A Metropolitan Area Network is a very high bandwidth computer network connecting a significant number of sites in an area. The four Scottish MANs connect together all Scotland's universities, colleges and research institutions and provide a computer network that is second to none in the world. Other MANs exist elsewhere, but only Scotland currently has such an extensive network. High bandwidth means that large volumes of data can be transferred across the network at very high speed, so that ordinary computer activities are easier to carry out, e.g. e-mail and Web browsing all work fast and reliably. This provides greater opportunities for innovative use of Internet facilities in teaching. This clearly impacts on distance education and self-paced learning, with teaching materials able to be made readily available on a reliable network. More information can be found from the UMI Web site [3].

COLLABORATION BETWEEN CTI STATISTICS AND TALiSMAN

In March 1997, TALiSMAN launched its first on-line course, entitled "Using the WWW in Teaching and Learning". It ran for six weeks, using the Web, e-mail and conferencing software, and requiring around three hours work from participants each week. The course was aimed at academics in Scottish HE institutions, and sought to demonstrate how the Internet can be used for teaching and learning, how effective it can be, and enabled the exchange of ideas among participants.

This first, generic, course was judged to be successful, with more than one hundred Scottish HE lecturers and support staff participating. Based on feedback received, the content and delivery of the courses was revised for the 1997-1998 academic year. For weeks 2 and 4 of the course, subject-specific material was to be introduced, with staff from external projects brought in to supply the content. Generic material would continue to be taught in the other weeks. Statistics, Medicine and Biosciences, Social Sciences, and Engineering were selected as the first subjects to be covered in the new courses, to begin in late 1997. Other subjects would be introduced in later courses. The course was structured on a topic-per-week basis, with the following themes:

1. Introduction (current uses, initial thoughts and reservations)
2. Identifying resources for statistics (using an information gateway)
3. Evaluating resources (quality criteria, good and bad practice)
4. Developing learning material in statistics (experiences and considerations)
5. Using Web-based resources (implementation, support, assessment, attitudes)

6. Next steps (further training, where next, Scotland, the MANs)

CTI Statistics was approached by TALiSMAN to provide the material for Week 2 of the course and to also advise on a suitable subject for Week 4. The Biomathematics and Statistics Scotland (BioSS) project *Statistics and Mathematics as Advanced Research Tools* (SMART) was selected (a demonstration version is available on-line [4]). This paper will focus on the approach taken to Week 2 of the course, with some general comments on the effectiveness of this type of distance education.

THE FORMAT OF THE COURSE

The rest of the course was entirely on-line, and delivered over the Web. In addition to the numerous Web resources which participants were asked to explore, a major feature of the course was the discussion area, a threaded newsgroup-style facility where participants were encouraged to discuss their findings. The conferencing software used was WebBoard [5], and each participant was issued with a user name and password, so that access was restricted to registered users.

WebBoard seemed to provide all the facilities that would reasonably be expected, and was straightforward to use. Help was available from TALiSMAN for any users who had difficulty with the technology. Messages could go beyond mere text, as images could also be incorporated, and any URLs (Web addresses) became live links to the external sites. Additional features included a search engine, profiles of each user, and access statistics. WebBoard also offered “chat rooms”, where several users could log on together and “chat” in real-time. Text entered in one user’s window would immediately appear in the chat windows of all users who were participating. In this way a discussion can be carried out in perhaps a more natural manner than the asynchronous approach offered by the newsgroup style. Participants were encouraged throughout to use the discussion area, and it was stressed that the sharing of experiences was seen as a major part of the course.

WEEK 2 OF THE COURSE: USING A STATISTICAL INFORMATION GATEWAY

Perhaps one of the most daunting aspects of the Web is its sheer size. People can feel overwhelmed, and struggle to seek out the information required efficiently and effectively. Search engines, such as AltaVista [6], are becoming increasingly

sophisticated and can be a valuable tool. In broad terms, a search engine works by visiting as many Web sites as it can, and gathering summary information on the pages it finds on each site. This summary information is then stored in a huge, searchable database. Although helpful, they do have their drawbacks:

- search engines can often supply too much information
- there is no discrimination; everything is documented, regardless of worth
- results can be out of date; it is difficult to keep the huge database current.

Alternatively, a properly maintained subject-specific information gateway can offer:

- up-to-date links; organised material, with related topics appearing together
- a degree of discrimination and relevancy, thanks to the presence of a subject expert
- the opportunity to browse rather than search, allowing learning by discovery.

Of course, there are drawbacks with information gateways too; they can never hope to be as comprehensive as one of the larger search engines. However, that comes down to the balance between discrimination (in trying to list the most relevant sites) and volume (in trying to cover as much as possible). With experience in searching the Web comes an intuitive understanding as to the best approach for particular queries.

The format for Week 2 was as shown in Figure 1. The smaller window on the left is the *Tutor Window*, which carried instructions, explanations and exercises for the course. On the right hand side is the main window, which was used to display various Web pages, and for the participants to navigate the Web and solve various tasks which they were set. This format entailed the use of some simple Javascript, and so a suitably-equipped browser was required for those taking part. In a restricted group, this was less of a concern than it might be for a course with global access, where often the lowest common denominator has to be catered for (in terms of technological capability). As with the discussion area, TALiSMAN experts were on hand to assist anyone having difficulty. The Week 2 material covered various search options, before focusing on the use of the CTI Statistics Web site as an information gateway. After a tour of the CTI Statistics site, the 18 participants were presented with a series of tasks to complete, a selection of which can be seen in Figure 1. They were also asked to use the discussion area to report their

impressions, including the relative merits of search engines and information gateways, and on Web-based resources in general.

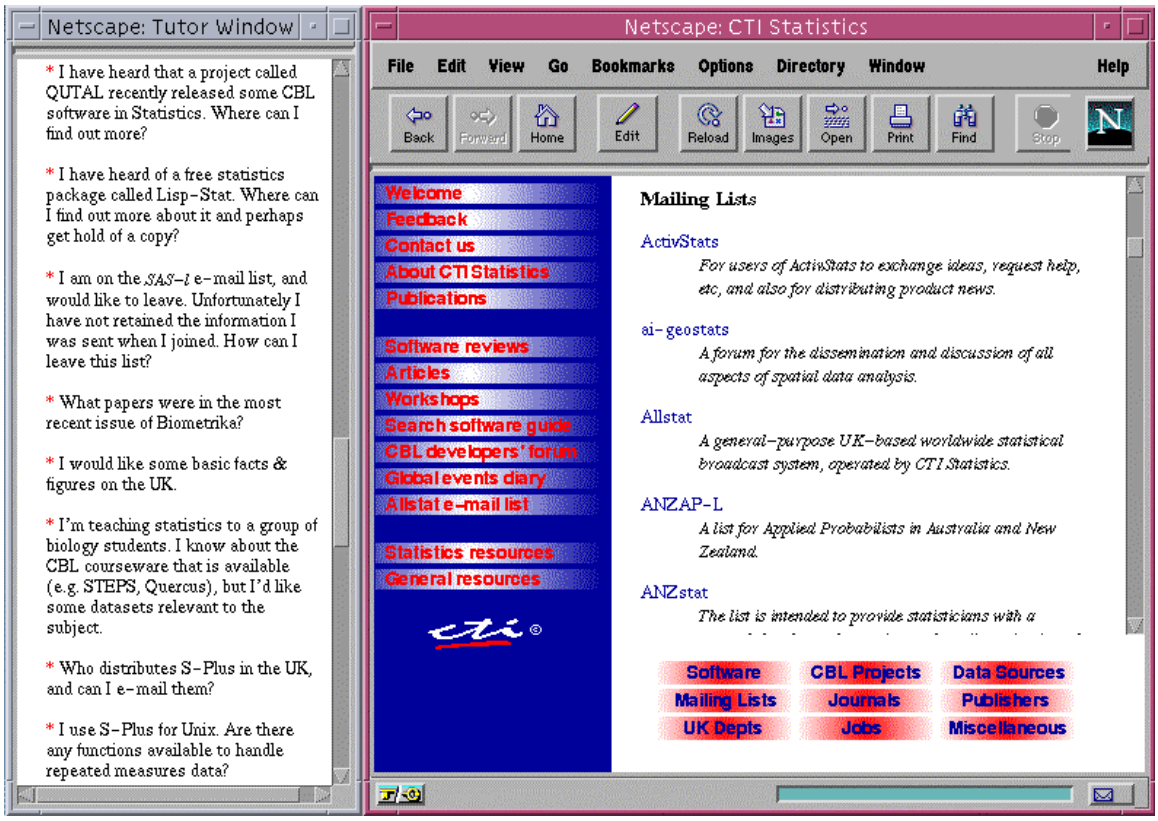

Figure 1. Some of the tasks set (left) and the CTI Statistics Information Gateway (right)

FEEDBACK AND CONCLUSIONS

After the course had ended, the participants were asked to complete an on-line evaluation form. This asked about prior experience in using the Web, expectations of the course and how far those were met, general comments, and suggestions for improvements. Unfortunately, only a few of the statistics cohort sent responses. The comments received on the Week 2 component were

- "Fine, although I already knew about the CTI site and was familiar with its contents"
- "I found this week the most useful and enjoyable"
- "We have been very impressed by the ease of finding information via the CTI statistics site. We had no problems answering the queries that we attempted"
- "I must admit I was aware of CTI statistics but hadn't realised it was such a mine of information - I had relied on search engines rather than the more focused gateways. I liked the use of the tutorial window."

General comments tended to suggest that the courses were well received, but that the discussion area did not live up to expectations. However, this type of comment tended to come from people who did not contribute to any discussions! The discussion area was certainly used on occasion, but did not feature as prominently as was hoped. Some participants were regular and enthusiastic contributors, whereas others were content to "lurk". This could perhaps be explained by time pressures on busy academics, who were content to cover the main body of course material, but less able to devote additional time to following and/or contributing to discussion. This was regrettable, but perhaps understandable, or even predictable.

No use was made of the chat facility offered by WebBoard. This feature needs careful organisation, to ensure the group are all logged on at a particular time. If the course were to be repeated, this is one area that could be explored.

Overall, CTI Statistics was pleased to be invited to participate in this course, and found the TALiSMAN representatives helpful and easy to work with. The high-speed MANs clearly offer numerous possibilities for imaginative use of Web technologies in teaching, and this course would seem a logical first step, to introduce academics to what is offered on-line. Away from the area of distance education, and into more traditional delivery methods, CTI Statistics have run several workshops on the theme of "Statistics and the World Wide Web". These have covered many of the areas explored in the TALiSMAN course, including the task-based approach, and have been very well-received indeed, with extremely positive feedback. It is hoped that having raised the awareness of what is available on-line, and how to navigate the Web efficiently, CTI Statistics can aid lecturers in taking the next step into effective usage of the Web in teaching and learning.

REFERENCES

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[6] AltaVista search engine http://www.altavista.digital.com/