The Role of the Internet in Statistical Education

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1.   Introduction

In the 1990's, Korea focused on the fulfillment of public needs for higher education and lifelong learning and the effective use of advanced technologies in schools. It also developed and implemented the concept of an "Edutopia", meaning an education welfare state to allow each and every individual equal and easy access to education at anytime and any place which aims to create an open and lifelong learning society.

The government's plans and action strategies regarding open lifelong education and technology have been developed according to the suggestions made by the presidential commission on Education Reform since 1995.

With the Korean government's support and funding, all formed higher education institutions are now connected to the education and research network and have computer laboratories. Many digital libraries have been established and linked. In 1998 the government initiated the Virtual University Trial Project under which 25% of higher education institutions in Korea and several private companies have used advanced technologies to deliver the courses to the university students and working adults

The Virtual University Trial Project aimed to explore ways to

i) Creats a cost-effective virtual education system without diminishing quality.

ii) Develop and implement web-based courses or other types of distance education courses.

iii) Identify appropriate policies and standards for running a virtual university.

iv) Share experience during trial period will last February 2000.

The government encouraged both partnerships among universities and the private sector, and sharing of existing resources in providing web based instruction to the university students and adults. The Virtual University Trial Project has inspired about 25percent of the formal higher education institutions and five private companies in Korea to collaborate in providing virtual courses using advanced technologies and to explore the possibility of incorporating distance education into the campus-based system and even of establishing a distance technology in the new future

Interactive technologies to help provide students with opportunities to receive learning support from the university. PC network and internet along with telephone and fax have been used as a formal channel for students to ask questions to their instructors and to interact with other students. Even though the interaction between instructors and students or among students themselves are less active than anticipated, interaction rate has been growing rapidly and now more than 30% of students appear to be using the computer network to communicate with faculty and staff and other students

A typical web based courses consists of learning contents on the web, small group inter action among learners and relevant information library. Each learner's learning progress is managed and monitored by the Cyber Academy Platform System.

It is very important to note that KNOU could establish a multimedia digital library system on the web in 1997.This new initiative would make KNOU digitize TV, radio and audiocassette programs. These digitized programs are integrated in a certain teaching and learning platform so

that the students study their courses in a multimedia format on the web.

The information technology situation is getting better in statistical education. In the near future every home will be accessed to information superhighway. In that case the digital library system or Internet courseware for self-study is going to be more active utilized by students

This paper review the background of web based statistical education and show the results of the evalution survey by the students

2. Internet based Statistics education

From 1986, the various kinds of computer based teaching statistics coursewares were developed in Korea. There were prepared following hardware and authoring tools.
- 8 bit apple computer with Basic (1986)
- Macintosh with Course of Action (1993)
- 386 PC with Great (1996)
- Web based Digital Library CD title (1998)
- Web based Cyber class courseware (1999)

Nowadays according to the change of computer circumstances, there are many researchers and development wase performed for virtual university. The Virtual University is defined as an institution that provides access to its educational services without the need for students to be physically present to receive them. The communication technology such as the internet system is needed as a main instructional and communication tool.

The motivation of virtual education of statistics is as follows;
1) Variety of educational demand
2) Change of paradigm of statistical education
3) Increase of access to W.W.W.
4) Enlargement of educational space
5) Various levels of teaching-learning system

The virtual class of statistics in universities started in February 1998. In establishing the Trial Project, the government sought to encourage partnerships among universities and the private sector, and the sharing of existing resources.

The virtual universities Trial Project have resulted in fifteen virtual entities. A total of sixty-five universities and five companies are participating in the project. 8 conventional universities have joined independently and the another 57 universities and five companies have formed seven consortia.

In 1998, 1999, the statistics coursewares were included. The web-based subject of statistics is as follows;
- Introductory Statistics
- Graphic/Data Analysis
- Statistical Computing
- Regression Analysis and Time Series Analysis
- Nonparametric Analysis

The tools for web based courses are HTML-based notes including gif, jpeg, pdf files. It was prepared using Lotus notes/Learning Space. As well as JAVA Applets for animation and linking to other reference sites.

The limitation of web based statistics education is as follows. First, from the instructor's side it is difficult to express statistical equations, explain proofs or extensions of equations. So a virtual class of statistics would not be suitable as a graduate course. Also it is very difficult to quantify 1 hour with 1 credit of learning materials. On the student's side it is costly to access an online course, and students feel a lack of interaction and personal touch.

3. Strategy of Development for Internet Courseware

The Basic direction of the internet courseware is developed very rapidly according to the computer enviromment.

We tried to set the educational cooperation frame for the efficient use of internet mediated statistical education and settled on the cooperative study model and derived the learning cmmunity.

The internet was applied as a new learning tool and was an educationally efficient supplementary media. Also we produced the standard electronic text material protocol for continuous development and extension of internet based courseware for statistics.

For the student's comfort and maximization of learning effectiveness, the practical internet courseware techniques of HTML, CGI, JAVA, DB, Video/Audio and high quality data using graphic animation were employed .

The common technology for internet courseware is as follows;

1) CGI

In the real development of courseware, CGI(Common Gateway Interface) which is used for interface between external data retrieving and registration and index searching.

2) JAVA.

JAVA supports the animation and interaction on the web. It is used for the preparation, the dynamic function and visual and dynamic animation and a dialog-style game and quiz.

3) Audio and Video

To achieve a high quality of data and video material we produced it in a professional the broadcasting studio. Also the method of down load was produced for real time as a basic form. The video data were prepared for betacamp tape which has a high visual quality.

4) Media Data

To study the optimal design for audio video animation for high speed correspondence we considered the memory size and quality. Specifically we looked at image data, the color, size and resolution. Also the courseware mangerd the media data using the index DB which supported the hyper-media for high speed searching and correcting.

5) Graphics

For the maximum effectiveness of courseware 2D/3D graphic and animation were employed. Also we used functional and visual informatic graphic design, graphic interface and education technological interface. The Backgroup 3D and Animation 2D were employed.

4. Evaluation Survey Results

This survey was done for the evaluation of the overall effects of web-based instruction and to identify important factors to consider in designing effective web-based courses.

The activities of this survey included

1) Developing evaluation instruments such as survey questionnaires, interview, and frame work for
  computer generated data analysis based on the results of related research and literature review.

2) Performing evaluation activities with the tools developed to investigate the effects of web-based courses
  offered to the students.

3) Identifying factors affecting effective delivery of the web-based courses.

4) Suggesting design strategies and policies to improve the quality of web-based instruction.

The major results of the study are summarized as follows;

1) Compared with conventional courses which use textbook and broadcasting programs, web-based courses showed higher course completion student performance. That is, about 75% of the students who took the web-based courses completed their courses and about 85% scored 80 or over out of 100. An average completion rate in the conventional distance course is about 50% with about 60% of those who completed the courses receiving scores above 60.

2) It appeared that more than 70% of the students were satisfied with various aspects of the web-based courses. Students showed a high level of satisfaction with technical and instructional support from instructors and online assistants, course design strategies and active online discussion.

3) It was found that content design strategy was the most important factor affecting student satisfaction(r=0.509). In addition students who studied web-based courses in a LAN environment showed more satisfaction than those in a modern environment(p<0.05).

4) In general, physical access to the environment, content design strategies, and online activities seemed to be the most important factors affecting the effectiveness of web-based instruction.

5. Remarks

Based on the survey results, several suggestions are offered to improve the quality of web-based instruction for the statistical educations. It will be a useful guide for the best role of the internet in statistical education

  1) The highest priority needs are the improvement of hardware and network environment. Students need more fluent voice service and image file. The drawback is that we need a huge memory.

  2) Integration of library resources, dynamic lecture notes like videos or frequent animation into web-based courses was needed.

  3) Encouragement of active student-instructer and student-student interactions.

  4) Providing of initial training and continual support to students and instructors.

  5) Adoption of professional instructional design strategies. It is better to develop new paradigm of teaching statistics. For example more high technology computer based method, team teaching, problem based learning system etc.

  6) Continual monitoring of courses.

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Resume

    This paper reviews the background of web-based courseware for teaching statistics and examines the effectiveness of this type of instruction for schooling.

    Using web-based statistics courses students showed higher course completion student performance. And it appeared that more than 70% of the students were satisfied with various aspects of the web-based courses. It was found that physical access to the environment, content design strategies and online activities seemed to be the most important factors affecting the effectiveness of web-based instruction