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PROBLEMS OF STATISTICAL EDUCATION IN CROATIA

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1. Introduction

The process of statistical education in Croatia can be considered to be as complex as it is in all other developing countries. As a part of former Yugoslavia, Croatia was a communist country with an inherited system of secondary and university education. However, the country is also in the process of economic development. Statistical education has been based mostly on the style of the Soviet Union, with the emphasis on statistical theory rather than practice. The available official statistics have been exclusively focused on planning the economy, especially when the new Yugoslav economy was in its infancy. These approaches to statistical education and practice lead to many problems in everyday life. As the Croatian economy is shifting towards a market-oriented economy, statistical research and applications must play a much greater role in all aspects of Croatian everyday life and scientific research. Now, the statistical treatment of scientific problems is spreading everywhere.

2. The lack of practical statistical research in the social sciences

A big problem arises from the fact that there have not been so many surveys in social science as would normally be the case in Western societies. This was due to the anxiety of the ruling party about free interviewing. Surveys about people's political preferences were almost unknown, so people had had no real insights into this until after the first free elections which were held in Croatia three years ago. We conducted one survey among the secondary school students (seventeen and eighteen years old) eight years ago and experienced public consternation when the results showed a high percentage of religious children. The publication of the survey results was later forbidden by party officials as it was not in accordance with the generally accepted opinion that there was a low percentage of religious students.

There have been some surveys about household expenditure, tourist

expenditure and other non-political issues, but not about the most important questions of the nation. The statistics for social science has been developing rapidly only in recent years, and there is now an explosion of sample surveys in all fields of social sciences. This sudden explosion, however, has led to misuse of statistics, to many kinds of measurement errors as well as to sundry other errors of methodology and interpretation. Many surveys have been conducted by non-trained people, with little knowledge of statistical theory and methods.

There is also the question of scientific honesty, since some scientists used to "adjust" the results of research according to the expectations of those who ordered the research. It happened especially in social science in a broad sense. So, we need to establish an institute for social research independent of government funding and independent of any political or other party.

For these reasons, we do not have many trained statistical experts in survey sampling, and it will take much effort to produce them in the near future.

For some applications of statistics the process of statistical education is just at the beginning. This is specially true for chemometrics, environmetrics, bibliometrics, scientometrics, but not for computational statistics or econometrics. Statistical research is now expanding in medicine and some other natural sciences, where it was also neglected in the past.

3. Statistics in business and production

There are also major problems in statistical education and research which are connected with business statistics and with the use of statistical methods in improving the quality of production. Since the economy was a so-called "self-governing" socialist economy, the business statistics were also adapted to that kind of production system. The Croatian economy was not well developed, so the use of modern statistical methods was not widespread. Statistical quality control was used only in some big enterprises. In planning the economy, statistics, and especially econometrics, were sometimes treated as something not very necessary. Only in a market-oriented economy can the role of econometrics be totally appreciated.

When measuring the productivity level, prices, salaries and other business variables, there were lots of misuses of statistics reflecting the politics of the day, e.g. the rate of inflation was always underestimated, total output was usually overestimated and the investigation of the

standard of living was not very popular. Inequality measures and measures of wealth were seldom used in practical scientific research.

4. Statistical education at the pre-university level

There is no uniform statistical education at the pre-university level. A big problem is the lack of a so-called statistical culture or statistical literacy. It is related to the use of numbers and their interpretation in everyday life.

As far as the secondary schools are concerned, statistical education coverage varies from rather good statistical theory in mathematical grammar schools to very poor descriptive statistics in some other schools. Because of this variation, students enter university education with very different backgrounds in statistical education. This usually causes many problems in the teaching of statistics at the university level.

5. Statistical education at the university level

Those problems in statistical education from secondary schools are reflected in university statistical education. It is very difficult to overcome these differences in the statistical course which is very rigorous one. Since the knowledge of those entering university is not standard, one must start from the very beginning, dealing with elementary and descriptive statistics in the first academic year, and only later on teaching more advanced statistics.

Statistical courses are now being taught in almost all faculties at the university level, because statistical methodology has been accepted as the most important tool in scientific research. Several years ago, for example, medical statistics was neglected and treated as something not very important. Now, however, there is hardly any research in medicine which does not make heavy use of statistical methods and applications. In fact, though, there is a further problem in universities because the level of teaching statistics varies a great deal between the faculties, from only descriptive statistics for the law faculty to mathematical statistics at a high level for students of mathematics. Between those levels are the others, e.g. the faculty of economics with several statistical courses in statistical methodology and economic statistics, the faculty of medicine with medical statistics at a moderate level, etc.

As the preparation for studying statistics at university level is not so good in secondary schools, students face lot of difficulties if they are to

pass the examinations in their statistical courses. For example, at the faculty of economics only 21% of all students pass the exam at their first attempt. This also results from their having insufficient knowledge in the mathematical theory necessary for understanding the statistical theory. Students can try to pass the exam as many times as they want (!) so the bulk of them do eventually pass the examination, albeit after several attempts. However, the Education Bill is going to be changed to enable the study process to be made more efficient. This will mean that students will only be able to make four attempts to pass the same examination, which may have serious implications for students taking statistics.

6. Development of computational statistics

The spread of statistical education among youngsters is connected very much with the expansion of computer science. Students become more familiar with statistics if they evaluate their own examples through computer programs. It is a very good tool for making statistical courses more interesting. It should be emphasised, however, that it can be counter-productive to introduce students to the use of computers before they have been given an in-depth explanation of statistical theory and methods.

The University Computing Center in Zagreb has organised two international conferencies in ITI (International Technology Interface) in Croatia, and is organising the next one, so we can say that lot of things have been done in computational statistics. The shortage of money due to the war situation in Croatia could be the only reason for slowing the development of computational statistics.