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Symposium: Games in the Classroom

Renewable resource dynamics: A Web-based classroom experiment

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ABSTRACT

The authors adapted a lab-in-the-field experiment emulating the dynamic extraction of a fishery to create a Web-based classroom experiment. The game includes a multi-player version analogous to an open-access problem and a single-player version analogous to the social planner problem. This game is helpful in introductory microeconomics courses to teach about dominant strategies and the consequences of resource rivalry. In elective courses, the game helps teach bio-economics concepts, including logistic growth functions and optimal extraction paths. Instructions for game deployment and creating the sessions are provided. Conducting the game takes about 20 minutes, and because the game is Web-based, students can access it from their laptops, tablets, or smartphones.

KEYWORDS

Bio-economics; fishery; logistic growth; teaching economics

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A20; C90; Q20

In the face of climate change, the most significant long-term social dilemma globally encountered (Milinski et al. 2008; Ostrom 2010), the connections between economics and sustainability could be valuable if presented earlier in the undergraduate economics curriculum. Nonetheless, the management of renewable resources is rarely covered in introductory courses, being relegated to specific courses in environmental or resource economics. In this article, we present a Web-based game that introduces the dynamic management of a renewable resource. It is simple enough to be employed in any economics course. Moreover, it has game variations that add complexities that students can explore at higher levels, and it takes about 20 minutes to be completed.

One potential reason for not covering models of renewable resources in early economics courses is that they are built on dynamic optimization problems that require complex mathematical tools to find solutions analytically. The dynamic component is needed to capture the interplay of biological properties and extraction patterns, and it helps students to understand the basic notions of intertemporal optimal consumption.

Decision-making classroom experiments provide undergraduate students with an introduction to these problems. Classroom experiments can help teach economics by improving test scores and increasing the long-term retention of economics concepts (Dickie 2006; Durham, McKinnon, and Schulman 2007; Emerson and Taylor 2004). Moreover, classroom experiments increase learning when combined with related assessments (Cartwright and Stepanova 2012) or by fostering ex post discussions between students and instructors (Holt 1999). In addition, digitalized experiments appear to be as effective for teaching purposes as classic pen-and-paper experiments (Carter and Emerson 2012).

We report the basic functioning (and additional teaching materials) of our Web-based adaptation of a lab-in-the-field experiment (Hopfensitz, Mantilla, and Miquel-Florensa 2019). It emulates a dynamic open-access resource exploited by several players. Common-pool resource (CPR hereafter) games for

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This article has been corrected with minor changes. These changes do not impact the academic content of the article.