

Applying Advanced Econometric and Marketing Techniques to Analyze Various Issues in Computer Science Education

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Abstract:

What are the causes of my low teaching evaluations? Why are students leaving the CS departments? Why didn't students take my section of a multi-section course? These are typical and frequently asked questions. For decades studies have found that grade inflation, class size, class meeting time, level of difficulty of a course, toughness of an instructor, students' ability to answer evaluation questions honestly, etc. may AND may not affect evaluation, retention, etc. However, these issues have not been addressed fully by educators in the discipline of computer science. We will present a framework that uses advanced econometric and marketing methods to explore these issues on various fronts to determine the causation among various factors.

Two types of datasets are usually available. The *aggregate* datasets (e.g., average score of an instructor in teaching evaluation) lack the in-group variances due to aggregation. The *disaggregate* datasets are the raw responses from the subjects being surveyed. Simultaneous equation models, in which each equation models the cause of a particular endogenous variable (e.g., evaluation scores, student expected or received grades, etc.), will be used on the aggregate datasets. The more innovative part of our framework is the use of disaggregate (rather than the less accurate aggregate) data directly from students. We shall apply discrete (cardinal or ordinal) choice modeling techniques to study how students rate their instructors, what factors cause students to leave the CS discipline, etc. We shall compare the stated expectation (i.e., stated preference) and the actual outcome (i.e., stated choice). The conjoint analysis methods in marketing analysis will be used for survey design and data analysis, while discrete choice modeling will be used for modeling the choice behavior of students. Finally, we will study if our models and model structures can be used at other schools and institutions (i.e., transferability).

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