STATISTICS TEACHING IN HUNGARY

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Teaching statistics in an agricultural university is not an easy work. The students usually not only are not interested in the subject but are afraid of it too. So the first step would be to turn the resistance and wake up their interest. That is a difficult task and very rarely successful. How can we break the resistance of students? To answer that question is the most important first step towards successful statistics teaching.

INTRODUCTION

There are many teaching methods and there are various teaching materials even in one university, not to mention different universities specialising in different disciplines. So I cannot talk about Hungarian method in general, but about my experience in teaching statistics. I teach statistics on several levels (BSc, MSc, PhD) and in different faculties (Agriculture and environmental Sciences, Economic and Social Sciences) and in different forms. I find different problems according to the faculties and forms. Now I would like to talk about only one of them, which is the most important for me.

TEACHING STUDENTS FROM THE AGRICULTURAL FACULTY

To increase the efficiency of my teaching method is the most important task for me. Knowledge of statistics would be essential for the students especially when they are working on their final theses and they need to evaluate their data. Problems involving data need statistics to solve them. Nowadays the scientific paper needs some kind of statistical analysis, which helps to verify the subjective statements in an objective way. But students in third semester do not understand why they have to learn statistics and how it could help them later, so they do not spend enough time on it.

The statistics is taught only in one semester with a 1 hour lecture and 2 hours of seminars per week. It is a very short time to learn and practice the statistics methods. It is only enough to give a very short summary of what the subject is about, and to remember later that there are methods to solve problems. I have met several students from the fifth year in my class who sit in because they realise that they need statistical analysis for their final theses.

Summarizing the main problem, the subject is taught when the student cannot catch the sense of it and the student is not interested in it. What can I do?

BACKGROUND

In 1996 I was lucky to spend a full semester in Beloit College at the Department of Biology taking part in the Genetics course of Professor Jungck. In that time I taught plant breeding, genetics and biometrics. I was there to learn more about BioQuest Software Library and new teaching methods connected with it. During this semester I gained a closer view in the teaching methods and the way of motivating students. It was quite different from the method we used in our university.

I entered the classroom. There were several little groups speaking inquisitively about something. Every group stood near a funny poster from which a slouching tortoise or a laughing clock or another strange image looked at me. Where am I? And what are these young people doing around me? And what do these many amusing and colourful posters mean? These questions intrigued me. I went nearer to one group to find out what was going on. And then I realized that the playful posters contained very serious topics. They spoke about one of the most interesting areas of genetics, the inheritance of quantitative traits. Every poster presented a different special question and its answer too. In front of posters, students discussed different topics. They spoke easily about the estimation of the number of genes, components of variability, and heritability. They spoke about it just like about what was on TV in the last evening. It was fantastic: not only

how much they knew but also how sure of themselves they were in dealing with the topic. I enjoyed the contradiction of the playful form and the serious scientific content.

The first lecture was the second big surprise. Having seen the posters before, I supposed I would hear a very hard, serious lecture. Instead of this I heard a kind, friendly conversation. The students asked a lot of questions. They were inquisitive and they had purposeful questions. (I am accustomed to our students who hardly ask any questions and who are usually quite inactive during the lesson.)

I had to think about it. What is the reason for this difference between the students of Beloit and in our university? Our students are intelligent and they can work hard, too. But there is a big difference between the behaviour and attitudes. I had to recognize the difference is not between the students but much more between the two education systems. We usually do not have enough time. When we meet with the students we want to tell them everything. We want to give more concrete knowledge to them, but we don't give them time to think, to think about different problems, to pose questions and, what is most important, we don't really give them an opportunity to solve a problem alone. So they don't have a daily experience of being successful. They have no time to "live together" with the subject and they have no time to become fond of it.

Arriving home I changed my teaching style. I did not want to teach everything but let them freely choose a topic and speak about it. In that way I successfully made them active during class and increased their interest in my classes. In that time I taught facultative subjects, such as biometrics and population genetics, that students chose because they were interested in those subjects and wanted to learn them. Teaching statistics is a completely different situation. For 3 years I have been responsible for teaching statistics to students of the agriculture faculty. It means about 120-140 students in a semester. I give lectures to all students and I lead seminars to one group. Leading seminars is the best way to keep contact with students and discover what they understood from the lecture and learn what is their opinion.

The first two years I was quite disappointed because the results of the final exam were worse than I expected. What was the reason for it? Maybe I expected too much from students? Did I ask wrong questions? Did I give the wrong lecture? Did they not learn enough? After asking them I got the following answer: "We do not understand the material and we do not need it. We only want to pass, not more."

ADAPT A NEW STYLE

I remembered my experience of Beloit and decided to try to adopt it in my statistics teaching as well. My aims were 1, to make the students active and to force them to practise the methods learned; 2, students should obtain experience in using statistics in solving a problem; 3, students should recognize that the statistics could be useful to demonstrate and solve different problems; 4, do not be afraid of statistics, get closer to the subject, try to enjoy a little.

It was not difficult to motivate them. I offered that year that one of their written tests (from two) they can replace with a "presentation." There was not a big risk. Knowing the results of statistics exams of the last few years, both the students and I thought that we could take advantage from it. The possibility of taking a presentation was chosen freely and it took place in the spare time of students. Approximately 75% of students made the best of the opportunity.

The conditions were:
1.   two or three students can work together on one topic
2.   the topic can be chosen freely (crazy, funny, special topics were preferred)
3.   students have to declare the aim of presentation (analysis), source of data, type of analysis used, have to show the results (table or figure), have to give a conclusion connected to the aim
4.   the results can be shown by poster or slide or computer and so on
5.   time of presentation 5-10 minutes

EXPERIENCE OF PRESENTATION

Generally it was successful. Most of the students worked well. They found suitable problems for analyses, they chose and applied the statistical method in a correct way and drew the

right conclusion. And all this they did with pleasure. They were proud of their results and I was proud as well as I reached my aims.

Furthermore it was very interesting to learn more about the students through the topics they chose. Some of the presentations were based on fictive data but there were some based on real data from experiments or a web site connected to agriculture science.

Students certainly learned more during the preparation of the presentation than they learned for an exam. And they listened to each other and discussed the results. What was good, and what has to be done better or in another way? So they saw more examples of how we could use statistics to solve different problems.

NEGATIVE EXPERIENCE

What I cannot solve yet is how to give grades to the students. Listening to all presentation I corrected the biggest mistakes and I could evaluate the presentation "itself." Sometimes I felt that only one student worked in the group and the other members got the results without doing anything.

CONCLUSION

In summary I can say that giving more freedom to students to show what they know, we can get better results. I think this experiment was successful because many of the students who closed their eyes and said "I am stupid for statistics - I don't want deal with it" now got results from their own work and got closer to the subject.

REFERENCE
Toth, K. L. (1997). Can less be more*? BioQUESTnotes*, 7(2).