follow the common themes.

### Types of conference

**Study unit-specific:** In Figure 2 you can see that many of the conferences relate to the study units (EP101, EP102...) that make up the course. In these conferences students discuss the issues that arise as they work through the study materials.

**Common rooms:** In the common rooms students are free to discuss anything they want, whether it be about the course or just general chit-chat. This helps to build up a sense of community amongst the students. Certain common rooms are restricted; for example, the 'Student Café' is accessible only by students, so they can ask questions and discuss the course without worrying about what a tutor might think. Similarly, the staff also have their 'Staff Room', which is

only accessible to tutors.

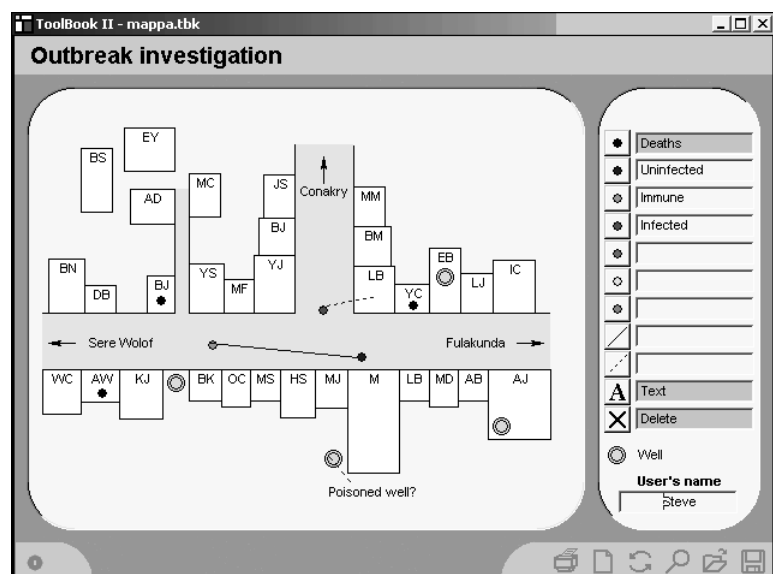
**Seminar rooms:** In the 'Seminar Room', we invite leading researchers from within LSHTM to come online and answer questions from students on the subject of their research speciality. We also have a 'Virtual Lecture Theatre'; here, lecture notes are provided for a forthcoming lecture at LSHTM, and the EPP students can post questions that they would like to ask the lecturer. These questions are read out in the lecture itself, and the lecturer's response recorded and passed back to

the students. The aim is to allow DL students to participate in some of the day-to-day life of the School.

### Example: Outbreak investigation

Our *outbreak investigation* exercise is an example of the CAL software combining directly with the conferencing system. Students are assigned to small groups, to investigate a simulated outbreak of cholera in a Gambian village. In this task they use a program called *Mappa*, which allows them to map the progress of the outbreak on a plan of the village. The students can export their results from this program, and collaborate and exchange data via the conferences. Figure 3 shows an example of some work done with *Mappa*.

Figure 3



### ***Level of use of conferences***

After the first year's use of the conferencing system, we analysed the logs to see how widely it was being used. We observed a 4-way split in modes of use, into the following groups:

- Active users: those who posted more than 2 messages
- Transient users: those who posted only 1 or 2 messages
- Passive users: those who chose to be registered but never posted
- Absent users: those who never responded to our invitation to register

The proportions in each group after the first year were 50% : 15% : 27% : 8%. This was fairly encouraging, because in online courses (where participation is not compulsory) an active of proportion of 33% is more usual. Nevertheless we wanted to encourage the other 50% to become active in the second year.

To encourage absent users to register we sent reminder emails explaining the benefits of the conferences. For passive users, we sent simplified instructions (in case they were having difficulty in posting), and made suggestions on what to post. We also introduced new attractions, such as the Virtual Lecture Theatre, to encourage participation.

However, the latest figures (now incorporating 3 years' intake of students, from Oct 1999 to May 2002) show a split of 43% : 13% : 35% : 9%, despite the measures described above. There has been evidence from other sources to indicate that our first year's intake were more familiar and enthusiastic in general with computer-assisted learning, so it may be that they were always more likely to be active than those that joined later.

### ***Costs***

Our initial budget for development was a loan of £300,000 from the University of London, but that was

certainly exceeded by the time the final study unit was completed. We estimate that the development required something in the range of 10-14 person-years, over an actual period of 4 years.

Operational costs have also been higher than expected. The tutoring requirement during the second year was about 20-30 person-hours per week, but now in the third year we have an extra 80-90 students, and so the tutoring requirements increase accordingly. Some of this tutoring load is allocated to staff already teaching in LSHTM, but tutors were also employed specifically to support DL. There is also the cost of technical support, which at the moment occupies a 50% full-time equivalent post.

Overall, operational costs break down into 50% teaching & support, and 50% to cover materials, copyright, admissions and exams.

### ***Evaluation & feedback***

We conduct student evaluations at the end of each year, but so far the response rate has been too low to generate useful results. However, the qualitative feedback throughout the year has been largely positive:

- Students described the computer-based sessions as "exciting" and "stimulating"
- Tutor feedback on conferences was considered "very helpful"
- Students stated that they felt part of a "community of students"

On the negative side, there were some common themes:

- Students complained about the number of mistakes in the early versions of the computer-based sessions, which arose due to poor quality control
- Some students found the volume of emails coming from the conferences overwhelming