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Methodology for Data Collection and Analysis with a View toward Continuous Evaluation and Improvement of the Croatian Secondary Education System

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Introduction, Background and Aim

In any system or process, there exists an ongoing need for valid, reliable, timely, and continuous feedback on performance metrics so as to improve performance constantly and efficiently, but also so as to leverage strengths, minimize or offset weaknesses, capitalize on opportunities and avoid needless treats.

The Croatian National Education System (1st and 2nd level Gymnasium program) is such a system. Decisions have been made at the national level to provide independent, impartial, external evaluations of the national education process/system – implementation of which is ongoing – so as to enable this sort of strategic insight.

The aim/purpose of this poster abstract is to present an overview of the research design , data collection, and preliminary statistical analysis methods used for a nationwide, first and second grade level, gymnasium student examination and attitude measurement project conducted during the 2006/2007 academic time frame.

Methodology

Data Collection

Two different waves of data were collected as part of this exploratory/descriptive research design. In May of 2006, 13000+ students were each examined in three subject areas: Croatian language, English language and Mathematics (yielding a total of 39000+ tests). In February 2007, the same 13000 plus students were randomly assigned to only one of 15 different possible examinations (as is described below).

To repeat, in the second instance (February, 2007) no student was required to take more than a single examination so as to reduce total data collection time effort and costs and to improve the efficiency of the data collection process.

The first wave of data collection was in fact not a sample, but rather a complete census of 1st grade gymnasium students and was very demanding in terms of time and effort for both students and staff/faculty personnel.

The second wave (February 2007) was designed in such a way so as to assign an appropriate number and type of exam (15

different subject areas across five different program types) to the same 13000+ students and also avoid exposing any student to more than a single examination. At the same time special consideration had to be given to smaller size (especially languages) subject areas and smaller sized schools, etc. Finally, appropriate allowances needed to be made so as to provide sufficient sample sizes to perform a variety of prespecified statistical analyses. Statistical analyses and sampling design arrangements were made through staff researchers.

Instruments for both the subject area "content" exams, and the demographic, teacher, attitudeopinionbehavioral questionnaires were designed by knowledgeable work groups (consisting of secondary school teachers and university professors) in cooperation with National Center for External Evaluation of Education (NCEEE), the Institute for Social Studies in Zagreb, and the "Ivo Pilar" Institute for Social Sciences. For both wave the data were collected over a period of three consecutive school days, whereas for wave two the data were collected during a single school day.

Demographic data and teacher/teaching related data were gathered both from school records and in part from the student respondents. Student opinion data (on subject area, classroom environment, expected grade and teacher interaction, etc.); attitude data (toward subject area, self evaluation, etc.); and behavioral information (study habits, prior subject area performance, etc.) was collected either prior to the exam, immediately after the exam, or in the case of certain opinion data, both prior to and immediately after the exam. This was true for both wave one and wave two data collection scenarios.

Statistical analysis

Since this program of ongoing research is in early days, a variety of both exploratory and descriptive statistical tools, procedures, and tests were run on the Croatian National Education system data. Exploratory methods (as is shown in the poster) included factor analysis and graphical presentations of the data across schools, geographic areas, program types and subjects. Standard tools, including regression, analysis of variance were also employed. Incidentally, for the second wave it was possible to estimate preliminary "gain score information" using mixed model methodology. Additionally, AN1 / AN2 (student attitude, opinion, behavioral data) questionnaires were analyzed and modeled in a number of interesting and informative ways. For example, information gathered on students self evaluation of performance and actual success on the exam were found to be relatively highly correlated. However, these correlations varied considerably across subject areas and program type. One conclusion is that external evaluation of the educational system has the potential to contribute to the standardization of the grading criteria, and hence reduce potential grading bias by better distinguishing between students according to actual knowledge gain.

Expectations Regarding Future Research Needs

Future research will attempt to identify factors which might allow us to predict those groups of students who are likely to mark more reliably and those who are likely to require additional training or monitoring. Work on identifying relevant data on teachers, social and economic status of the teachers and parents, demographics and a number of other relevant factors is under way and is expected to be collected, hopefully, during the next wave of longitudinal research.

After a process of systematic data collection over a number of years, the Center will be in a better position to offer impartial suggestions for valid and reliable (i.e., unbiased) comparisons among schools, programs, teachers, teaching methods, classroom activities, student needs, etc.

In summary, using this poster we'll try to systematically present the methodology of data collection and processing currently being done by National Center for External Evaluation of Education in an attempt to evaluate and improve the quality of Croatian school system.

Keywords:

National exams, external evaluation, standardized criteria, questionnaires, data collection, processing and presentation, student, school, teacher.

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