

Using ToolBook to Produce a Distance-Based MSc

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Introduction

The London School of Hygiene and Tropical Medicine (LSHTM) is producing a new MSc course called "Epidemiology: Principles and Practice". This is one of 3 distance-based MSc's under development at the School, of which this is the only computer-based one. This is our first computer-based course; moreover it will be the first CAL based MSc to be released by the University of London's external programme. The software is being written using ToolBook II Instructor 6.0 and will be delivered on CDROM.

About the Course

The principal subject areas for the course are epidemiology (the quantitative study of disease occurrence in populations) and statistics. We chose these subjects for our first CAL course because both are mathematical, and both require the student to make extensive use of a computer in order to carry out research. The subjects therefore lend themselves well to computer-based education.

Our students will be based all over the world - so far we have interest from 23 different countries in 6 continents. Therefore there will be a large variation in the types of computer they have and their connection to the Internet. We require that they have a PC, and an email account, but not necessarily WWW access. We are in the process of conducting a survey that so far has shown that the standard of PC that our potential students have is quite high in general, but that their WWW access varies.

Here is a sample of the survey results:

- Most users had a CDROM drive (rather than a Zip drive, or no removable large storage medium)
- Most users have more than 1GB disk space available
- Most users do have Web access, but the majority had to pay for the time they are connected. Some users in remote areas had a good connection when it was up, but it often failed
- A significant proportion of users had no sound card
- Most clock speeds were over 100MHz

We wish to make the course as inclusive as possible, so we are not using sound in the course, to avoid excluding those users without sound cards. Although there will be a website associated with the course, it is an optional extra and it is not essential that the student accesses it to complete the course.

In addition to the ToolBook sessions the students will be supported by a web-based conferencing system which will be monitored by tutors, so that they can discuss their questions with each other and with the tutors. We plan to use O'Reilly's WebBoard 3.0 which allows those without web access to participate using email, so we are not excluding anyone from this important part of the learning experience.

The team producing the course consists of two full time staff, and 6 part-time staff at the last count. The principal roles are taken by myself, as ToolBook programmer and general techie, Jane Bruce who is writing the storyboards and repurposing existing material, and Bianca de Stavola who is the part-time project manager and also writes some of the storyboards.

The course consists of 500 hours learning time, but a large proportion of this time is allocated for background reading, and use of the conferencing facilities. Even so there is a large amount of CAL to produce and it all has to be ready by September 1999.

Why We Chose ToolBook

I came to this project from a previous European project (EuroMET) to produce web-based CAL for meteorologists. In that case we had to produce cross-platform, interactive modules, and so by necessity it was written in Java. For the EPP project we had somewhat different requirements:

- Vast majority of our potential students are PC users, so no need for cross-platform considerations
- Huge amount of courseware that needed to be produced meant that we needed some sort of authoring environment to increase the speed of production
- Couldn't assume our users had Web access

Based on these considerations we decided to go for a Windows-based authoring system. We identified 4 potential packages:

- ToolBook
- IconAuthor
- Authorware/Director
- Quest

Various reviews and word-of-mouth recommendations came out heavily in favour of ToolBook, and I was particularly attracted by the potential of openScript. It didn't seem to me that any of these other packages would give me the control over what I was doing that openScript would. In retrospect I think this was a correct judgement, since I have found that almost all the interactions in our course have been written in openScript, rather than using the built-in widgets which I find far too restrictive.

The EPP Interface

The graphical design for the EPP interface has only recently been completed; it was designed by Jan Chipchase, of the Institute for Learning and Research Technology (ILRT) at the University of Bristol. A screen capture of the interface is shown in figure 1.

Prevalence Exercise

The chart above represents the lives of 5 individuals (labelled A to E), who were followed up for a period of up to 10 years. The chart indicates whether each individual is healthy, has the disease, has been lost to the follow-up, or has died.

From the chart, find the number of cases and the population at risk at the end of YEAR 7 and calculate the corresponding prevalence. Enter the numerator and denominator in the yellow boxes below, and press return to calculate the prevalence rate and see if you are correct.

Individual	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
A	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy
B	Healthy	Healthy	Healthy	Healthy	Disease	Disease	Disease	Disease	Disease	Disease
C	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy	Lost to Follow-up			
D	Healthy	Healthy	Healthy	Death						
E	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy

Legend:

- Healthy Period (Blue)
- Disease Period (Red)
- Lost to Follow-up (White circle)
- Death (Black X)

Prevalence rate at the end of year 7: / =

Figure 1: EPP User Interface

The design specification for the interface was to have a "clean" look to the page, with plenty of space between blocks of information, with the buttons clear but subtle so that they do not detract from the learning.

All buttons are reactive, so they change colour when one moves over them, and again when they are clicked. The cursor gives additional feedback by changing to a "hand" when the user moves over a button.

Examples from the Course & Pedagogy

The pedagogy used in this course is loosely based on Diana Laurillard's book "Rethinking University Teaching", but also on my own experience, and from discussions with Jan Chipchase and Jane Williams, our consultants at the ILRT. I wanted to have as many interactions as possible, since that is the primary purpose of putting a course onto a computer. If the program merely presents text and still graphics then it is doing a job that is better done by books. Where a particular taught concept is accompanied by an interaction in which the student actually uses that concept, the learning is enhanced. In some cases these interactions are simple questions with fixed answers, but in other cases they are simulations, where the student has free rein to investigate a system and learn by their own experience.

The interactions (and reactions) we have used so far in the course are

- Step cards for presentation of text, linked to diagrams that adapt as the reader progresses
- Built-in widgets such as multiple choices and fill in the blank exercises
- Numeric data entry for mathematical problems
- Point-and-Click exercises where the student identifies regions of a diagram
- Drag-drop exercises
- Simulations

No scoring has been used in the course. I don't see the interactions as being assessment; rather they are for reinforcing concepts in the student's mind by making them use the information they have read. In this sense, getting a question wrong is as valuable as getting it right because of the formative feedback that explains why their answer was right or wrong. However we might use scoring for tests at the end of each session so that the students can gauge their progress.

Conclusion

This project is my first experience of using ToolBook, so I went straight in at Instructor 6.0. Coming from doing Java programming, the object-oriented metaphor was familiar so this helped a lot, but even so I have been surprised at the speed at which I have got to grips with openScript programming. Although I was rather disappointed with the technical support on offer at first, since I discovered the ToolBook list everything has been running smoothly.

The work we have ahead of us in order to be ready on time is daunting, but progress will accelerate now that we have the interface designed, and much of the work that has been done so far will be reusable in later sessions. The first sessions will soon be ready for the evaluation stage, which will take place both within the School and around the world.

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