SUMMARY

The purpose of this project is to develop a new approach to statistical courses based on structuring their curriculum around case studies.

The currently taught courses in statistics are structured based on their technical content. It means that lectures are devoted to specific statistical techniques one after another. As a consequence, during the process of learning, students often have difficulties with associating those techniques with the real-life applications. They perceive statistical courses as very technical and boring. Additionally, when faced with a practical problem to be solved, students have difficulties with identifying appropriate technique to be applied. During a recent take-home exam, I was approached by a student who asked from which chapter was one of the exam problems. The student had difficulties with identifying the proper technique (which was very obvious in that case), when the problem was not formulated in the context of a specific lecture, as is usually done during the course.

The goal of this project is to overcome these difficulties and make statistical courses more accessible and attractive for students, especially those outside of the CQAS program. This can be achieved by re-structuring a course using case studies. The whole course would consist of 1-3 larger case studies including story-telling about specific situations in a company, a research institution, etc. The statistical techniques will be introduced as need for them arises during the development of the action in the case study. Each case study will be designed so that the techniques are introduced in the proper order, as required by majority of the statistical material, which tends to be sequential. Those kind of case studies are widely used as a successful educational tool in many areas, for instance, in management sciences. However, this approach is very innovative in statistics and would certainly improve teaching and learning process. Within this project, I would develop the case-study approach for two courses: EQAS 0307-842 70 Regression Analysis II and EQAS 0307-830-70 Multivariate-Analysis Theory.
WHO ARE THE TARGETED LEARNERS

Students of graduate statistical courses EQAS 0307-842-70 Regression Analysis II and EQAS 0307-830-70 Multivariate-Analysis Theory are the targeted learners. Currently about seven students per year, on average, attend the first course, and about 15 per year attend the second course. However, both courses will be offered in distance learning format next year, and those numbers should increase significantly. Additionally, the Regression Analysis II course has recently become a required course in the CQAS master program, and the number of students is expected to increase significantly.

ANTICIPATED IMPACT

I anticipate that the two courses (Regression Analysis II and Multivariate-Analysis Theory) will become more accessible and attractive for students, especially those outside of the CQAS program, who usually have less experience with statistics. Students will have a better understanding how the statistical techniques should be applied in real-life situations. If this approach turns out to be successful, it can be used also in other courses in future years.

The teaching methodology described above is very innovative in statistics. There are some books with case studies in statistics. However, they consist of separate case studies, each of which describes a separate data set with relatively limited background information. In some books, each chapter is introduced with a narrative case study; however, the remaining part of the chapter gives little or no reference to that case study. As a result, those case studies are not an integral part of the material and do not significantly impact understanding of the material. I am not aware of a statistical course that would use the case studies in the way I described it in this proposal.

MEASURING THE IMPACT

The impact will be measured by using a questionnaire asking students about their opinions (in addition to the regular teaching evaluations). All students will be asked about effectiveness of this new approach and their satisfaction from the course. Those who already have some previous experience with traditional statistical courses will be asked to comment on the comparison between the two approaches and indicate advantages and disadvantages of the new method. Results and conclusions of these surveys will be presented in the final report from this project.
REPORTING FINDINGS

The experiences and findings from this project will be summarized in a final report.

SHARING RESULTS OF THIS PROJECT

Results of this project will be shared with faculty by
- Informal exchange of information during the project
- Distribution of the final report copies
- Oral presentation, if needed
- Copies of lecture notes available for those interested in details

RATIONALE FOR THIS PROJECT

a) Why it is not part of regular college business

The current practice in teaching statistical courses is that they are structured based on their technical content. It means that lectures are devoted to specific statistical techniques one after another. The case-study approach to be developed in this course is very different and innovative in statistics, and it is not part of the regular college business.

b) The project’s relevance to required cluster, college, and/or department competencies

It is the department’s obligation to provide courses in statistics, which are accessible and attractive for students, so that they can learn a lot and be able to apply their knowledge in practice. This project will enhance our ability to provide that kind of courses.

c) How the project is relevant to other faculty

This project will draw from the faculty experience, and, in turn, will allow them to see if the new approach may enhance their courses.

d) What it would take to transfer the project’s success to other faculty

The faculty would need to incorporate similar case studies into their courses as part of the course, or even organize the whole course into one or more case studies. This experience may be applicable not only for statistical courses within CQAS, but may also be applied by other faculty in the College of Engineering, or in other colleges at RIT.
CREDENTIAALS AND EXPERIENCE

Dr. Bajorski has 12 years of academic experience in teaching and 5 years of experience in consulting and training in the Research and Development Bureau at the New York State Department of Transportation.

TIMETABLE

The majority of work will be done in the Summer'99 and Fall'2000 Quarters. The remaining time will be devoted to implementation and improvements.

**Summer'99 Quarter:**
The case-study approach for EQAS 0307-842-70 Regression Analysis II course will be developed. The work will be preformed in the following steps

1. Internet and literature search to find examples, data, and case studies appropriate for this course
2. Getting in touch with statistical practitioners in industry in order to collect material for real-life case studies
3. Developing narration for all case studies, and planning incorporation of all statistical techniques to be covered in this course
4. Writing lecture notes containing descriptions of all case studies

**Fall'2000 Quarter:**
The case study approach for EQAS 0307 830 70 Multivariate Analysis Theory course will be developed. The work will be preformed following the steps described for the Summer'99 Quarter.

**Winter’2000 Quarter:**
I will be teaching both courses and will implement the new case-study approach. Adjustments and corrections will be made based on my experience and students’ reaction during this implementation.

**Spring’2000 Quarter:**
I will be teaching EQAS 0307-842-70 Regression Analysis II as a distance learning course using the case-study approach as the second, improved implementation.

**Summer’2000 Quarter:**
The final report will be written.