Chapter 4

Using Prediction Markets to Deliver Authentic Learning Experiences

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ABSTRACT

Mass higher education presents serious problems to implementing active learning. Large class sizes mean that traditional active learning strategies are becoming more and more difficult to implement, due to the administrative burdens associated with them. In this chapter, the authors present prediction markets as a pedagogical tool which can be used to allow teachers to implement active learning in a large group teaching environment without imposing prohibitive administrative overheads. They outline the benefits for students in the cognitive and affective domains of learning. They move on to present a case study describing in detail how our methodology can be implemented and conclude by presenting research on the effectiveness of our approach in the cognitive domain of learning. The authors conclude that prediction markets are a powerful tool for implementing active learning in a large group teaching environment.

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INTRODUCTION

Mass higher education presents serious problems to implementing active learning. Large classes at undergraduate level are regularly measured in hundreds of students (Hogan & Kwiatkowski, 1998). These large classes often mean that traditional active learning strategies cannot be implemented due to administrative overheads. Information Communication Technology (ICT) offers the potential to enable active learning in large groups. However in many cases the amount of time that staff will invest in managing the educational process in an online forum is similar to the amount of time they will spend managing an offline process and is proportional to the class size (Lemak, Reed, Montgomery, & Shin, 2005). In extreme cases, ICT may just become a burden where teachers are required to make the same content and learning activities available in a variety of different formats (McAvinia & Oliver, 2002). In order to take advantage of the capabilities of ICT, careful pedagogical design is required.

In this chapter, we introduce a relatively novel decision making tool called a prediction market. By leveraging the capabilities of ICT, a prediction market can be used to implement active learning in large groups, without incurring the prohibitive administrative overheads of more traditional methods. Our approach improves pedagogy by enabling active learning, by using real-world problems and by presenting students with decision situations which closely approximate those they will face in their professional careers. The realistic nature of the problems, as well as the group interactions inherent in our approach promotes engagement. Finally, prediction market participation promotes independent learning, empowering students to take responsibility for their own education.

The chapter is structured as follows. We begin by introducing a theoretical framework outlining the attributes associated with active learning pedagogies. We use this framework throughout the chapter to highlight the suitability of prediction markets as a tool to implement active learning. We emphasize the growing importance of information literacy in the modern environment. Moving on from this, we discuss in detail the particular challenges that are raised by large group teaching.

We then provide a basic introduction to prediction markets. We describe prediction markets, and outline the benefits that prediction markets can bring in an educational setting. Following on from this, we deliver a detailed case study illustrating how our methodology can be deployed. Finally, we present research on the effectiveness of this approach in the cognitive domain of learning.

BACKGROUND

Active Learning

Constructivist learning theories are based upon the concept that knowledge is constructed by an individual using their own cognitive processes. Learning is dependent on both feedback from the environment and social interactions (Dunlap & Grabinger, 1996). Constructivism provides the theoretical justification for active learning. Active learning promotes critical thinking and teaches learners to search for, analyze and apply knowledge to solve the complex problems which are a hallmark of the modern world. According to Bostock (1998) active learning is defined by five specific attributes: Realistic Learning Experience; Student Led Learning; Generative Learning; Realistic Assessment Mechanisms; and Collaborative Learning.

Active learning requires that the learning experience should be realistic and should accurately reflect both the situation where the learning is expected to be applied and the decisions that will be required in that situation. In general, the learning experience should be built around real-world problems, events and issues (Bostock, 1998).

A second attribute of active learning is that it should promote initiative and responsibility in
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