An e-Learning Course for Multivariate Analysis: The Case of Rikkyo University

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Abstract — Center for Statistics and Information in Rikkyo University has developed an e-learning course for multivariate analysis. This course is designed for students in arts departments and has two features. First, contents in this course are based on examples of analysis of real data, rather than mathematical aspects. Second, this course has some devices to learn multivariate analysis with interactive materials. These two features enables students to learn multivariate analysis, without a struggle for mathematical aspects.

Keyword: e-Learning; multivariate analysis; statistical education.

1 Introduction

Rikkyo University launched a new center for statistics education, survey research and data archives, named the Center for Statistics and Information (CSI), in March 2010. In Japan, there are no departments and faculties of Statistics. The demands for statistics education and consultations for data analysis, however, are very strong as like other countries. A survey was conducted by Senuma (2004) to determine what students were expected to study through mathematical studies at universities. This survey was conducted on all the companies listed in the Tokyo Stock Exchange. The results revealed that statistics education, which enables students to use data substantially, is regarded as highly desirable.

Watanabe and Yamaguchi (2006) reported the process of developing the e-learning contents and educational materials for statistics education. Watanabe and Yamaguchi (2006) also pointed out the needs for changing the classical styles for statistics education as follows; numerous statistics teachers in arts departments are of the opinion that students, in general, are hesitant to study the type of statistics that emphasizes mathematical aspects. Course materials utilizing the Internet and other multimedia resources have recently been developed and put to practical use in university education. Multimedia materials emphasize audio and visual components that can be interactively operated and verified. It is hoped that the use of multimedia will positively affect university education; however, no concrete lecture form that will create that positive effect has been standardized in the field of statistics. One of the possible reasons for this failure is that most of the syllabuses that are publicly available are developed in text form and are not based on Internet awareness or the course materials being converted into multimedia formats.

On the other hand, Uts (2004) and the GAISE report of American Statistical Association suggest a new style for statistics education and contents students should learn in higher education. In this paper, we introduce our e-learning course for social survey and basic statistics, which are developed on the according their suggestions.

2 The e-Learning course for multivariate analysis in Rikkyo University

CSI provides one subject for the e-Learning course for multivariate analysis; "Introduction to Multivariate Analysis". This subject has two features for teaching multivariate analysis to students in arts departments.

First, contents in "Introduction to Multivariate Analysis" are based on examples of analysis of real data, rather than mathematical aspects. Especially, we explain methods of multivariate analysis based on real data analysis (see Table 1). For example, we explain multiple regression analysis through analyzing data of beer sale in a convenience store. Students can learn how to use multivariate analysis in real data, without a struggle for mathematical aspects. Moreover, this course contains many videos which interview statistician from industry.

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<table>
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<tr>
<th>Method</th>
<th>Dataset</th>
<th>Task</th>
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<tr>
<td>Multiple Regression Analysis</td>
<td>Sale of beer in a convenience store</td>
<td>Analyzing effects of weather-related factor on sales</td>
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<tr>
<td>Logistic Regression Analysis</td>
<td>Social survey dataset for mothers with children</td>
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<td>Social survey dataset for friend formation</td>
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<td>Principal Component Analysis</td>
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<tr>
<td>Cluster Analysis</td>
<td>Batting records of baseball players</td>
<td>Classifying baseball players based on batting records</td>
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Second, the e-learning course has some devices to learn multivariate analysis with interactive materials. Students can reanalyze datasets with additional variables in the course by web-based materials based on S-plus. Moreover, this course set Bulletin Board System (BBS) to receive students’ questions on lectures. Using BBS, we can have the same level of the question-and-answer session with students as the ordinary type of lecture.

3 Conclusion

CSI provides an e-learning course for multivariate analysis, which is aimed for students in arts departments. This course teaches multivariate analysis using analysis of real dataset and interactive materials.

We have a plan to open all contents. We would like to get public comments on the e-learning course and make them better using such comments. Student evaluations are also considered. We will do comparison scores of final examination between e-learning course students and face to face class students.

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References