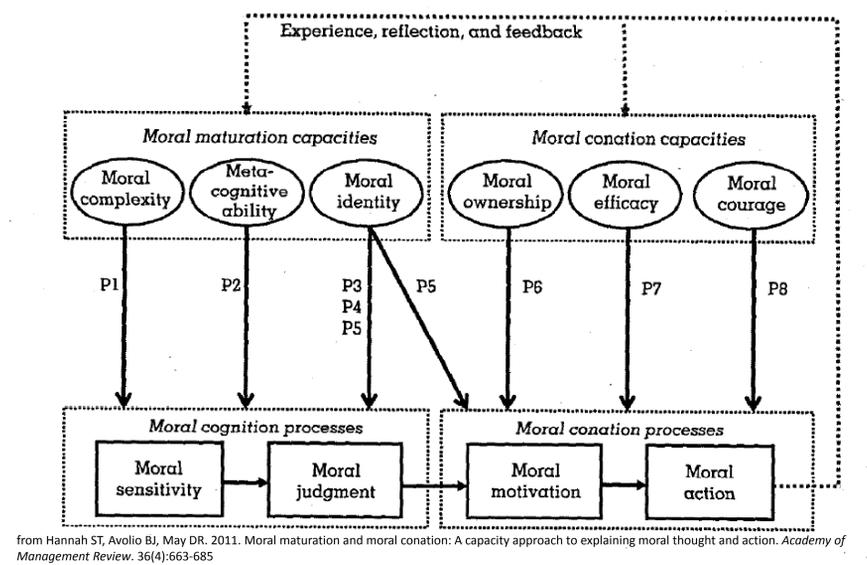


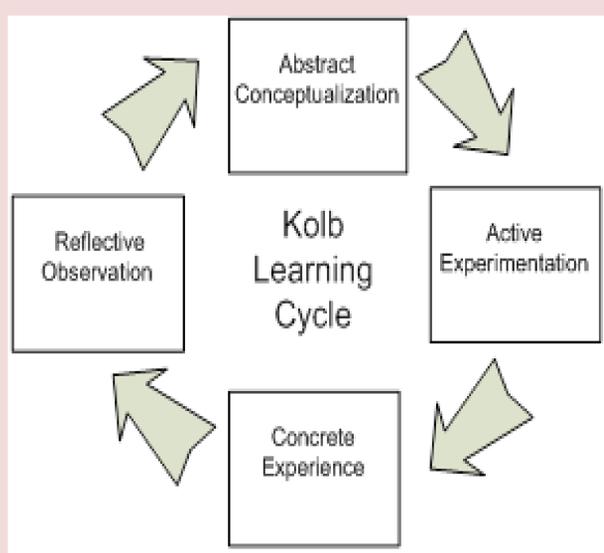
Abstract:

This project is developing and testing a new approach to teaching engineering and science students that leverages their interest in experiment and experience. Unlike a traditional liberal arts pedagogy involving reading about ethics, discussing the readings, and writing new analyses, this pedagogy uses *games* to position students in a series of potentially adversarial relationships that force them to confront some of the salient problems of sustainability, including environmental externalities, the Tragedy of the Commons, weak vs. strong sustainability and intra-generational equity. Recent tests allow students at different universities to play the games simultaneously using information communication technologies (ICT). In each game, students must ask themselves the questions related to **moral cognition**, "What are my obligations to my fellow students?" and **moral conation**, "What am I willing to risk in my own sense of well-being to meet these obligations?" We hypothesize that this approach will result in students that are actively engaged in learning exercises, and result in an improved ability to identify ethical problems, pose potential solutions, and participate in group deliberations with regard to moral problems.

Framework for Moral Maturation and Moral Conation



from Hannah ST, Avolio BJ, May DR. 2011. Moral maturation and moral conation: A capacity approach to explaining moral thought and action. *Academy of Management Review*. 36(4):663-685



The students know in advance that their performance during the game will result in a grade. The games are designed so that students must confront the moral dilemma of advancing their own grade at the expense of others

Students are encouraged to communicate face to face with their classmates during class, as well as via information communication technologies (ICT) outside of class and with students located at other universities using (e.g., Twitter, ethicsCORE).

	Abstract Conceptualization	Active Experimentation	Concrete Experience	Reflective Observation
Objectives	<ul style="list-style-type: none"> Provide background for sustainability issues Introduce related theory and general ethical codes of conduct 	<ul style="list-style-type: none"> Learn how the game works Determine effective strategies Identify desired outcomes 	<ul style="list-style-type: none"> Directly experience ethical decision making Sharpen deliberation skills Practice discourse ethics 	<ul style="list-style-type: none"> Develop realizations of individual moral fiber Confront discrepancies between what they say they would do and what they actually did
Activities	<ul style="list-style-type: none"> Assigned readings PowerPoint lecture Educational videos 	<ul style="list-style-type: none"> Experiment with game calculator Discuss possible outcomes of various strategies and thought experiments Experiment with online collaboration tools 	<ul style="list-style-type: none"> Navigate non-cooperative situations Role playing Negotiating & deliberating Opportunities for leadership and teamwork 	<ul style="list-style-type: none"> Compare hypothesis to results Relate to real-world collective action problems Debate the actions of other students Classroom discussions Reflective writing assignments
Assessments	<ul style="list-style-type: none"> Graded writing assignments such as essays, wikis, tweets, and discussion board entries 	<ul style="list-style-type: none"> Students apply theory by publically hypothesizing about expected behavior 	<ul style="list-style-type: none"> Individual and average grades Communication record Observation of game-play interactions Sharing of game points 	<ul style="list-style-type: none"> Graded reflection essays on their experience and/or how they might redesign system for more cooperation
Outcomes	<ul style="list-style-type: none"> Students develop interpretations and conceptualizations of sustainability problems 	<ul style="list-style-type: none"> Game strategy Some students emerge as group leaders at this stage 	<ul style="list-style-type: none"> Relationships and trust between students Heightened emotions and memories Teamwork skills Improve ability to improvise A sense of accountability to others 	<ul style="list-style-type: none"> Group tacit knowledge Students alter their perceptions and interpretations of theory and conceptualizations Student increase awareness of the perspectives held by others

Classroom experiences are consistently characterized by surprising, emergent behavior and high quality discussions. Issues concerning leadership, transparency, risk and trust dominate discussion.

Participating students reveal deep parallels between their game-play experiences and real-world problems, such as climate change and other environmental issues.

Game modules have been tested at a number of Universities including Rochester Institute of Technology, Purdue University, Dartmouth and Arizona State. A recent game experiment allowed students at ASU, RIT and Mountains of the Moon University (located in Uganda) to simultaneously play an externalities game.

Plotting the participation of students on Twitter during game-play reveals a power law relationship; most of the contributions to the group are made by just a few extremely active individuals. These students provide a critically important role as **moral leaders** That set expectations for other students.

Twitter Participation

