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Will this be on the test? How exam structure affects perceptions of innovative assignments in a masters of science microeconomics course



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ABSTRACT

During the 2014 and 2015 offerings of a Masters of Science-level microeconomics course in an agricultural economics department, writing assignments and in-class application exercises were added to reach higher learning objectives, including application, analysis, synthesis, or evaluation. In 2014, problem sets and exams remained focused on knowledge and comprehension. At the end of the semester, for each assignment type, the students were asked about how well the experimental assignments increased their understanding of course material. Second, they were asked to rank assignments based on how helpful they were in developing understanding of material. While students were observed applying, analyzing, synthesizing, and evaluating models learned in class while working on the experimental assignments, in 2014 problem sets and exams ranked higher than the experimental assignments. In 2015, application-type questions were added to exams, under the hypothesis that students used exam performance as their benchmark of knowledge acquisition. In 2015, students still ranked problem sets first according to questions 1 and 2, but writing assignments moved into second place. Interestingly, studying for exams ranked last according to question 2 in 2015. Comparing across years, the level of importance attributed to writing assignments was statistically significantly higher in 2015, suggesting that exam content affected students' perceptions of the writing assignments.

1. Introduction

Microeconomic theory courses form the core of most undergraduate and graduate economics programs. In these courses, students learn microeconomic concepts and methods. Many of the concepts are highly stylized. One such example would be a consumer's utility function and corresponding utility maximization problem. The consumer's satisfaction is reduced to a graphical or mathematical tradeoff between consumption of two goods, x and y . By the end of the semester, most students in introductory microeconomics courses can quickly identify the utility-maximizing combination of goods x and y on a graph of indifference curves and a budget constraint, and students in intermediate and/or graduate microeconomics courses can solve a constrained optimization problem to derive the optimal consumption of x and y . However, if you asked the student to explain what the point on the graph means or what the numbers derived for x and y mean, many students would struggle. If you asked a student when they might use the graph or constrained optimization problem outside of class, most students would have no response.

Given the above examples, based on Bloom's Taxonomy (Bloom, 1956), most learning remains in the most basic level: knowledge. Those students who can explain their answers have reached the level of comprehension. However, most students never reach the

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higher levels: application, analysis, synthesis, and evaluation. This limits the usefulness of learning the material if the student does not know how to use the material outside of the classroom for either more advanced classes, research, or future employment.

This trend may be driven by the kinds of assignments generally used in microeconomic theory classes; problem sets and exams form the core of assessments in most classes. An informal survey of colleagues at the assistant and associate professor level whose degrees were obtained from twelve leading programs indicated that all of the microeconomics courses they took as graduate students utilized problem sets. About 83% indicated that their courses used exams or quizzes, and only 25% and 50% indicated that their courses had included group projects or writing assignments, respectively. They indicated that exams tested primarily knowledge, comprehension, and applications, while rarely, if ever testing analysis, synthesis, or evaluation. Problem sets had similar emphasis on knowledge, comprehension, and to a lesser extent applications. In contrast, the colleagues whose courses included writing assignments indicated that writing assignments were able to reach application, analysis, synthesis, and evaluation.

There are two potential ways to achieve higher levels of learning and develop students' abilities to apply microeconomic theory: 1) Lectures and in-class non-graded activities and 2) graded assignments. While in-class teaching can emphasize applications and many textbooks include small inset textboxes to discuss possible applications, most instructors can attest to the fact that students are primarily motivated by grades. This would imply that graded assignments have a stronger likelihood of developing higher skills than non-graded methods. Additionally, the higher levels of learning are all active endeavors; synthesis is unlikely to occur listening to a lecture or reading a textbook, but could occur if challenged to answer questions that require moving away from repeating problems similar to examples from lecture or the textbook.

This presents the need for innovative assignments that help students develop a better understanding and use of microeconomic theory, and a need to motivate students to undertake more challenging assignments. This paper discusses two kinds of experimental assignments: in-class applications done in groups and writing assignments completed independently outside of class time, implemented in a Masters of Science-level microeconomics course. The analysis that follows suggests that while these assignments successfully engaged students in higher levels of learning, the students' perception of the usefulness of these assignments was likely influenced by exam content. Previous literature has found that perceptions of the usefulness of assignments and the learning environment affect the amount of effort given to assignments and learning outcomes (Lizzio et al., 2002; Owston et al., 2013; Salomon, 1984). Thus, educators should care both about designing assignments that obtain higher order learning, as well as students' perceptions to ensure that students are fully engaged with assignments and obtaining the full learning benefits of the assignments.

2. Previous work

Other microeconomics instructors have sought to increase students' ability to apply theory to the real world. Instructors at Seattle University developed "scaffolding assignments" that gradually decreased the structure provided to students on assignments that required students to apply theory to real world problems (Green et al., 2013). Assignments included questions on problem sets that guided students through applications, a writing assignment that guided students through writing a policy memo, and a second memo assignment that provided possible topics, but less guidance.

While Green et al. (2013) decreased the amount of guidance during the semester, Dynan and Cate (2009) compared the effect of writing assignment guidance on student performance. Among six sections of a course titled The International Context of Business, sections were split among three groups: control, sections with weekly writing assignments with specific questions to be addressed, and sections with weekly writing assignments with suggested guidelines (eg, address an interesting idea, discuss disagreements you have with ideas). Students in sections with either kind of writing assignment outperformed students in the control sections on the final exam, but students with the more structured writing assignments outperformed students with the less structured writing assignments. Similar results were found in a Principles of Macroeconomics course where students who were assigned eight to ten writing assignments throughout the semester outperformed those students in sections that did not have the writing assignments (Greenlaw, 2003).

In a similar vein, other instructors have engaged in "flipping the classroom" within microeconomics courses. In one such endeavor at the University of Illinois, students participated in various activities to illustrate concepts instead of spending most class time listening to lectures (Vasquez and Chiang, 2015). Activities included a gift trading exercise to illustrate gains from trade and the *Balls and Buckets* game that illustrates diminishing marginal returns to labor, as more students are sequentially added as labor. The flipped classroom method was also implemented in a Principles of Microeconomics class at Texas Technical University. Classroom activities included more traditional activities like practice problems, group discussions, and worksheets (Roach, 2014). Using Likert scale ratings, the instructors asked students to evaluate several aspects of their learning experience. The majority of students agreed with statements pertaining to the value of the course, the value of interacting with their peers, and the usefulness of videos as pre-class preparation.

On the less extreme end of the spectrum, flipped-blended classrooms have been implemented in economics courses, where some of the course material is delivered prior to class and supplemented with in-class activities, and some of the material is delivered in class through traditional lectures. In one such experiment in a Principles of Microeconomics course, compared to students receiving traditional lectures, students in the flipped-blended sections showed greater improvement between pre- and post-tests (Olitsky and Cosgrove, 2016).

On a smaller scale, instructors can implement individual active learning activities within traditional lecture-style courses (Robinson, 2015). Some of these activities include short writing assignments at the end of class that ask students to explain or illustrate a concept, graph, or economic issue (Crowe and Youga, 1986), negotiation exercises to explain the gender pay gap (Roche, 2014), pit and double auction markets to illustrate competitive equilibria, and ultimatum and signaling games to illustrate sequential

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