Media Literacy: Using a Game to Prompt Self-Reflection on Political Truth Biases

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Abstract

In this paper we examine how games can capture both player biases around truthfulness and facilitate self-reflection on such patterns of biases as a pedagogical approach to media literacy. Our focus is on the study of a game called *Fibber*, conducted with 344 participants online. The gameplay entails guessing whether statements made by presidential candidates are mostly factual, and receiving aggregate feedback on their judgment patterns and potential truth biases. Specifically we sought to answer the questions: 1) how can the game prompt self-reflection in players, 2) what player characteristics are linked to self-reported acts of self-reflection and biases, and 3) how can the study inform future designs of media literacy and self-reflection games? Our results suggest that efforts to promote self-reflection on truth biases – a useful media literacy technique – may be facilitated through aggregation of in-game decisions that can serve as an end-of-game self-reflection prompt. Furthermore, self-reflection on potential political truth biases may be supported by specific in-game behaviours and player characteristics such as gender and political orientation.

Keywords

self-reflection, games, truthfulness, bias, media literacy

Introduction

Research has shown that when individuals filter information, they commonly observe what they unconsciously expect. This information bias is commonly referred to as confirmation bias (Stanovich & West, 2008). Such potential bias in how we interpret information is especially relevant when designing media literacy initiatives, which are increasingly moving beyond "raising awareness" and toward empowering learners to make meaningful choices, critiques and content (Hobbs, 2010).

The dominant approach in digital media literacy interventions remains focused on how media messages are framed and should be carefully evaluated based on sources, evidence, and context (Sambasivarao, 2013). Still nascent in the field is a focus on approaches to promote self-reflection that focus on our internal biases that mediate interpretations such as confirmation bias. With the increasing adoption of games for teaching media literacy (e.g. Federal Trade Commission's *Admongo*), there is a need for more research on how games can also prompt self-reflective practices that are part of larger media literacy goals. Games can prompt self-reflection around such biases given their inherent characteristics–rules, choice, feedback, and monitoring–which mirror fundamental components to reflective thinking. Choices in game spaces prompt constrained decision-making within defined contexts that can be used by game systems to help players meaningfully reflect on decisions in a variety of ways.

In this paper we examine how a game can capture potential biases in judgments on truthfulness that can be aggregated as patterns to self-reflect on. Specifically, we sought to answer the questions: 1) how can a game prompt self-reflection in players, 2) what player characteristics are linked to self-reported acts of self-reflection and biases, and 3) how can the findings inform future designs of media literacy and self-reflection games?

We begin with an overview of media literacy and what scholars have discovered about self-reflection and heuristics in making judgments, focusing on research in education and psychology. This is followed by a brief overview of game-based examples connecting self-reflection and media literacy. We then analyse a game, *Fibber* (SeekChange, 2012), and describe our analysis of player data on the game's ability to prompt self-reflection. The game focuses on guessing whether statements made by presidential candidates are mostly factual or not and at the end receive aggregate feedback on their judgments so as to prompt reflection on potential truth biases. This case example and analysis expands preliminary work on the game's design (Vacca, 2012) and is intended to have direct and practical applications to the design of games that seek to empower people to self-reflect on internal biases that

mediate judgments on media messaging that too often misrepresents and misleads.

Background

Media Literacy

Media literacy is an umbrella concept increasingly broadening to include various kinds of literacy such as information literacy, visual literacy, and digital literacy among other forms of literacy (Hobbs, 2010; Koltay, 2011). It is often best characterized as a movement to help to understand, to produce, and negotiate meanings in a culture of images, words, and sounds (Aufderheide, 1992).

There are a wide variety of approaches taken in media literacy interventions such as assessing trustworthiness of material, using the internet to find alternative viewpoints, and creating messaging (Kahne, Lee, & Feezell, 2012). However, a meta-review of media literacy interventions has shown that most interventions focus more on media-relevant outcomes (e.g., knowledge and realism) than on behaviour-relevant outcomes (e.g., attitudes and behaviours) (Sambasivarao, 2013). In other words, in tackling assessing trustworthiness of messaging, there may be an opportunity to focus more on the personal aspects of literacy – attitudes and assumptions – in addition to domain knowledge. In a white paper prepared for the Knight Foundation on how to deal with media literacy in the emerging digital-centric information era, Hobbs (2010) highlighted the importance of "reflecting on one's own conduct and communication behaviour by applying social responsibility and ethical principles." While self-reflection is increasingly being explored within approach such as creative message production (e.g., Peppler & Kafai, 2007), there has been limited research on game-based approaches that support self-reflection on existing internal biases.

Heuristics and Biases

Confirmation bias is understood as a cognitive bias in which people observe what they expect in observations (Stanovich & West, 2008).

Useful to understanding the underlying cognitive factors to confirmation bias in judgments is Chaiken's (1989) analytic/heuristic dual-process model. In this model heuristic processing is characterized as relatively automatic and leads to automatic contextualization of problems, whereas analytic processing involves a more controlled decontextualized and depersonalized processing style. In other words, rather than just engaging in a discreet analysis of the information, individuals who use a heuristic processing style rely on contextual cues that allow them to rely upon internal representations of the problem. This, in turn, allows them to make inferences about the issue or task without detailed analysis of the material. As such, this type of processing is especially sensitive to contextual cues, such as how the problem is framed – which is very much relevant to our perception on truthfulness.

Building mainly on the work of Kahneman and Tversky, Stanovich & West (2000) argue that analytic processing is more likely to occur in individuals with: 1) specific cognitive styles, 2) high levels of motivation, or 3) sufficient cognitive capacity. In a study testing implications of the heuristic\analytic model, participants were induced to engage in either a primarily analytical or a primarily heuristic processing mode by manipulating the relevance of a task designed to measure attitudes (Chen, Shechter, & Chaiken, 1996). Participants engaged in analytic processing when the task was self-relevant whereas they engaged in heuristic processing when it was not. Other studies have shown – but not without debate – that an individuals' general thinking style plays an important role in their decision-making preferences; biases and framing effects may be stronger for heuristic than for analytic style thinkers (McElroy & Seta, 2003). One key aspect of this emerging research is the role of self-reflection whereby one can become aware of the use of internalized heuristics and as such potentially mediate the way one processes information (McElroy & Seta, 2003). In other words, we become aware of our heuristics approach that may bias our judgments and potentially shift towards more analytical processing.

Self-Reflection

Self-reflection is a process commonly referenced in the learning sciences; however it is a complex process with varying perspectives, approaches, and associated constructs. Broadly speaking, self-reflection is perceived as an active process of learning through experience where one engages in cognitive meaning-making enacted through critical inquiry into one's experiences (Dewey, 1916). However, within that definition of self-reflection, there are varying perspectives on how self-reflection is facilitated to promote meaningful learning. For instance in Kolb's learning cycle, "reflective observation" consists of a person stepping back to understand and conceptualize a completed experience (Mezirow & others, 1990). In contrast, Schon (1984) developed reflection-in-action to promote a person stepping back in the moment as a way of making rapid judgments and decisions. Other researchers conceptualized reflection as a way to question "meaning perspectives" such as perceptions of power in society (Mezirow & others, 1990). In addition, notions of single-loop and double-loop learning are built largely on ways in which individuals not only reflect on technical understandings (single-loop), but also the assumptions that go into judgments (double-loop) (Argyris, 1976). Shared amongst the various perspectives on reflection is the core notion that reflection is a meta-thinking process where learning is enacted through examination of one's own experiences, thoughts, feelings, actions and knowledge.

Games and Self-Reflection

Games provide a unique opportunity in promoting self-reflection because, unlike more passive forms of media, games require active decision-making on the part of the player and reflection on system

feedback in order to make sense of the gameplay (Salen & Zimmerman, 2004; Vacca & Bromley, 2012). In other words, games are inherently experiential. Yet games also differ from other experiential approaches sometimes used to prompt self-reflection in that they take place in a controlled rules-based environment (Salen & Zimmerman, 2004).

For instance, games can create systems that define meaningful relationships between decisions made by the player and internal heuristics he or she may be using. The system and narratives would be defined in such a way that they draw out those patterns of judgment so they can be reflected upon.

One example of a game-based approach to media literacy that seeks to prompt self-reflection around biases in media messaging is *Admongo* (Federal Trade Commission, 2010). *Admongo* focuses on getting kids to think critically about advertising by identifying ads, allowing them to take apart an ad, and build and target their own ads. At the core of the game-based learning experience is to iteratively ask the questions of: 1) who is responsible for the ad, 2) what is actually being communicated, and 3) what action does the ad want me to engage in.

Figure 1. Screenshot of the Admongo.gov game.

Admongo seeks to empower the player to understand specific media literacy concepts through feedback of their in-game decisions. For instance in level one, when a player comes across an ad, a narrated screen first presents information about the advertisement and then asks a multiple choice question based on the conveyed information. *Admongo* can be critiqued along various fronts but relevant to this paper, is whether or not game-based interventions like *Admongo* could adopt other kinds of approaches whereby the focus is shifted from reflecting on individual decisions, to reflecting on aggregate decisions. In other words, instead of attempting to provide judgment patterns didactically

(e.g., you should be aware of potential distortions on the benefits of an action), could a game use the player's own in-game decisions to support self-reflection on existing heuristics (e.g., are you aware that you seem to be sensitive to distortions on benefits of a specific action)?

One example of a game that uses a post-game summary on aggregated in-game decisions – although not focused on media literacy – is *Starcraft II Wings of Liberty* (Blizzard Entertainment, 2010). In this strategy game players assume the role of an alien race in a struggle for survival with other races, and make decisions such as how to use natural resources, build units for attacking other players, managing those units in attack and defence strategies, and other strategic decisions.

Figure 2. Screenshot of *Starcraft II Wings of Liberty*.

At the end of the game players are provided with a summary screen on their in-game decisions. The summary screen displays behavioural patterns such as how many of a specific type of unit was destroyed, how quickly resources were spent, what kind of army was created, etc. While the game does not provide guided reflection prompts, the player is provided an alternative perspective that can prompt reflection. For instance, can a player's focus on building units and overproduction of natural resources potentially say something about a player's reliance on a defensive strategy? Or perhaps a player's pattern of building particular kinds of unit or attacking specific kinds of players may say something about specific judgment patterns the player is using that he or she may not be aware of.

Given the potential in aiding self-reflection, the use of aggregate performance summary mechanics may be useful in game-based media literacy approaches.

Study Design

Participants

The participants were 391 online users with diverse characteristics such as political orientation, gender, and age group – see Table 1 for sample descriptives. Overall a majority of the participants were male (58%) and were between the ages of 18-25 (33%). In addition, a majority of players were self-reported liberals (61%) and other (31%).

Variable	Descriptives
Gender	Male (58%); Female (42%)
Political Orientation	Conservatives (8%); Liberals (61%); Other (31%)
Age Group	18-25 (33%), 26-35 (28%), 36-45 (16%), 46-55 (10%), 56+ (12%)

Table 1. Sample Descriptives

Recruitment of participants was done through local university email lists, social media sites, and gamer community sites. Participants were not offered any compensation for their participation and users were free to interact with the game as long as they wanted and filled out demographic information at the start of the game.

Game Design

Fibber is a simple quiz game where players decide whether statements made by presidential candidates are mostly factual or not and at the end are prompted to self-reflect on their in-game decision-making patterns that may be biased. The in-game content was all sourced from Factcheck[1], which provides triangulated fact checking and rates statements along a continuum of truthfulness. All statements sourced were on the extreme ends of Factcheck's label of truthfulness, meaning we chose very clear-cut cases of political deception. The game was designed to be politically neutral and provide no clear initial inclination on a political agenda (Vacca, 2012).

Once the game loads, the player is first provided a brief description of the game concept, "Obama and Romney want your vote. Is what they say fact or fib (lie)?" After clicking start, the player is presented with the rules for how to play: 1) read actual statements made, 2) decide if it's fact or fib (lie), and 3) strip your clothes when you're wrong; their clothes when right.

The core game mechanic is where a player is presented with: 1) a statement by one of the characters in quotes, 2) where/when the statement was actually made, and 3) two buttons: Fact or Fib (see Figure 3). The user selects whether he/she thinks the actual statement

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[1] Factcheck: http://www.factcheck.org

made is factual or not. If the user selects incorrectly (selects Fib when it's really Fact or vice-versa) they lose an article of clothing (see Figure 4). If the user catches a Fib (selects Fib when it's really a Fib) the character making the statement loses an article of clothing. When either the player or one of the non-player characters loses all of their clothes, the game is over.
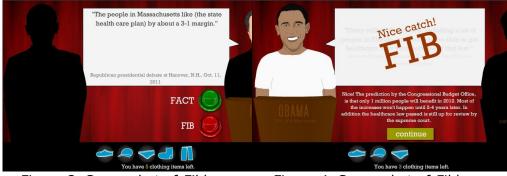

Figure 3. Screenshot of *Fibber* Question

Figure 4. Screenshot of *Fibber* Feedback

As depicted in Figure 5, at the end of the game users are provided a performance summary based on their in-game decisions such as: 1) fib detection rates, 2) directed inquiry statements, and 3) a key fib they thought was a fact. The directed inquiry statement is based on the player's performance and seeks to prompt self-reflection. For example in Figure 5, the statement reads, "Is there a reason you may have felt Obama was more likely to lie? Or why you may have felt Romney was more likely to be truthful?" The player is also prompted to self-report whether or not the performance summary prompted them to "reflect on [their] own potential bias."

Figure 5. Screenshot of *Fibber* Aggregate Performance Summary

The variables collected by the game and used in subsequent analysis are outlined in Table 2.

Variable	Source Description
Political Orientation, Age-Group, and Gender	Derived from the three survey questions at start of the game.
Who Lost	Derived from which character in the game (Obama, Romney, or player) ended up with no more clothing options (lost).
Fib Detection Rate	A percentage calculated by: (the number of fibs labelled as facts by the player / total fibs provided during gameplay).
Fact Detection Rate	A percentage calculated by: (the number of facts labelled as fibs by the player / total facts provided during gameplay).
Fib Bias	A nominal variable detailing whether or not there is bias towards a specific character or none detectable. Calculated by comparing fib detection rates for each character (Obama and Romney) and seeing if any if significantly higher (more than one SD). If one is higher than Fib Bias value is assigned to the character. If no difference than it is set at "None."
Fact Bias	Similar to Fib Bias, but instead this variable is calculated using the fact detection rates for each character instead of the fib detection rates.
Self-Reflection Rating	Derived from the 4-level Likert question (strongly agree to strongly disagree) at the end of the game that asked, "This experience has prompted me to reflect on my own potential bias."

Table 2. List of Variables in Analysis

Procedure

The study was conducted online rather than in a lab setting in order to enhance the ecological and external validity of the study. A result of deploying the study in this way was the lack of limited qualitative data and limited ability to gather extensive base-line data on previous familiarity with politics and current events. Participants completed one gameplay cycle (i.e. achieve a win/lose state), and at the end of the game upon receiving an analysis of their in-game performance (Figure 5) were prompted to provide a rating on their level of self-reflection at the end of the game (See Self-Reflection Rating in Table 2).

Results

Gameplay and Biases

Our sample of 391 players was restricted to include first-time plays and not any subsequent plays. Most players lost their first-time play

(74.4%), with only 4.9% resulting in Obama losing, and 20.7% with Romney losing.

Recall that in the game the player loses when they no longer have any remaining articles of clothing, and they win when either Obama or Romney lose all of their clothing. With that said, there are two ways in which the player can lose their clothing, either by incorrectly labelling a truth a lie, or vice-versa – we call these fact bias and fib bias, respectively.

So why did most players lose their first time? Fact bias – labelling a statement as true when it is not. Fact bias (see Table 2 for how this was calculated) was significantly correlated with losing; $r(388) = .367$, $p < .005$. In contrast, fib bias – labelling something as false when it's true – was not correlated to losing yet opportunities to engage in either bias was made available to users at equal rates.

In looking at what key characteristics may be related to fact and fib bias and the underlying fib and fact detection rates we looked at gender, political affiliation, and age group, for which we ran an ANOVA analysis. For gender we found that males were more likely to have lower rates of fib bias and higher rates of detecting non-factual statements from factual statements, $F(1, 389) = 9.724$, $p < .005$. Around 2.4% of variance account for which is a small effect size, $\eta^2 = .0243$. In looking at political orientation liberals were significantly more likely to also have lower rates of fib bias and higher fib detection rates than self-reported conservatives or other, $F(3,387) = 2.789$, $p = .040$. 2.1% of variance is account for which can be considered a small effect size, $\eta^2 = .0211$. In looking at age group we found no relationship between age group and fib detection rate, $F(5, 385) = 1.769$, $p = .118$.

Prompting Self-Reflection

At the end of the game where players were presented with the aggregate performance summary (Figure 5) they were prompted to rate the degree to which they felt the summary triggered them to self-reflect on their own potential bias. 64% of players generally agreed that the performance summary prompted them to self-reflect on their own potential bias, while 35% generally disagreed that the summary prompted their self-reflection. In short, players were significantly more likely to report self-reflecting as a result of the behaviour summary than not self-reflecting; $t(390)=26.59$, $p < .0005$.

We conducted an ANOVA analysis on player characteristics and self-reflection. In looking at gender we found that females were significantly more likely to report self-reflecting on their potential bias than males, $F(1, 389) = 10.573$, $p = .001$. Around 2.6% of variance is accounted for, which can be considered a small effect size, $\eta^2 =.026$. In looking at political orientation self-reported conservatives were significantly less likely to report self-reflecting on their potential bias than liberals, $F(3,$

387) = 2.789, p <.05. Around 2.1% of variance accounted for which is a small effect size, η^2 =.0211. In looking at age group we found no significant relationship with self-reflection, $F(5, 385)$ = .302, p =.911.

Discussion

Prompting Self-Reflection

In addressing our first research question, how can the game prompt self-reflection in players, we found that the use of an aggregate performance summary at the end of the game experience did significantly prompt players to self-reflect on their potential bias – as measured through self-report. In other words, the approach taken by the game in which the player's own in-game behaviours are aggregated into patterns that are used to prompt self-reflection may suggest another game mechanic that can be incorporated into games tackling issues of information literacy – specifically awareness of truth biases.

However, the question that emerges is how the gameplay itself contributes to self-reflection as a result of the summary. While, there was no experimental design that differentiated between different kinds of gameplay dynamics, our findings may suggest a dynamic that may have contributed to players reporting self-reflection.

Losing through Fact Bias

In our analysis we found that most players lost their first time playing, yet it is in the way they lost that may highlight a dynamic worth further exploration. Most players lost through fact bias – thinking something is true when it isn't. While our research design does not provide sufficient evidence to warrant a claim on how players experienced fact bias, there may be differences in the way players experience losing from thinking lies are truths (fact bias) versus thinking truths are lies (fib bias).

For instance, if one were go into the game holding the assumption that all politicians were largely deceitful, then thinking a statement made by a politician is true is likely held to a higher standard than thinking a statement is false. In turn, finding out something you thought was true was in fact a lie, may cause more dissonance than vice-versa. In other words, there may be variation in the degree of cognitive dissonance generated from revealing fact bias than when compared to fib bias. Such differences may have implications on motivation to self-reflect as prior research has connected differences in cognitive dissonance to motivation states (Elliot & Devine, 1994).

It is unclear from the way our study was designed as to the role cognitive dissonance may have played in ratings of self-reflection. If the game only led to losses through fib bias instead of fact bias, would players still have rated the end-of-game summaries as prompting self-reflection? Variables on the degree of dissonance or assumptions on

political deception were not collected for this study and as such an analysis on these questions could not be clearly addressed.

Player Characteristics and Acts of Self-Reflection and Biases

For our second research question, what player characteristics are linked to self-reported acts of self-reflection, we found that gender seemed to have the greatest influence on self-reflection, while political orientation seemed to minimally be associated with self-reflection. However, it is important to highlight that political orientation was divided into three levels of liberal, conservative, and other, which ignores more nuanced political stances. Research has shown that political orientation may be related to psychological constructs such as openness to experience (Jost, Glaser, Kruglanski, & Sulloway, 2003), which may in turn influence self-reflection. Such results are highly indicative of the complexity in attributing self-reflection to a game intervention and not to other variables that may suggest existing receptivity to self-reflective practice.

Informing Media Literacy Game Design

In addressing our third research question, how can the design inform future designs of media literacy and self-reflection games, our results indicate that the use of performance summary of aggregated in-game decisions can be affective at prompting self-reflection on biases. Such an approach is in line with objectives of media literacy programs focused on building awareness around how we assess truthfulness.

While the study was highly specific to political deception, and did not address questions of differences in degrees of self-reflection or differences in the kinds of players that could be attracted to the game, the study does highlight the potential for focusing on personal biases rather than content knowledge to facilitate self-reflection.

This shift away from content knowledge or focusing on techniques for validating truthfulness may provide another tool that allows us to shift player perspectives – perhaps in a way that is less didactic and more personal. For instance, for specific populations and content areas, an indirect inquiry-based approach like *Fibber* might induce more receptivity in players than games that clearly have a message or procedure the player needs to internalize. Especially in the games for change space, games that do not have a clear biased agenda, but merely focus on self-reflection may be better able to reach audiences outside ones already bought into the game's agenda.

Lastly, this design approach introduces a new approach to the use of fact checking content, that is commonly not engaged with outside those already deeply involved in politics. As organizations like Politifact[2]

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[2] Politifact: http://www.politifact.com/

explore the use of publicly shared data through APIs (Application Programming Interfaces), there may be a growing opportunity to design games and tools that make use of this content in new and interesting ways.

Limitations and Future Research

The core limitations of the research are around inclusion of possible confounding variables and lack of an experimental design that could highlight key aspects of design that can promote self-reflection. For instance, one aspect that became clear was that many of the players lost when they played *Fibber*, yet differences in difficulty and degree of dissonance from revealing biases are not variables we could easily isolate. For instance, failure is often seen as an impetus for reflection so that players can learn the relevant patterns that are essential to eventually winning at a game (Gee, 2003). Perhaps the degree of difficulty and failure itself led to the high levels of self-reflection reported. Future studies may need to more clearly explore the role of difficultly and reports of self-reflection. Furthermore, limitations in the kinds of demographic and political orientation information collected (e.g., socioeconomic status) may have limited understanding the role of specific player characteristics on self-reflection. Lastly, there are issues of what is meant by truthful facts and the varying degrees of truth that is embedded in the mechanics of the game, which has not been directly addressed.

Acknowledgements

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