Motivating Question
• How do we let students actively experiment in the game theory without programming skills or tools?

TLEF: Project AXLRD
• Web-based educational application based on Blockly framework allows for user-friendly design and playing of simulations
  • No technical skills necessary
  • Intuitive, easy to use

Introduction
Simulations and games are valuable pedagogical tools for engaging students in experiential learning. However, how can we conduct these kinds of experiences in complex environments without compromising either the setting or the learning goals?
• We present a set of tools (software + teaching) which can be used to build and play complex simulations in an accessible and engaging way.

Educational Context
• Students: 1st - 4th year, non-technical, general background (no required math or CPSC background); economics, computer science.
• Classroom: large (100+) classroom, 1 hour sessions, minimal TA support
• Learning objectives: applied game theory and programmatic reasoning; to understand how beliefs can create emergent complexity and cooperative behavior, and how strategic thinking works
• Experience: based on Axelrod (1980)’s repeated Prisoner’s Dilemma tournament

Key Challenge
• Experiential learning theory (Kolb, 1980) requires active experimentation
  • Requires on-going interaction with learning context
  • Learning context requires (a) complex setting (can’t simplify) and (b) experimentation (but no specific skills assumed)
  • Simulation “too complex”: learning to “play” the game instead of understanding context

Development Process
• Two-year development timeline, mainly using student (co-op) developers
• Integrated and support from CTLT and IT
• Development was easier than original estimates (even given COVID-19 problems)

Evaluation and Feedback
• Evaluated (and guided development) using a series of student feedback surveys
• Supplemented with user trials and workshops

Outcomes
Student evaluation of project was very positive:
• 74% agreed it made learning more fun
• 67% agreed that it made learning easier
• Biggest challenge was in ease-of-use: there was key indication that good training was key

Faculty involved also found several benefits:
• Increase introduction to strategic thinking and experiential learning in non-traditional settings.
• Clear and tangible benefits to peer-learning and group interaction in this environment
• Interesting and unexpected sophisticated in student strategies and behavior was observed
• Learned that Blockly and this tool-kit is more flexible and easier to use than expected, with many potential uses in other courses

Conclusions
This project demonstrate a practical, scalable and effective way to encourage experiential learning in courses that involve strategic thinking and analytical reasoning, with potential applications in other areas

Reference / Bibliography

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