http://explosm.net/comics/1022/Political Agenda: A Cognitive Game for Political Perspective Taking

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In a democracy, overcoming societal challenges such as climate change, hyper-inequality and education requires an alert and knowledgeable citizenry. Researchers, educators and practitioners have recognized the need for a *new civics* that provides citizens with the abilities to effectively participate in the democratic process (CIRCLE 2003) and for learning technologies that help them become civic innovators. One ability citizens must develop to become effective participants is *political perspective taking*, that is, the ability to reason about the ideological values of others and themselves (Fitzpatrick, Hope, Barahumi, Krupnikov & Easterday, 2012). How might educational games help students learn such a complex and ill-defined skill?

Background

Games for civics. Games have great potential to promote civic learning, but it is unclear whether they can promote the complex abilities needed for civic participation. Recent reviews of educational games conclude that games can promote learning but also that high-quality evidence on games is scarce (Connolly, Boyle, MacArthur, Hainey, & Boyle, 2012; Federation of American Scientists 2006; Honey & Hilton, 2011; Tobias & Fletcher, 2011; Young et al., 2012). Furthermore there is relatively little research on games for civics. iCivics (2011), a non-profit organization founded by Justice Sandra Day O'Connor, has created nearly a score of civics games, but work presented at GLS questions whether learners can apply what they learn from the games to outside political realities (Stoddard, Banks, & Nemacheck, 2013). Raphael, Bachen, Lynn, Baldwin-Philippi and McKee (2010) argue that civic games should connect: content to gameplay, individual action to social structure, and ethics to expediency. There are examples of civic games that increase understanding of a citizen's role in addressing societal challenges (Chee, Mehrotra, & Liu, 2013), but for now, games for civics remains a largely unexplored territory.

Ill-defined domains. One of the difficulties of designing games for teaching civic abilities is that we are still trying to define the new civics (Gould 2011). Easterday (2012) argues that civics incorporates the disciplines of policy argument, civic journalism and activism. However, disciplines such as policy argument are ill-defined (Rittel & Webber, 1973; Voss 2005). That is, unlike domains like algebra with correct solutions and clear steps for solving problems, problems in ill-defined domains: do not have single correct answers, can be framed in different ways, require argument to justify, and so on. Easterday, Aleven, Scheines & Carver (2009) showed that we can address this issue of ill-definition in policy argument through a cognitive framework that makes policy argument well-defined enough to teach in games. However, they ignore an important skill: reasoning about political values. For example, when reasoning about whether to adopt a policy that will increase taxes to provide universal health care, citizens not only need to know that the proposed intervention will have the desired effects (a causal argument), they also need to know which outcomes are affected (greater tax burden, greater access to health care) and how different ideologies value those outcomes.

Political perspective taking. The complexity and diversity of approaches that different disciplines have taken with respect to understanding political perspective taking presents an additional challenge. Political science has done a great deal of work on polarization (Layman, Carsey, & Horowitz, 2006; Abramowitz & Saunders, 2008) although much of this work focuses on distinctions between Democrats and Republicans—parties composed of heterogeneous, conflicting ideological groups and that do not provide categories with enough nuance for political perspective taking. Political philosophy has spent thousands of years on questions of ideology and justice, producing theories such as Bentham's utilitarianism, Novack's liberty, Kant's categorical imperative, Rawl's difference principle, etc. (Sandel 2010). More recent work in moral psychology has explored the social, psychological and evolutionary basis of our moral intuitions upon which we base our political judgments (Haidt 2012).

Cognitive games. Even if we can define the ill-defined domain of political perspective taking and reconcile the different disciplinary approaches, we must still design a game that provides effective feedback. Situational feedback, of the type often provided by game environments, is not always sufficient guidance for teaching complex problem solving (Nathan 1998). At a recent GLS Fireside chat, Denham (2012) proposed that we might be able to increase the effectiveness of games by combining them with intelligent tutors that provide *step-level* feedback on each stage of problem solving (VanLehn 2006), as opposed to feedback only on problem solutions. A recent meta-study of intelligent tutoring systems shows that they can increase learning nearly as well as individual human-tutors in well-defined domains (VanLehn 2011). In fact, recent studies on cognitive games (that embed intelligent tutors in

game environments) show that they improve learning and interest better than games without tutoring (Easterday, Aleven, Scheines & Carver, 2013; Easterday & Jo, 2011). Of course, using cognitive games assumes that we can articulate the knowledge and skills for political perspective taking in the first place.

Purpose

The purpose of this design-based research study was to determine how we might design a game for teaching political perspective taking. Our design argument claims that we *can* teach political perspective taking to undergraduates using games that:

(a) define perspective taking as a 5 step process requiring an understanding of moral foundations theory, the cultural attachments of different ideologies, and common policy interventions;
(b) have fantasy environments where players achieve success through predicting policy positions and that obscure demographic information about characters; and
(c) use embedded intelligent tutoring.

In this paper, we describe the evidence gathered through the design-based research process that led to this argument. This contributes to research on civic education, games and learning, and moral psychology by providing a well-defined model of political perspective taking, showing limitations of a traditional game design, and showing how we can design more sophisticated cognitive games that overcome these limitations.

Phase 1: Assessing political perspective taking

The purpose of the first iteration (described in Fitzpatrick et al. 2012 and summarized here for clarity) was to evaluate the need for a political perspective taking game by assessing students' political perspective taking skills. Survey responses were collected from 187 students enrolled in political science classes at a private Midwestern university. Students were given 4 different policy interventions (on gun control, immigration, health care, and national security) like that in Figure 1, and asked how five different political ideologies (Libertarian, Egalitarian, Utilitarian, Liberation-Theology, Confucianist) would respond, either: *support*, *oppose*, *it depends*, or *not sure,* and asked to explain why.

Policy: SB 1234: Health Care Currently 20% of the population does not have secure health care coverage. The government has decided to provide healthcare to all of its citizens. This system is funded by a progressive tax that runs from 0 to 3%. Households that make over $150,000 per year will pay 3% tax. Households that make less than $150,000 per year will not be taxed

Figure 1: Policy question

On average, students answered 62% (M=12.49, SD=.81) of the questions correctly, showing that there is great room for improvement even among political science students at an elite university. Not a single participant scored a 20 out of 20. 5 participants (2% of the sample) scored 90% (18 out of 20 questions).

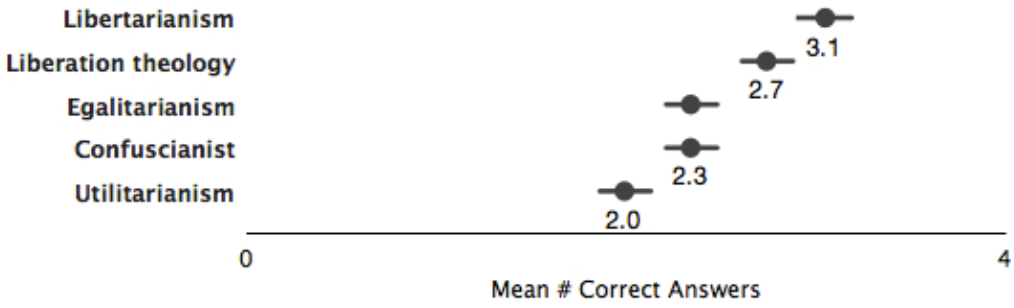

Figure 2: Some ideologies, like Libertarianism, were easier to reason about than others, like Utilitarianism.

Figure 2 shows the average number of correct answers for each ideology. An ANOVA of the differences between the scores on each ideology found that some ideologies were significantly easier to reason about $F(4,930) = 34.91$, $p < .0001$. Tukey post-hoc comparisons showed that the easiest ideology to reason about was: (a) libertarianism ($M = 3.05$, $SD = .98$); followed by (b) liberation theology ($M = 2.74$, $SD = .86$); then (c) Confucianism ($M = 2.34$, SD

= .95) and egalitarianism (M = 2.34, SD = 1.00); and finally (4) utilitarianism (M = 1.99, SD = .94). For each pair-wise comparison except Egalitarianism and Confucianism, p<.002; and for the Egalitarianism and Confucianism, p=1.0.

Phase 2: Field test of the Perspective Detective game

Given the results of phase 1, the purpose of phase 2 was to explore the feasibility of a game for teaching political perspective taking. The challenge is to design a fantasy environment where the learning task is tightly integrated with gameplay. Researchers have found that fantasy environments (Cordova & Lepper, 1996; Schell 2008) and integration (Habgood & Ainsworth, 2011) can increase learning. For civics games in particular, researchers speculate that connecting content to gameplay, action to social structure and ethics to expediency should also increase learning (Raphael et al., 2010). Other researchers have shown that interactively contrasting viewpoints improves moral reasoning (Cavalier & Weber, 2002).

Figure 3: Screenshots from the digital prototype of Perspective Detective

Perspective Detective.

In Perspective Detective (Figure 3) players assume the role of a political talk-show host assistant whose task is to construct the most contentious debate panel possible in order to increase the show's ratings. The game begins by introducing 5 ideological partisans including: Calvin the Communitarian, Lilly Liberty, Unizah the Utilitarian, Sammy the Socialist and Eva the Egalitarian. The player chooses one character to be the show's "star." During each policy debate the player must: play the political perspective of the star character and choose the 1-4 partisans that are most likely to disagree with the star.

At the beginning of each round, the player must decide whether the star supports or opposes a particular policy (Figure 1). After the player chooses the star's position, the game explains the star's position in more detail. If correct, the player's score increases. If incorrect, the player must choose again (to ensure understanding of the star's viewpoint).

Next, the player must choose all members who will disagree with the star. In each round, the player is given the opportunity to use a hint by clicking on any of the members to hear his/her stance on the policy. The player can also ask each partisan to describe their ideology at any time and see the partisans' positions that were already described in the same round. After choosing the panel, the player watches as the animated ratings of the show go up or down (depending on whether the player chose the correct opponents) and hears the stances of one of the opponents. If the player is correct, his score increases and moves on to the next round. If the player is incorrect, his score decreases and he must attempt to choose the correct panel again. If the player repeatedly fails to construct the best panel after hearing all the opponents' viewpoints on the policy, his score decreases and he is shown the opponents he should have chosen. The player can optionally hear the stances of all members before moving to the next round.

The game has 4 rounds with policies on healthcare, national security, immigration and gun control. The player's total score determines whether he will keep his job, be fired, or promoted. By the end of the game the character would have taken on the perspective of their chosen star for all four rounds as well as learned about the viewpoints of the other character's ideologies from hearing their stances on the various policies. Perspective Detective was designed through many rounds of user-testing in which we iteratively refined the fantasy environment, character

personas, information availability, incentives, feedback, etc.

Method

To test the effectiveness and desirability of the game, we conducted a field test with the following:

- **Setting/Participants.** Students enrolled in an Introduction to Social Policy course at a private Midwestern university were given the option to complete an essay or participate in the study. All 19 students elected to participate in the study and 14 completed the study.
- **Research design.** We assessed the learning effectiveness of the game using a single-group field-test with pre- and post-assessments.
- **Procedure**. Participants were given 2 days to complete the pre-survey, 2 days to play the game at least once and 2 days to complete the post-survey.
- **Data collection & analysis.** The pre- and post-assessment included 20 questions in which learners determined how each of the 5 ideologies responds to 4 policies. Data were analyzed with a paired t-test. We also solicited positive and negative feedback on the game and logged times played.

Results

Learning. The group mean for content knowledge survey scores decreased from 14.57 (1.74 S.D.; 73% correct) in the pre-survey to 13.71 (1.59 S.D.; 69% correct) in the post-survey but was not statistically significant; $t(26) = 1.36$, $p = 0.184$. These results suggest no learning gains from playing the game.

User-experience. Three of the 14 participants reported playing the game twice although not required to, indicating a strong interest in the game. The average game score was 7/20 points, suggesting that the game was difficult. Participants reported enjoying the game and liking: the "proposed bills," the "different characters," the core mechanic of the game: "choosing oppositions," and the "feedback given on each move." Some thought the game was "easy to understand and play," while others said that "it was too complicated," and "I was a little confused as to what I was supposed to do." The most frequent criticism was the need for additional feedback and practice: "I think the game could be longer," "I did not like that the people did not explain/give more details of their position if you got it right," "there was no feedback other than yes or no and you had to keep guessing combinations without that feedback," and "the characters' positions are very vague, it would have been nice to include examples of policies they would support."

Phase 3: Design of Political Agenda, a cognitive game with intelligent tutoring

Perspective Detective's fantasy environment seemed to engage students in political perspective taking but did not promote learning. We therefore designed a second version of the game, Political Agenda and altered our design argument in 3 ways: (a) the fantasy environment uses non-human characters to avoid interference from players' stereotypes; (b) the game teaches reasoning strategies based on the more intuitive Moral Foundations Theory; and (c) an intelligent tutor provides more in-depth step-level feedback.

Figure 4: Political Agenda

Change 1: Fantasy environment. In early user-testing, participants indicated that their perspective taking was influenced by the character's appearance: *"I viewed the younger looking characters as more liberal, and the older looking ones as more conservative."* So in Political Agenda (the successor to Perspective Detective), learners continue to play the role of a political talk-show host assistant but the partisan avatars consist of animals in suits (Figure 4). Players find these characters humorous and, more importantly, they do not evoke the stereotypes that interfered with learning perspective taking seen in Perspective Detective.

Change 2: Moral foundations theory. Political Agenda teaches student to use an elaborated version of *Moral Foundations Theory* (MFT, Haidt 2012) rather than political philosophical concepts to analyze political values. MFT describes 6 moral intuitions (*caring* for the weak, *liberty* from oppression, *fairness* or proportionality in treatment, respect for *authority*, *loyalty* to the group, and *purity* of sacred entities). All individuals use all foundations when making moral judgments, but particular ideologies rely more heavily on particular foundations (e.g., liberals emphasize *care*, libertarians *liberty*, etc.). MFT provides a bridge from intuition to political perspective taking by making the common ground between ideologies explicit and showing how ideological differences are a result of emphasis, rather than a result of avarice, ignorance or cynicism. Furthermore, MFT is based on everyday psychological intuitions, so it provides a grammar for analyzing political perspectives that is easier to learn than the constructs of political philosophy. Unfortunately, MFT does not fully define political perspective taking because it does not define the cultural objects of our moral intuitions. For example, both liberals and libertarians care about liberty, but libertarians worry more about liberty *from government*, whereas liberals worry more about liberty *from concentrated economic power*. So political perspective taking requires understanding: (a) MFT, (b) the cultural objects of ideologies, and (c) how intuitions support/oppose policy interventions and outcomes.

Change 3: Intelligent tutoring. The feedback in *Perspective Detective* was insufficient—learners did not always understand why the character did not take the predicted position even given repeated explanations of characters' positions. Embedded intelligent tutors that provide step-level feedback in games can increase learning (Easterday et al. 2013; Easterday & Jo, 2011), but only if the steps can be well defined. We argue that basic political perspective taking can be broken down into 5 types of questions that rely on knowledge of the MFT of each ideology, cultural attachments, and policy. We have implemented this reasoning strategy in Political Agenda. Figure 5 describes how these questions are asked when tutoring the player on the libertarian character's position on health care policy (Figure 1).

1. **Which moral values do libertarians care about most?**
   Options: Care / **Liberty** (correct) / Fairness / Loyalty / Authority / Sanctity
   Feedback to "care": No—libertarians care more about liberty, not that all people are taken care of.
2. **Which moral values does this ideology *also* care about?** (Not asked for the libertarian character)
3. **What do libertarians want freedom from?** (Other ideologies, could also be asked about authority and sanctity in this step)
   Options: **government** (correct) / corporations
   Feedback to "corporations": No—libertarians care about freedom from government rules. Business leaders should be free to make their own choices and individuals to enter freely into contracts.
4. **Does the value of liberty support this policy?** (Asked for each of the characters' primary values)
   Options: Pro / Indifferent / **Con** (correct)
   Feedback to "pro": No—this liberty imposes a mandated responsibility (not necessary for upholding security, rule of law, contracts etc.)
5. **Overall do the values support the policy?** (This is relevant for ideologies with conflicting values)
   Options: **Pro** (correct) / Indifferent / Con / Conflicted
   Feedback to "con": No—this policy does not increase liberty.

Figure 5: Sample tutoring for libertarian position on health care. Feedback is for incorrect response.

Discussion

In this design research study, we asked: How might we design an educational game that helps students learn political perspective taking? Phase 1 showed that students find political perspective taking difficult and thus a learning need worth addressing. Phase 2 shows that we can design engaging game environments for political perspective taking but that typical game-based approaches to feedback are not sufficient for teaching such a complex skill. Phase 3 shows that we can define political perspective taking well enough to provide the step-level feedback shown to promote learning of complex skills.

These findings lead to the design argument that we *may be able to* teach political perspective taking by using games that: (a) define perspective taking as a process requiring an understanding of Moral Foundations Theory,

the cultural objects of different ideologies, and common policy interventions; (b) have fantasy environments that ask players to predict policy positions and that obstruct stereotypes; and (c) use embedded intelligent tutors. This work contributes to research on civic education, games and learning, and moral psychology by providing a well-defined model of political perspective taking; showing limitations of a traditional game design; and showing how we can design more sophisticated cognitive games that overcome these limitations. While there is still much work to do, this study brings us closer to our goal of designing games that teach political perspective taking, a necessary skill for an alert and knowledgeable citizenry.

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