

# Experience with an Online Introductory Statistics Course

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## 1. Introduction

This paper reports the delivery of a completely online version of an introductory statistics course. The course has been offered in five successive trimesters during Sept '97 - April '99. The course has minimal mathematics prerequisites and yet is a serious introduction to the concepts of statistics. Verbalization, visualization, conceptual understanding and problem solving are emphasized, with some efficiencies gained by relying on computer software for graphs and calculations. In the descriptive part of the course, topics include: bivariate data, time series, categorical data, and data presentation; while in the inferential part: sampling, study design, and inference (including the simplest anova and regression) are covered.

The motivation for an online version of the course is to improve on the educational quality of the correspondence version of the course, within a similar cost envelope. To achieve this the use of online two-way communication over the internet has been added to the original features of the correspondence course -- the latter used self-study, assignments, and telephone and postal communication, as the only pedagogic tools. Unlike many other initiatives in online instruction, the internet has not been used in this course for the supply of data or information. The use of the internet as a communication tool substituting for FTF contact has been exploited.

The main impediments to an online course are: compatible and adequate software and hardware for communication; lack of unstructured contact among students and between students and instructor; avoidance of viruses; and identification of the person submitting material over the internet. The course described here has overcome most of these impediments.

## 2. Course Components

Students are allocated to study groups of 4 or 5 students at the beginning of the course - these groups usually do not change. Within a study group, students can communicate with each other without their online conversation being accessible by other study groups. These study groups are responsible for answering fairly open questions from each week's material. (For example: "Which technique is best for graphing a univariate data distribution?") The study group appoints a moderator who is responsible for submitting the group consensus, and this moderator job rotates through the study group. These group assignments count 15% of the course grade. Participation in these study group assignments and in other course conferences counts for another 10%. These percentages have been high enough to coerce a high degree of compliance in study group activity; for example, a recent class averaged a grade of over 80% on this portion of the course grade.

There are also assignments submitted by individuals - these count another 15% of the grade. Students submit assignments electronically and responses are returned electronically. This submission process is handled using a conferencing system called FirstClass published by SoftArc (1998). Each message has the capability of including one picture or graph, and some assignments require more than one message. Attachments were not used, in order to avoid virus problems. The problem of communicating equations is not a big one in this course. Most communication is a record of verbalizations or graphs, which FirstClass handles easily.

FirstClass also manages the study conferences, and the questions and answers between students and the instructor. Most questions and answers are accessible by the whole class, just as they would be in a classroom. Private conversations are possible by ordinary e-mail, but students are told they do not get participation credit for this, to encourage them to use the shared conferences for questions.

There is a read-only conference in which the instructor can alert the entire class to certain important ideas, administrative changes, old examinations, or assignment solutions. A useful feature of FirstClass is that, for any particular posted message, the instructor can easily get a list of who has accessed the message and when. It is possible to tell who will have missed an important message.

FirstClass is available for Macintosh or Windows PCs. Students download the software at no cost while the institution pays a one-time fee per student account. The accounts are reusable in subsequent semesters. The course text is Griffiths, Stirling and Weldon (1998).

### 3. Instructor Workload

Because all the course communication is recorded either in FirstClass conferences or e-mail, it is possible to estimate the total workload involved in delivering the course. Over the five trimesters 97-3 to 99-1, the numbers of students were 41, 21, 23, 30, 37 and the per-student hours spent by the instructor were 13.8, 14.3, 11.3, 9.1, and 5.2. The reduction in instructor time was partly due to the elimination of unforeseen problems due to this new mode of instruction, and partly due to the switch to FirstClass for the most recent two semesters.

### 4. Summary

The basic idea of using the internet to add socialization to an otherwise lonely correspondence course seems to have worked well - students seem to enjoy the easily arranged non-simultaneous online communication. Achievement on the examinations is comparable to the lecture versions of the course. When students have a choice of the online course and the conventional lecture version, only about 15 percent opt for the online mode. But for those with scheduling problems, or who live far from the university, it does fill a need. From the perspective of the university, it is less expensive to produce than a traditional lecture course, once the start-up problems are solved.

### REFERENCES

SoftArc Inc (1998). FirstClass Version 5.506 is software published by SoftArc Inc. and detailed information can be obtained from [info@softarc.com](mailto:info@softarc.com).

Griffiths, Stirling and Weldon (1998). Understanding Data: Principles and Practices of Statistics. John Wiley & Sons. Brisbane.

### RÉSUMÉ

L'idée d'utiliser l'internet pour ajouter la socialisation au cours de correspondance apparaît être réussi. Les Étudiants apprécient la facilité de communiquer nonsimultané online. L'achèvement aux examens est comparable aux versions du cours. Quand les étudiants avaient la choix du cours online ou le cours conférence, seulement 15 pour cent choisissent la version online. Mais pour ceux avec les problèmes de cédule, ou qui vivent loin de l'université, il satisfait un besoin. Pour l'université, le cours online est moins cher qu'un cours de conférence traditionnel, dès que les problèmes du commence sont résolus.