JAPANESE INTER-UNIVERSITY NETWORK FOR STATISTICAL EDUCATION AND NEW TRIALS FOR DEVELOPMENT OF STUDENTS' DATA ANALYSIS SKILLS

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In knowledge-based society, it is shared understanding throughout the world that "Statistical Thinking" and "Competency of Statistical Analysis" is a substantial skill for detecting and solving new issues. "Japanese Inter-university Network for Statistical Education (JINSE)" has been newly organized in 2012. The first aim of JINSE is to develop Standard Curriculum and Teaching methodology for fostering human resources capable of coping with new issues, and eventually, to establish Quality Assurance system for statistical education by introducing Evaluation Committee consisting of members from academic statistical societies and other educational/economic organizations. In this talk, we introduce activities of this project and new trials for developing students' data analysis skills in Rikkyo University. One of our trials is to introduce action learning methods and combine leadership developing program.

INTRODUCTION

Fostering people who can setup new challenging issues and solve them by applying data-oriented, quantitative skills have become essential to enhance industrial innovation in Japan in future. In knowledge-based society, it is shared understanding throughout the world that "Statistical Thinking" and "Competency of Statistical Analysis" is a substantial skill for detecting and solving new issues. Thus, building an educational system which aims to foster these abilities is internationally proceeding. Obviously, reinforcing statistical education is one of the most pressing issues for universities.

In Japan, Statistics is a hot topic in the media recently. Societies, industries, many places are interested in statistics and data sciences. However there are no departments of statistics in Japan now. Statistical educations are parts of each majors or general curriculum. Many of instructors may not be statisticians. Some of universities and Ministry of Education of Japan recognized the needs of revolutions of statistical education in Japan.

A new project of statistical education in Japan has been started in 2012. In this project, we have newly organized "Japanese Inter-university Network for Statistical Education (JINSE) ".The first aim of JINSE is to develop Standard Curriculum and Teaching methodology for fostering human resources capable of coping with new issues, and eventually, to establish Quality Assurance system for statistical education by introducing Evaluation Committee consisting of members from academic statistical societies and other educational/economic organizations

In this paper, details of this project would be introduced and examples of new trials of each universities of the network will be shown.

JAPANESE INTER-UNIVERSITY NETWORK FOR STATISTICAL EDUCATION

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JINSE is organized as follows:

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Eight Universities
- The University of Tokyo
- Osaka University
- The Graduate University for Advanced Studies
- Aoyama Gakuin University (Head of the partnership)
- Tama University
- Rikkyo University
- Waseda University
- Doshisha University

Six Academic Societies
- Japanese Society of Applied Statistics
- Japanese Society of Computational Statistics
- The Biometric Society of Japan
- The Behaviormetric Society of Japan
- The Japan Statistical Society
- Japanese Classification Society

Eight Organizations
- National Center for University Entrance Examinations
- The Institute of Actuaries of Japan
- National Center for University Entrance Examinations
- The Bank of Japan
- Keidanren
- Japan Pharmaceutical Manufacturers Association
- Japan Statistical Association
- Japan Marketing Research Association

Goals and objectives of JINSE are as follows. We will foster college graduates with problem solving capability needed by the society. For this purpose, we first establish standard curriculum system for statistical education at the higher level, and implement standard performance measurement for assurance of statistical education. Second, we will introduce credit transfer system based on assessment by JINSE.

Some of the participating universities will start "Sub program" or "Minor program" for Statistics both at undergraduate and graduate level, by utilizing teaching materials provided by JINSE.

By the time when our project will be over in 2017, we will have accumulated resources of teaching material and assessment method in JINSE. We can offer them for all universities in Japan, which will enable us to perform statistical education to fill the needs from our society.

EXAMPLES OF NEW TRIALS IN RIKKYO UNIVERSITY

Rikyo University is one of eight universities in JINSE. 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, Utts (2004) and the GAISE report of American Statistical Association suggest a new style for statistics education and contents students should learn in higher education. CSI in Rikkyo University provides e-learning courses for social survey and basic statistics, which are developed on the according their suggestions.

CSI started to provide four subjects in 2010; “Introduction to the Social Survey”, “Social Survey Methodology”, “Introduction to the Statistics: Descriptive Statistics” and “Introduction to the Statistics: Statistical Inferences”. Hirose et al. (2010) introduced details of these courses. “Introduction to the multivariate analysis” started in 2011. Students can learn about survey methods, for example, designs of samples, how to make questionnaires and so on, as well as basic statistics in this course. The maximum class size of each subject is two hundreds and expected size of each class may be 150. All students in Rikkyo University can take these subjects.

These five subjects have been accredited by Japanese Association for Social Researchers as the course for social researchers. The association has been established by the following three academic societies, the Japan Society of Educational Sociology, The Japan Sociological Society and the Behaviormetric Society of Japan. The association has a leadership for the social survey education in Japan. On the other hand, the Japan Statistics Society has special committee of statistics education. We can get many information and ideas on education on statistics from the committee. In a sense, our course is supported by them.

In JINSE project, these courses will be provided to other universities. We also have a plan to make new versions of these contents in 2015 and 2016. All contents are in Japanese now, but English versions will be provided until the end of JINSE project.

STATISTICAL LEADERSHIP AND ACTION LEARNING

The Business Leadership Program (BLP) is the core curriculum of the Department of Business, Rikkyo University and encourages students to take an active role in the global community. Through team-based projects and skill-enhancing exercises, BLP nurtures business leadership capabilities in an experience-based learning environment.

The Business Leadership Program (BLP) begins with an "Introduction to Leadership" course in the Spring semester of the first year, and concludes with BL4 in the Spring of the third year. This five-semester course of study has a dual approach, using project implementation and skill enhancement to develop leadership. In the semester dedicated to project implementation, students learn to recognize their strengths, and in the succeeding semester dedicated to skill enhancement they work to develop these good points intensively. The cycle continues in the next project implementation semester, where students can check their own progress. Rikkyo University started the Global Leadership Program (GLP) for all students, which was extended program from BLP in 2013. Statistical skills are very important for working on real problems. So students in BLP can recognize the importance of statistical knowledge and thinking.

Importance of Statistical leadership is pointed out by Snee and Hoerl (2004). Rodriguez (2012) gave three comments on the statistical leadership as follows. “First, the road to statistical leadership begins with volunteering. Second, successful leaders work on their communication skills and apply them as champions for our field. Third, great leaders encourage and develop younger leaders”.

In BLP and GLP, an action learning method is used for developing leadership skills. Action learning is a process which involves working on real challenges, using the knowledge and skills of a small group of people combined with skilled questioning, to re-interpret old and familiar concepts and produce fresh ideas (see Revans, 1980, 1998). This method can be combined into group works on statistics classes. A combination program of statistics courses, leadership program

and action learning will be started in 2015 or 2016. This program is planned for developing students' problem solving skills using statistical skills as well as leadership skills.

CONCLUSION

A new project of statistical education in Japan has been started in 2012. In this project, we have newly organized "Japanese Inter-university Network for Statistical Education (JINSE) ".The first aim of JINSE is to develop Standard Curriculum and Teaching methodology for fostering human resources capable of coping with new issues, and eventually, to establish Quality Assurance system for statistical education by introducing Evaluation Committee consisting of members from academic statistical societies and other educational/economic organizations.

We are discussing about standard curriculum system for statistical education at the higher level, and implementation of standard performance measurement for assurance of statistical education. We also have a plan to introduce credit transfer system based on assessment by JINSE.

Some of the participating universities will start "Sub program" or "Minor program" for Statistics both at undergraduate and graduate level, by utilizing teaching materials provided by JINSE.

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