

Abstracts and Short Presentations

Projects at a Distance

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Project work typically involves considerable consultation between student and supervisor. However, demand from people in the workforce for practical training in statistics led Massey University to introduce a distance-taught diploma including some projects. The lack of supervision may mean that the written projects are not always as technically polished as conventionally supervised projects, but as polishing is sometimes the work of the supervisor, this does not necessarily reflect what the student has learnt.

This talk describes our experience with distant-taught projects, and attempts an assessment of what our students do in fact learn from them.

Distance Education in Statistics in Japan

Chikio Hayashi and Hiroshi Midzuno - Tokyo, Japan

The media of radio and television are utilised widely for educational purposes, including statistics education as well. The National Broadcasting Corporation (NHK) uses one channel of each mainly for education, assisting school education and self-study. The television is for all school levels and the radio for the secondary levels. Sometimes commercial channels arrange educational courses. Texts are published for all the NHK courses and for some of the others.

The "Hoso Daigaku" or "University of the Air" is a special public organisation established in 1983 by a special law, having special channels of radio and television for its exclusive use. It provides a formal university education in six specialisations - Living and Welfare, Development and Education, Society and Economy, Industry and Technology, Man and Research, and Understanding of Nature. At present, the coverage is limited to the Kanto area (around Tokyo) but it is expected to cover all Japan within several years. The broadcasting starts at 6.00am and ends at 12.00pm, seven days a

week. Generally one course consists of 15 sessions of 45 minutes each, spread over 15 weeks.

The transmission is open for general reception. To be a formal student, however, one has to register, pay tuition fees, submit a report by mail, attend schooling, and take the examination for completion. Four years of study and 124 credits are required for graduation. Printed texts prepared for each course are distributed free to registered students, but they can be purchased by anyone. For registration, the only requirement is to be at least 18 years old; students are admitted on the basis of first come, first served. The university employs a two-term system and students can start either in April or in October. Those who have graduated from other higher educational institutions are allowed to start at the third grade and the residential requirement is reduced to two years, with 62 credits, as 62 credits awarded elsewhere are accredited. Altogether about 300 courses are provided. For broadcasting, videotapes are utilised. They are broadcast repeatedly.

There are a number of statistical courses including Probability and Statistics as basic courses in the natural science stream; Basic Data Analysis, Development of Data Analysis, Special Issues of Statistics, Time Series, Statistical Data Analysis and Software, Biometrics and Behavioural Measurement, and Survey Methods in the specialised course in the stream of Understanding of Nature. In addition there are some other statistical courses in other streams.

As an example of contents, the themes taken up for the Statistics course are: the theory of probability and statistics, basic notions of statistics, statistical distributions, correlation coefficients and correlation ratios, measurement errors, statistical estimation and testing, sampling survey, survey designing and statistical approaches, understanding survey data, application to engineering, application to soft sciences, application to life sciences - metric diagnosis, application to life sciences - statistics of preservation of nature, statistical methods for measuring quality.

For the course on Data Analysis the theme are: (1) what are data? (2) importance of graphical presentation; (3) quality and quantity of data; (4) on correlation; (5) on multiple correlation; (6) variance in a multi-dimensional space; (7) and (8) measures of discrimination; (9) distance and generalised variance; (10) importance of analysing multi-dimensional data; (11) and (12) meaning of measurement error; (13) quantification in data analysis; (14) basic notion of quantification; (15) and (16) quantification when the external variable is quantitative; (17) and (18) quantification when the external variable is qualitative; (19) (20) and (21) quantification when there is no external variable (quantification of pattern grouping); (22) and (23) quantification when there is no external variable (quantification of E_{ij} type); (24) quantification of paired comparisons; (25) contradiction and quantification in paired comparisons; (26) and (27) multi-dimensional scaling; (28) quantification based on the relationship of three elements; (29) parallel factor analysis model; (30) classification and clustering.

Recently closed television has been utilised for teaching. It has been made known that mathematics education is to be carried out on this basis, so statistics education must also be included, but the details are not yet clear. Statistics education by correspondence has a long history providing a specialised curriculum to qualify personnel for statistical work. A well-prepared text was issued. Judging from the announcements in newspapers, it seems it is still active.

Statistics by Distance Education - Across Disciplines and at New Zealand Secondary Level

Pam Oliver and Caroline Smith - Wellington, New Zealand

This paper looks at the teaching of statistics, at a secondary level, by distance education in New Zealand.

It attempts to describe the widely varied student population and the way in which instructional material is developed and designed to meet student needs. The paper also outlines some of the problems inherent in the teaching of statistics at a distance. By comparing instructional material from different mathematics levels and between different disciplines, the paper demonstrates the difficulties faced by the learner who attempts to build up a coherent framework of statistical concepts and skills.

Teaching Statistics in a Science Centre

Juha Puranen - Helsinki, Finland

Science Centres are adequate places to familiarise people with statistics amongst other scientific fields. This is because people who attend them are eager to learn new things and, for most of them, statistics is an unknown branch of science.

In Spring 1988 we had an opportunity to make a statistical presentation to the Finnish Science Centre. We soon noticed that teaching statistics in the Science Centre is quite different from teaching statistics in a high school or in a university.

In the demonstration, we used the following main principles:

- (i) *Easy-to-update*: Since the Science Centre is not a science museum, we must regularly update the system with new examples, and put old ones aside for future use.
- (ii) *We must make statistics - not just talk about statistics*: If the same old experiments based on fixed data sets are exhibited repeatedly, a visitor cannot get a true impression of the nature of statistical phenomena.
- (iii) *On-line help*: In the Science Centre there is usually no statistical expert providing desired explanations.
- (iv) *Multivariate-level presentations*: Since the background of the visitors is quite varying, it is necessary that the programs work on different levels. Each presentation is started with an easy-to-understand version. However, the user can get more and more specific details on the subject of interest by request.

It took about 10 months of part-time work for two persons to create the demonstrations. The first version has been successfully running for over a year.

At present, the contents of our system are as follows:

- (i) *How to read statistical presentations*: Elementary statistics à la Huff: "How to lie with statistics".
- (ii) *Buffon's distributions*: Estimating the value of π with powerful, dynamic graphics.
- (iii) *Continuous distributions*: Presentation of basic statistical distributions by graphical simulations.
- (iv) *Sampling project*: How to sample and what is the sampling method? More advanced statistics.

The whole demonstration is running under the statistical system SURVO 84C created by Professor Seppo Mustonen at the University of Helsinki. Certain programs are written by the author separately.

References

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- Puranen, J (1986) Constructing teaching programs in editorial mode. Contributed paper, ICOTS 2.