

Games for Change: Looking at Models of Persuasion Through the Lens of Design

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Abstract Games for Change are digital games that purport to change people’s opinions, attitudes, or behaviors around specific issues. While thousands of games have been created, there is little evidence that such games do persuade or contribute to behavior change. To address this problem, address the research question: How do elements of the different models of persuasion and behavior change manifest within Games for Change? We identify and focus on three models: Information Deficit, Procedural Rhetoric, and a new model called Emergent Dialogue. To answer this question, we had to determine what “clues” there were in games that we could use to identify each model of persuasion. Using a collaborative version of a Close Reading methodology we analyzed ten Games for Change about sustainability. Based on our results we propose six categories of design markers. Each marker can be used to identify or implement specific design elements associated with a particular model of persuasion. In this chapter, we describe our methodology, present six categories of design markers, and describe the specific strategies for each marker associated with each of the three models of persuasion. We illustrate each model and its design markers through canonical examples including a new game called Youtopia that we have created to encode the Emergent Dialogue model into a digital game. We conclude with proposed guidelines for game design of Games for Change.

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1 Introduction

Persuasive computing focuses on how interactive technologies and services can be designed to change people's attitudes and behaviors (Fogg 2003). The motivational power of playing video games has been leveraged by groups interested in social change for some time now (Games for Change Society 2014). Games for Change and Serious Games are increasingly being used as play-based tools for behavior change. Games have been created to address social issues such as sustainability practices, bullying, political lobbying, and personal health care. But do these games actually enable behavior change?

In this chapter, we explore how digital Games for Change can be designed to influence behaviors, thoughts, and feelings. Many Games for Change are developed based on implicit knowledge or assumptions about how external persuasion can motivate attitude and/or behavior change. One of the contributions of this chapter is to make these models of persuasion (and expected behavior change) explicit. We describe three models of persuasion: Information Deficit, Procedural Rhetoric, and Emergent Dialogue.

There are other models of persuasion—more than we can discuss in one chapter. We delimit our work by focusing on three models. The first, called the Information Deficit model, is one of the most common models (He et al. 2010). The Information Deficit model focuses on persuasion through information. Our analysis found evidence of this model in most Games for Change. The origin of this model in Games for Change is likely that “best practices” were mapped uncritically from educational games to Games for Change. However, if the purpose of Games for Change is not learning related but future behavior change, is this appropriate? The second, called Procedural Rhetoric, is a model that has recently emerged from the games studies community as an alternative, and possibly more effective approach to serious game design (Bogost 2007). The Procedural Rhetoric model focuses on persuasion through interaction. Lastly, we introduce a new model of persuasion that has recently emerged from the environmental studies community in response to the failure of existing models to elicit the change they purport to enable. We call this model, Emergent Dialogue (Robinson 2004). The Emergent Dialogue model focuses on persuasion through participation in discussion around personal values. We suggest that this model is similar to a model of behavior change recently appearing in the counseling psychology literature called Acceptance and Commitment Therapy (ACT) (Hayes et al. 1999).

There is no empirical evidence that any one model is more effective than the others, and each may have an important role to play in persuasion depending on the goals of those seeking change and the specifics of the social issue at stake. However, we think that the practice of developing Games for Change can be made more effective if designers are explicitly aware of the persuasion model they are using, its benefits and weaknesses, and the kinds of design decisions entailed by each model.

In order to relate design decisions to models of behavior change, we introduce a methodology for deriving design markers from game play experience. A design marker is an identifiable element or strategy that is either encoded in a game during development or emerges through game play and which indicates the implementation of a specific behavior change model. When designers create a serious Game for Change, they encode their own assumptions about persuasion and behavior change into the game system, sometimes without any awareness that this is happening. When we play and analyze a game we are able to identify evidence of one or more models of behavior change encoded into the system in the form of design markers. Markers may involve or be apparent based on different game elements such as game controls, content, visuals, interface features, rules, game mechanics, or rewards. In this chapter, we present six important design markers that reveal underlying behavior change models. We define, describe, and illustrate each marker type for all three persuasion models in order to make explicit the relationship between models of persuasion and game elements. We delimit our study by focusing on Games for Change related to social issues where the intent of the game is to produce some form of short- or long-term attitude or behavior change in the players. Specifically, in our games analysis phase, we looked at Games for Change around issues of sustainability and the environment. We suggest that our results will be applicable to other Games for Change where the core objective is behavior change. We conclude this chapter with best practices for designers of Games for Change.

2 Three Models of Persuasion

We focus on three different models of persuasion that can be observed within the design of Games for Change: the Information Deficit model, the Procedural Rhetoric model, and the Emergent Dialogue model. These models are described in detail in Tanenbaum et al. (2011, 2013). We provide a summary of each model here. The three models are not mutually exclusive. A single game may have evidence that more than one model is at work. They are not formal models in any sort of “framework creation” sense. Rather, each of these models of persuasion represents an intellectual commitment to specific ideas about how persuasion happens (or should happen) in games that are designed to promote attitude or behavior change. These models are therefore attitudes about persuasion in games.

2.1 *The Information Deficit Model*

The Information Deficit model assumes that providing correct knowledge about the phenomenon in question will lead to behavior change. Many current approaches to sustainability are based on this model of behavior change. The Information Deficit model posits that providing information changes values; value change drives changes in attitudes; attitude change drives changes in behaviors (He et al. 2010). For example, it is common for local governments and organizations to run community workshops and lectures intended to educate participants in the benefits of recycling, conservation, reuse, and other environmental friendly practices. These types of workshops are based on the model that unsustainable behaviors arise from a lack of education.

The Information Deficit model assumes a top-down model of sustainable behavior change where some entity or organization (such as a national government, NGO, educational institution or other authority) already has determined what the optimal behavior is for the individual to adopt. There are five common motivational models that conform to this approach: (1) Attitude, (2) Rational-Economic, (3) Information, (4) Positive Reinforcement, and (5) Elaboration Likelihood Model (He et al. 2010). The Attitude model assumes that changing an individual's attitudes will result in changes in behavior. The Rational-Economic model assumes that financial factors alone will motivate positive changes in resource use behavior. The Information model, similar to the Attitude model, assumes that providing information to people will encourage improved behavior, reasoning that, "once you know what to do, you will do it" (He et al. 2010). Positive Reinforcement encourages desired behaviors through positive feedback stimuli. Finally, the Elaboration Likelihood technique uses a more sophisticated approach, combining logical arguments and emotional persuasion to motivate behavior change. All of these models have been implemented using networked technology for a variety of applications. All of these models assume a top-down approach where an authority provides "correct information" about what to do, and possibly why to do it.

As such the key assumption behind all of these persuasive models depends on the intellectual commitment that what the public is largely lacking is information. These information-centric models assume that by using best new media practices to design and communicate the right information, behavior change will follow.

Quiz games are the quintessential form of Information Deficit-oriented design. These types of games have been around for decades and are still in use today. Consider the interactive section of NASA's website on Climate Change (Fig. 1a, b).¹ It includes a selection of quizzes on topics such as the impact of global warming, sea level rise, and the state of the Earth's glaciers and ice caps. These quiz games all operate on the premise that learning the facts about climate change will change how the player thinks and acts when confronted with questions of sustainable living. They

¹ <http://climate.nasa.gov/interactives/quizzes>



Fig. 1 a NASA quiz game based on information deficit model of persuasion in which information/facts are presented through the quiz questions and answers. b Players win by choosing the correct answer/fact and are judged based on their performance (e.g., expert or student)

are primarily interested in testing the knowledge of the player, and correcting any misconceptions that he or she may have about climate change.

As game systems there is very little to them. A player is presented with a question and a set of multiple choice answers. When the player selects an answer the system reveals whether or not it was correct, often with accompanying didactic material that expands upon the fact that the designer wished to communicate. At the end of the experience, the player is evaluated, scored, and either praised, or not, by the system accordingly.

2.2 The Procedural Rhetoric Model

The study of games to educate and persuade has led to the formulation of new models of behavior change grounded in the dynamics of simulations. The Procedural Rhetoric model of behavior change has emerged from game studies as a response to the criticism that many Games for Change, most based on the Information Deficit model, were either ineffective, unappealing, or both. Bogost coined the term Procedural Rhetoric to describe the practice of authoring arguments through interactive processes (Bogost 2007). In this model the argument of persuasion is not represented through information but through interaction. The game designer(s) create the rules of interaction in the game mechanics that are in line with their argument for attitude or behavior change. Arguments are represented through the dynamics of interaction rather than specific textual or visual forms. Instead of simply providing the player with the desired information, the player is given an opportunity to interact, observe, and reflect within a dynamic game system.

Games often involve a possibility space that represents a microworld or a simulation, in which players can explore and play in a simulated situation related to some particular social issue. The world enables players to understand how that world works. For example, most Games for Change about sustainability involve game play with a small world in which the goal is to create a sustainable situation for that world.

The set of rules or mechanics that constitute a game define the possibility space for that game. The game rules define what a player can and cannot do, and what happens when they do or do not make certain choices. As a media form, video games can represent cultural values, norms, and expectations. They can do so in the content they represent, such as text-based instructions, auditory dialogue, visual depiction of settings or characters, and background sounds. However, as Bogost points out in (Bogost 2008), the game rules or processes that define the possibility space may also represent cultural values. For example, in a microworld simulation style environmental Game for Change, using a lot of energy usually results in effects such as high energy prices, environmental degradation or energy shortages. The implicit message is often that these effects are bad or negative. Cultural values around sustainability and responsible energy use are communicated to the player through the game rules, triggered by their choices through

interaction. This is what Bogost calls *Procedural Rhetoric* (Bogost 2008). Rhetoric refers to a claim or argument being made, here about a particular cultural value around sustainable energy use. Procedural refers to the rules programmed into a game through its rules, algorithms, and other forms of code. Through Procedural Rhetoric a particular claim or argument is programmed into the game rules.

An underlying assumption of Procedural Rhetoric used in Games for Change is that by creating a set of game rules (procedures) that enable players to experience—through their choices and interactions—particular events, they will modify their behavior in line with the claims of the argument being made. Both the Information Deficit model and the Procedural Rhetoric model employ a top-down approach to content and information. These two models are based on the assumption that the desired outcome is a known quantity that must be advanced through the delivery of either facts or processes. Unfortunately, there is little evidence that either model of behavior change works.

Environmental role playing games often employ the Procedural Rhetoric model of persuasion. The BBC's Climate Challenge role playing game (Fig. 2a, b) has elements of Information Deficit present in it.² However, the primary mode of communication is in the dynamics of the game's simulation, making it an excellent example of Procedural Rhetoric at work. In Climate Challenge the player is responsible for dictating the national, trade, industrial, local, and household policies of the European continent. The player is the "leader" of Europe, and alternates between setting policies, and engaging in negotiations with the leaders of other continents (Fig. 2a).

The game uses internal iterations of cause and effect, and interaction and reflection, to augment and communicate its core message. After each turn, the number of variables and options available increases slightly, so that decisions increase in complexity over time. At the same time, the core mechanics of selecting policy and experiencing consequences remain firmly in place throughout the game. The values of the game are apparent through play: carbon is bad, but without popular support, economic stability, and access to food, power, and water a government cannot operate (Fig. 2b). The core rhetoric of the game is about balancing this equation. In most of the game, the player is led to interpretations about the consequences of her actions via a variety of contextualizing factors, such as natural and civic disasters, and newspaper reports.

2.3 *The Emergent Dialogue Model*

The third model of behavior change that we consider is a relatively new one that has emerged from environmental studies, specifically from research into creating and running policy workshops with the general public around sustainability issues.

² http://www.bbc.co.uk/sn/hottopics/climatechange/climate_challenge



Fig. 2 a BBC climate challenge based on procedural rhetoric model of persuasion uses advisors to communicate facts to player. b Players experience the consequences of their actions represented by voter response

It has been primarily advanced in the work of our collaborator, John Robinson, who developed it in response to extensive critiques of the Information Deficit model. Robinson’s group argues that the previous conception of a unidirectional flow from information to behaviors is incorrect: that people often bring their

attitudes in line with their behaviors, rather than the other way around. The Emergent Dialogue model of behavior change has emerged from environmental studies as a response to the failures of the last few decades of sustainability education, which have not resulted in widespread behavioral change. John Robinson points to some reasons for this:

Multiple conflicting views of sustainability exist [that] cannot be reconciled in terms of each other. In other words, no single approach will, or indeed should be, seen as the correct one. This is not a matter of finding out what the truth of sustainability is by more sophisticated applications of expert understanding... Instead we are inescapably involved in a world in which there exist multiple conflicting values, moral positions and belief systems that speak to the issue of sustainability (Robinson 2004).

Robinson contends that for behavior change to occur the critical element is not information but personally meaningful *participation* in discussions about information, decisions and personal values. Unlike the previous two models, this approach is bottom-up. The Emergent Dialogue model holds that behavior change occurs when participants become engaged stakeholders in the process of co-constructing their own narrative about a desired future. Unlike Information Deficit and Procedural Rhetoric, Emergent Dialogue is agnostic about desired outcomes, instead focusing on supporting a collective meaning making process of social change. Informational processes in an Emergent Dialogue model take the form of static representations of information or dynamic simulations that model potential consequences of actions—but both are ideally neutral, rather than top-down value-laden stances about desired outcomes.

An underlying assumption of Emergent Dialogue is that information in a participatory process is not determined ahead of time—instead it emerges from dialogue alongside personal values in an iterative ongoing process. This process is less about educating people about what behaviors are correct or incorrect. Instead it is about enabling people to generate their own understandings of how their behaviors are in line with their values, or not, and how their behaviors will shape the world they live in.

To date this model has only appeared in workshops and facilitated sessions (Robinson 2004). The challenge of the Emergent Dialogue approach is in finding ways to support it through design decisions about content, procedures, rules, and rewards in games. It does not readily lend itself to being encoded in software.

As we explored this model, we noted similarities to an emerging model in behavioral psychotherapy called ACT (Hayes et al. 1999). ACT has been recently proposed as an effective method of supporting experiential behavior change around issues including depression, anxiety, and pain management and to increase psychological flexibility. A key element of this approach is the explicit discussion of personal values and plans to take actions in accordance with those values.

We have just developed a sustainable land use activity for children (aged 9–12) on a Samsung Pixel Sense interactive tabletop (i.e., Microsoft Surface) that

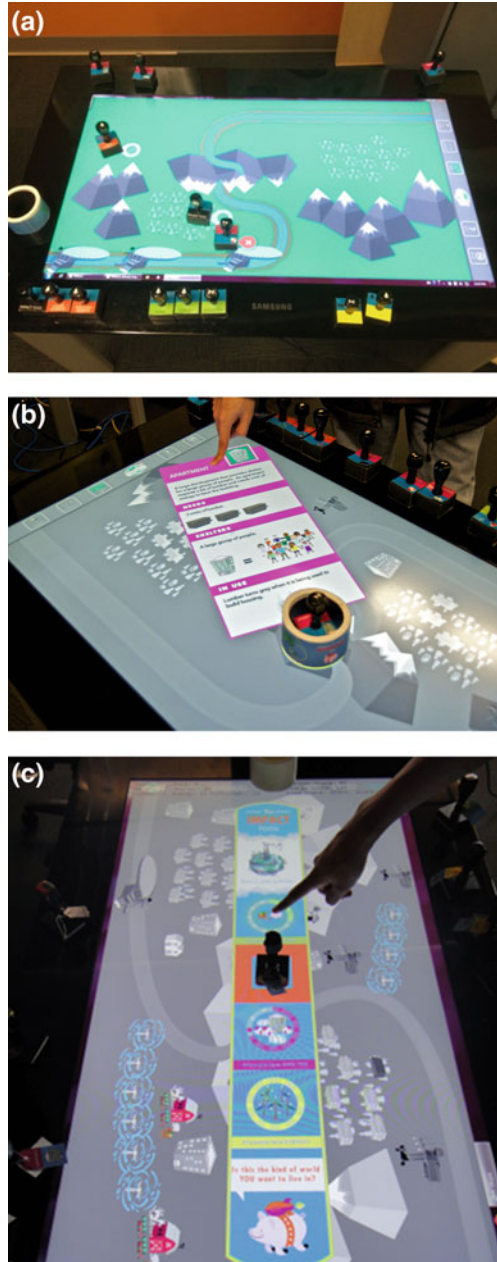
incorporates the Emergent Dialogue model of behavior change. In the activity, called Youtopia, we support players to explore information as they need it, to discuss their own values and to see how their decisions impact the world they create (Antle et al. 2013). To support emergent dialogue we created an open-ended activity. There is no explicit goal or “winning state” in the game. Instead players are asked to make a world they would like to live in. The interaction in Youtopia involves using physical stamps to designate land use types on an interactive map (Fig. 3a). Players can choose to work with either a small or large population. There are different types of shelter, food, and energy sources as well as nature reserves, each with different benefits and limitations. Players take on the roles of builder or natural resource manager. Creating the world involves decisions about using natural resources (land, trees, coal, water) and building developments for human needs (energy, food, shelter) as well as designating reserves (mountain, forest, river).

Building any development requires two stamps used sequentially. A natural resource stamp must be used to designate a resource for use, and then a builder stamp must be used to place a related development in a suitable location. When natural resource stamps are assigned to one player (or group of players), and builder stamps to another, a situation of positive interdependence between the two players (or groups) may result. For example, one player must use their lumber stamp to designate an area of forest as logged before the other player can use the shelter stamp to build housing using that lumber. We expect that players will need to engage in dialogue about the decisions they need to make. For example, they need to decide which natural resources to use, which to preserve, and which and where to put developments. This dialogue will in all likelihood include reflection about personal values.

At any given time players can see the amount of shelter, food, energy, and pollution that they have created. There is no reward for meeting the population’s needs without over polluting the world. And conversely, not meeting the population’s needs or creating pollution is not associated with right or wrong judgments or values. Information about the relationships between resources, development and pollution is available when the player wants. It is secondary, and the information the game contains is factual but not value laden. For example, an information card on coal plants simply explains the resources used, energy produced, and pollution created without indicating if any of these things are good or bad, right or wrong. Players can use the eraser tool to change any decisions and experiment with options. The activity ends when the players decide they are satisfied with their world.

The open-ended goal to create a world “you” (i.e., the players) want to live in—combined with system design for interdependent action, game mechanics that involve no winning state and value-free content—may better support players to discuss, reflect, and make decisions based on their personal values about what is important in balancing human and natural needs compared to games in which

Fig. 3 **a** The Youtopia land use simulation based on Emergent Dialogue model of persuasion enables two players to create their own world. **b** Information is presented on demand when players place a stamp in the information ring and is value-free. **c** Impact stamp shows state of the world in terms of how many people have their needs met and pollution levels, and asks if this is a world the players want to live in. If not, the players can erase and make new decisions



players focus on getting the right answer or winning (Information Deficit) or avoiding the wrong action(s) (Procedural Rhetoric). We are currently conducting a study with 40 children (aged 10 and 11) to evaluate this proposition.

3 Methodology

In order to derive design markers of persuasion models, we used a variant of the close reading and textual analysis methods outlined by Bizzocchi and Tanenbaum (2011) and Carr (2009, Carr et al. (2003)). The goal of using close reading was to gain insight into the design strategies of Games for Change in the realm of sustainability. We departed slightly from the pure humanities methods outlined in these chapters, extending the method to support the interpretive processes of three researchers looking at several digital Games for Change in parallel. Previous versions of this method primarily deal with a single researcher interacting with a single game. In our variation, we systematize the process so that multiple analysts may perform comparative close readings of multiple games. In this way we enhance validity with multiple analysts, and by analyzing multiple artifacts to look for commonalities in the ways that persuasion models are encoded into game interfaces, content, and mechanics. The purpose of our close readings was to identify common markers within a number of games in order to better understand how these models of persuasion have been encoded within Games for Change as persuasive artifacts.

To select games for this study we started with some broad criteria:

- *Topics.* Sustainability, environment, climate change, and urban development. *NOT* social justice, gender, speech, civil liberties, and other sustainable development issues.
- *Platform.* Downloadable, playable, Browser Based, PC, or iPhone/iPad games. *NOT* board games, or ARGs, console games or anything that is unplayable.
- *Audience.* All ages. If necessary to reduce numbers we will exclude games that are directed specifically at older teens and adults.
- *Quality.* The goal is to have the best representative sample, rather than the largest sample.

We first searched for games using the criteria of “topic,” identifying 35 games that were worth considering, based on an initial survey of serious games on the Web. Eight of these games were excluded when it became apparent that they did not meet the playability or the platform criteria. All of the remaining 27 games were reviewed by two of the researchers independently and annotated for the following information:

- *Game Title.* The name of the game and a link to a playable version (or an install file).
- *Funders/developers.* Who had commissioned and developed the game.
- *Funding Type.* Whether the game was the result of a corporate interest, an academic research project, a governmental initiative, or some other source (such as the broadcast media, or an independent environmental organization).
- *Cost.* How much money it cost to play/access the game.
- *Genre/style.* What type of game was it?
- *Topic.* Which aspects of sustainability did the game address?

- *Audience.* What age/demographic was the apparent target audience of the game?
- *Platform.* What technology was needed to access/play the game.
- *First impressions of quality/importance/usefulness.* A more subjective assessment of the game after an initial play through, annotating whether the reviewer enjoyed the game, what the learning curve was like, and whether or not it appeared (on the surface) to utilize any of the models of persuasion under discussion.

This review revealed a number of interesting patterns among the 27 games under consideration, including several common subgenres and game types that recurred multiple times throughout. These included simulation games that emphasized sustainability policy making, or corporate/industrial management, turn-based strategy games, environmental simulations, non-game simulators, and arcade/reflex-oriented games. It also became apparent that games fell along a spectrum of difficulty, which rendered them more or less appropriate for audiences of different ages. Within specific subgenres, some games stood out as clearly higher quality than others, containing more sophisticated visual and audio assets, more comprehensive training systems, and game play that both reviewers found more engaging.

Based on this initial review we selected 10 games to perform more deep analysis on. This included a selection of the standout games from the most common genres, as well as several games that stood out for their inability to fit comfortably within any genre category. We also made certain to include games from a range of sources and platforms, including large-scale commercial games, and free-to-play independent games developed by NGOs, media organizations, independent game developers, and small family run foundations. The final list of ten popular Web and DVD Games for Change around the topic of sustainability included: Spore (EA), Futura (Tangibles Lab, SFU), Flower (That Game Company), Climate Challenge (BBC), CEO2-The Climate Business Game (WWWF/Aliaz), Energyville (The Economist Group/Chevron); Energy City (Filament Games/JASON Science), Precipice (Centre for Digital Media/Global EESE), and Rizk (Player Three/W. Garfield Weston Foundation).

An important part of close reading is the use of one or more analytical lenses. Analytical lenses enable us to focus on elements of interest during close readings (Bizzocchi and Tanenbaum 2011). In this project, we used two analytical lenses. The first was rooted in theoretical concepts from three models of persuasion. The second was our knowledge from game studies of key elements in game design. Based on these two lenses, we began our process of analyzing the ten Games for Change about sustainability. Through individual and subsequent close readings of these Games for Change, we iteratively refined our design marker category definitions and filled in details about how each model of behavior change presented in each marker category. Our process revealed aspects of the lenses that were inaccurate or insufficient to the task. During close reading of each game we documented and tracked insights into the operations of the three models of persuasion as well as defined our design marker categories. The main outcome of our close reading process was to identify strategies used by designers to persuade players.

In a close reading methodology, in addition to applying analytical lenses to the games, we need to account for the active presence of the researcher within the play experience (Bizzocchi and Tanenbaum 2011). A rigorous critical reading of games requires an ongoing act of oscillation between a distanced and critical state of mind, and an active and engaged process of play. Rather than assume a specific role (such as expert gamer), we chose to conduct a collective reading, in addition to the solo readings. This enables us to productively triangulate between our three different play experiences.

4 Design Markers

Based on our iterative close reading analysis, we propose that the dominant behavior change model instantiated in a game may be revealed by identifying the nature of a series of six design markers. The six markers are: content; interpretation; mode of communication; game goals; game motivation and rewards; and game path and outcomes (see Tables 1 and 2). It is possible to identify the specific characteristics of these six design markers because there are observable patterns in the game that reveal specific design decisions about game elements. In order to base a game on a model of behavior change, either implicitly or explicitly, design decisions are made. Markers are game elements that reveal these decisions. Note that it is not necessary for the game developers to be aware of the model of behavior change that they are using. It may often be the case that they have internalized a particularly model, most commonly the Information Deficient model, and simply proceed in game development using this model subconsciously.

Design markers then describe specific elements of the game that provide evidence of the designer's commitment to the different aspects of one or more models of persuasion. Markers in this case might be seen as "things in the game or play experience that indicate to us when a specific model of persuasion was in operation during the game's design." They are, to use a term from hermeneutics, "textual markers," or "things in the text (game) that indicate the author's (designer's) intent." We have distilled how elements of each model manifest within the design of the game.

The first three design markers are interrelated (Table 1). As such it is difficult to write about any one of them without discussing the other two. In part this is because our unit of analysis is the entire game, not a small component, so design strategies work together. One way to think about the distinctions between the first three design markers is through the following questions that can be used to identify the markers:

What is the game's message? (content)

Why do you think this is the game's message? (interpretation)

How do you know the message of the game? (mode of communication).

Table 1 Comparison of first three design markers for each model

	Content	Interpretation	Model of communication
Information deficit	Info, facts	Enforced	Didactic presentation
Procedural rhetoric	Values, judgements	Led to	Through interaction
Emergent dialogue	Our stories or world	Open to	Dialogue, exploration, co-creation

4.1 Content

The Content marker is about the information, meaning or “text” of the game or the message that the game is trying to communicate. It is one of the most important markers as it deals with the “what” of the game. What is the core message of the game? We distinguish between the three kinds of content based on the dominant meaning that a game system encodes and expresses. While each of the three models is theoretically able to communicate any form of content, in practice we are making a distinction between them based on the dominant meaning that a system attempts to encode or express.

The Information Deficit model deals primarily with content representing facts and information. Through information the content of the game has one or more clearly articulated positions about values and behaviors that are right and wrong. The information is known, defined, and encoded into the game at design time. When a player encounters this content it is already shaped. The player is simply accountable for consuming this content. For example, NASA’s Climate Change quizzes present facts about topics related to climate change, which is clearly articulated as undesirable (Fig. 1a).

The Procedural Rhetoric model deals primarily with content that supports preset judgements and values about what is right and wrong. This content is encoded within the dynamics of the game as enacted by the player. It is not *present* in the game artifact. It is there to be *inferred* and *experienced* rather than to be consumed. The player experiences the effect of making his or her decisions about actions in the game based on his or her own judgements, or values about the content domain. The player’s values and judgements are explored through and shaped by their actions within the game. For example, BBC’s Climate Challenge presents information through advisors (Fig. 2a).

The Emergent Dialogue model deals with the player’s personal narratives about the content domain, rather than an authored or encoded message or judgement. This content is not present in the game, rather the game provides opportunities to reflect and discuss personal meanings and values outside of the mechanics of the game. In this model the game artifact serves as a means of *eliciting* a player’s perspective on the content domain by providing the player with a kit of reconfigurable expressive elements. Content in this model is the most socially situated of the three, involving a dialogue around the content domain between both system and player, and with a community of players. For example, in Youtopia, the system requires one player to stamp resources as usable before the other player can use them to build. This co-dependence mechanism supports negotiation and discussion about decisions.

4.2 Interpretation

The Interpretation marker is about how the designers of the game intend the core content to be interpreted by players. Do players reach their own interpretation of the core message as they experience the results of their actions in the game play? Or are they left to form their own interpretation of what the core message of the game was? Interpretation can fall anywhere on a continuum between “closed” or forced and “open” or unenforced.

Interpretation in the context of this analysis may be seen as synonymous with “authority.” The question of “how much of/how the content is open to player interpretation?” might be also framed in terms of “whose authority shapes the interpretation of the content?”

The Information Deficit model assumes that the designer’s perspective or authority is dominant. The player must bend to this perspective in order to succeed. Interpretations are fixed, and pre-encoded within the artifact. For example, in the NASA quiz, a player must get the right answer to win.

In the Procedural Rhetoric model, more authority/responsibility is given to the player. Rather than the system *telling* the player what the designers want him to know, the dynamics of the game constrain the player in ways that provide *designed experiences* that ideally lead the player to conclude the desired message. Consequently, this model is less rigid, especially as the complexity of a system increases. For example, BBC’s Climate Challenge enables a player to take the role of a politician, make decisions, and see the consequences of their decisions through voter response. However, the information presented by the advisors is not open to interpretation. They explicitly advise how voters will response to various actions.

In the Emergent Dialogue model, there is a more even division of authority and interpretation between the experience designer and the player, who is invited to contribute her own interpretations and perspectives to the meaning making process. In Youtopia, players are invited to create a world they want to live in (Fig. 3c—near bottom pig). It is open to the players to decide the size of the population, how much of the population’s needs they will support and how much clean water and air pollution they are willing to live with.

4.3 Mode of Communication

This marker deals with how content is communicated through the game to the player. Are players told or shown the core message through text, graphics or sound? The mode of communication is a comparatively simple marker, and is largely a function of the interaction of the previous two markers.

Table 2 Comparison of last three design markers for each model

	Game goals	Motivation/reward	Path/outcomes
Information deficit	To win	Extrinsic/external—getting facts right	Single unidirectional/Single predetermined
Procedural rhetoric	To complete, play or experience game	Either/internal—doing it right	Multiple unidirectional/multiple predetermined
Emergent dialogue	To create/express and/or to communicate	Intrinsic/internal—authentic participation	Multiple bidirectional/multiple undetermined

In the Information Deficit model content is communicated *didactically* through text, visuals or sounds. A canonical example of how content is encoded is an information screen (Fig. 1a), card or non-player dialogue.

In the Procedural Rhetoric model content is communicated through interaction with the game and subsequent game responses. Content is communicated *dynamically* by experiencing events in the game that result from player actions and choices. Content is encoded within the dynamics of the game play and the logic of the simulation. In Climate Challenge, players can choose to access their advisors to get information or not.

In the Emergent Dialogue model opportunities to reflect on content are created through the game interface or mechanics *indirectly* or content *directly* (e.g., through a question—What do you think about...?) Content emerges as a bidirectional phenomenon that happens via a process of player dialogue, exploration, and co-creation supported by game elements. For example, in Youtopia, players can choose to access information to inform their decisions by placing any land use stamp in the info ring which halts the game and displays value-free information. Figure 3b shows the apartment stamp in the info ring which prompts the display of content indicating that one apartment needs three lumbers and provides shelter for a medium group of people. Based on the players' own values about balancing human and natural needs, they can then decide how to proceed.

The last three markers can be described individually, but they may be integrated or entwined with other markers in a game (Table 2). For example, game goals and game rewards may involve content about facts and getting the “right” answer and may be communicated with value-laden content.

4.4 Game Goals

Most contemporary definitions of games include some notion of winning and losing: games are structured experiences with some sort of goal state that the player is struggling to attain (Jesper 2005). In Games for Change, variations in these goal states are often markers of different models of persuasion at work.

The Information Deficit model is primarily concerned with whether or not the player has acquired the desired knowledge, so goals in this model are essentially

“Grades” on a test: quantitative assessments of performance in the form of score cards and categorical rankings. In the NASA quiz game the goal is to get a near perfect score.

The Procedural Rhetoric model is more concerned with the process of the play, so the emphasis is less on winning or losing and more on providing value oriented feedback that moves the player toward a desired interpretation of the experience. Some games that use Procedural Rhetoric resist providing any explicit goals at all to the player, as in the case of Gonzalo Frasca’s *September the 12th*.³

In the Emergent Dialogue model, the goal is to arrive at some shared narrative or expression of a desired future world. In design this manifests in the form of open-ended tools for creating and sharing content within a community of players, and through establishing this process of dialogue as the central objective of the experience. In *Youtopia*, the players’ “goal” is to explore, through game play, how to create a world that reflects their personal values.

4.5 Motivation and Reward

Closely related to the Game Goals marker is the notion of Motivation and Reward. How does the game motivate the player to take action, what types of rewards are provided to the player to remain engaged, and what types of behaviors are reinforced with rewards in the game?

In the Information Deficit model, motivation is almost always extrinsic to the experience of play itself. Rewards take the form of high scores, badges, trophies, and other evaluations of performance. However, these rewards are external to the core game experience; they seldom feed back into the game play experience, or the game system. In the Information Deficit model the player is rewarded for getting the facts right and demonstrating knowledge. In the NASA quiz game, the player is rewarded by being designated as an expert or student based on their performance (extrinsic motivation and external reward).

In the Procedural Rhetoric model, some motivation might be extrinsic but most of the rewards are connected to the actual experience of play. That is, they are internal to the core play experience. An internal reward creates new opportunities for play, or augments existing capabilities: becoming more skilled at the game is thus rewarded by making the game more interesting, complicated and challenging. Procedural Rhetoric oriented games reward the player for taking actions that are in line with the values encoded in the system and punish players in ways that are equally expressive of those values. In *Climate Challenge*, players are voted out of office for not making decisions to support sustainability.

In an Emergent Dialogue-oriented design, it is harder to imagine how systemic rewards and punishments would be meted out, due to the absence of predefined

³ <http://www.newsgaming.com/games/index12.htm>

objectives. Feedback in a system built to facilitate Emergent Dialogue must focus on the *process*, providing rewards and incentives for authentic participation and honest engagement in the experience. In Youtopia, the players are motivated by their personal values (intrinsic motivation) and their reward is being able to work through how to a world that reflects their values.

4.6 Game Path and Outcomes

Our final maker is concerned with the path that players take through the game, and the nature of the game's outcome.

In an Information Deficit oriented design there is often only a single unidirectional route through the game system. Choices are limited to demonstrating knowledge and the outcomes in these systems are predetermined by the designer. Causality is almost always explicit in these systems: the player selects an answer and is told whether or not it was correct, as shown in Fig. 1a.

Procedural Rhetoric provides players with a more complicated simulation, often with multiple paths toward completion and outcomes that arise from the state of the computational model. Paths are still often unidirectional. Players cannot go back and reverse decisions. Cause and effect is often left implicit in a Procedural Rhetoric, however they are still predetermined by the game design. For example, in Climate Challenge there is more than one path (and sets of advice that can be followed) to stay voted in office.

In the Emergent Dialogue model the path to be navigated is less clear and there are no predetermined outcomes for the player to encounter. Causality is secondary to configurability and it is up to the player to determine his or her own stopping point. In Youtopia, players can stop whenever they are satisfied with their world. They can then use a 3D pig object to take a snapshot of their world and final impact (state of human needs and nature). At any time they can start over, change the map, change the population, erase land uses and continue playing. There are multiple bidirectional pathways and the final outcome is determined by the players rather than determined by the game design.

Based on these six design markers, we next discuss general design guidelines that may result in more effective games for behavior change and learning about social and environmental issues.

5 Design Guidelines for Persuasion Through Games for Change

Persuasive technologies mainly fail due to poor design (Fogg 2009). For example, many persuasive projects are too ambitious in that the targeted behavior may be extremely difficult to change (e.g., stop smoking) and/or the design team may be

too inexperienced. Persuasive games may also fail because they fail to engage users, either because the core game mechanic is not well developed or the game itself is simply not fun or interesting to play. While concerns about quality and engagement seem reasonable explanations for the failure of many Games for Change to promote desired outcomes, it is possible that failure may, in whole or part, be because the underlying model of behavior change is flawed.

By making explicit what design decisions underlie each persuasion model in each design marker category we aim to support designers to be more intentional in the model they implement. While it is unclear which model is the best in all cases, research suggests that the Information Deficit model is ineffective at supporting behavior change (Robinson 2004). We suggest that using a more value-free approach with the Procedural Rhetoric model may work well for single player games. However, for multiplayer or games with agents, the Emergent Dialogue model may be the more effective. The particulars of each game design context will dictate how, and if, these guidelines can be implemented. In general we suggest the following guidelines based on the six design marker categories:

1. **Content:** Use value-free content that is about causes and consequences but not right and wrong;
2. **Interpretation:** Enable players to experience and interpret the consequences of their actions;
3. **Mode of Communication:** Allow the player to access information and facts on demand and provide mechanisms to support discussion about content;
4. **Game Goals:** Enable players to set goals and take action in line with their personal values;
5. **Motivation and Reward:** Reward actions, choices, and outcomes in line with personal values;
6. **Game Path and Outcomes:** Provide “no cost” opportunities to explore the consequences of a range of choices and finish when satisfied with attainment of personal goals.

Further research is needed to assess the effectiveness of these guidelines. We have one such study underway in which we are investigating the effectiveness of these guidelines in supporting emergent dialogue with 20 pairs of children using Youtopia, the open-ended tabletop sustainability game (He et al. 2010). Initial results from video coding the kind of in-depth discussions associated with emergent dialogue are promising. More work is needed.

6 Conclusion

Our work exploring different models of persuasion for behavior change in Games for Change related to sustainability is early stage and still fairly subjective. However, it contributes by explicitly articulating three models of persuasion that

underlie today's Games for Change in terms of observable design strategies associated with each model of persuasion. A second contribution is that we have identified six observable design markers in existing Games for Change that enable us to identify how and when each of these models is being employed. And thirdly, our work contributes by describing our first pass at transforming the Emergent Dialogue model to one that can be used to design digital games. We illustrate our Emergent Dialogue design markers with our first fully functional Game for Change, called Youtopia. We summarize our work with six design guidelines that can be used by designers of Games for Change to support behavior change through Emergent Dialogue in multiplayer or agent-based Games for Change.

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