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## Learning in Online Environments: Balancing Cooperation and Competition

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# Learning in Online Environments: Balancing Cooperation and Competition

TREO Talk Paper

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## Abstract

Our behavior is shaped by our environment. We learn by interacting with our environment (Piaget and Cook 1952). Because our environment is largely social, learning is primarily a social process (Lave and Wenger 1991). We learn by interacting with others and this interaction can take place in multiple contexts. Two main contexts in which learning happens are cooperation and competition. Cooperation is defined as joint action among several actors who have the incentives to work together towards achieving a common goal (Ouchi 1979). On the other hand, competition involves rival actors who have conflicting incentives to gain an exclusive outcome. Coordination and competition are common in the society and economy (Nalebuff and Brandenburger 1995; Nowak and Sigmund 2005).

Learning environments, such as classrooms, can be designed to combine elements of cooperation and competition (Attle and Baker 2007). Assessing these novel settings is not easy as it requires prolonged observational or experimental data. Today, many online environments are virtual providing transparent settings for assessing the effectiveness of learning strategies. We benefit from DOTA 2, an online video game in which players join competing teams fighting in battles (Sapienza et al. 2019). Leveraging data about 3.5 million matches, we operationalize learning using objective data (Herbrich et al. 2006) and perform conceptual clustering (Alberdi and Sleeman 1997) to uncover the best strategies for learning with cooperation, competition, or both elements. This work contributes to a better understanding of learning and informs the design of virtual learning environments.

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