PLAYING FOR FUN AND PROFIT: SERIOUS GAMES FOR MARKETING DECISION-MAKING

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INTRODUCTION

Much of marketing research concerns organizing activities of consumers so as to enable inferences about their attitudes, beliefs, values, or preferences. Traditional procedures like surveys, interviews, experiments, and focus groups structure the activities of participants, and constrain what they do by way of explicit requirements and implicit rules of interaction. Games are a more natural form of organized activity for people than are conventional research procedures, and are in fact a type of activity that people engage in energetically of their own volition. When properly implemented in regard to organizational learning objectives, games have advantages that include being able to motivate participants, or "players," to produce desired results. They also provide a framework for rewarding players in proportion to their contribution to desired outcomes, as has been illustrated by recently published academic research. In this paper we:

review the characteristics of games and game play;

summarize who plays electronic and online games, and what the underlying technologies are;

describe the growing areas of serious and purposive games;

summarize games recently developed to address marketing issues;

describe design and implementation issues, and

wrap up by describing a linguistic game platform we developed and deployed.

GAMES AND PLAY

To grasp how and why games are useful for marketing research purposes, it's important to understand what a game is, and what the nature of play is. A reading of the game design literature yields a wide array of definitions for what a game is. Saleen and Zimmerman (2006) distill several definitions. We prefer ours, a synthesis of various authors' definitions, as general and flexible enough for research applications:

> "A game is an activity engaged in individually or in groups that is played by rules and with intent to achieve a particular outcome."

Huizinga (1950) provided an often-cited definition of "play." According to Huizinga, the key attributes of play are:

1. Participation is voluntary
2. Pretending is involved
3. The experience is often immersive
4. It's done in a particular time and place
5. It is based on rules, but the rules may only be implied
6. It is often social, and can create groups

"Pretending," above, refers to imagining some circumstance. "Immersive" suggests engrossing, or perhaps "flow-like" experience, perhaps in the sense described by Csíkszentmihályi (1990). Rules may only be implied. When tossing a ball back and forth, for example, one implied rule is "don't drop the ball." Uncertainty about outcomes is another, oft-noted, feature of play. In any case, play is something other than "work."

Caillois (2001) studied the cultural significance of games, and perceived gameplay experience as being an mixture of improvisation, joy, and gratuitous difficulty. He defined four types of games:

Competitive

Chance

Simulation

Vertigo

Games of chance are gambling games, like blackjack or the lottery. Simulation games include role-playing games. Vertigo games are games that cause dizziness, such as the kind of playground games children invent that alter their balance by spinning around. Note that these are game types of which most games are hybrids. Of Caillois's four types, "Vertigo" games seem the least adaptable for research on consumers, at least at the present time.

Who Is Playing Electronic Games?

Using games to accomplish objectives like problem solving, idea generation, or forecasting is not a new practice. A recent example is Ethiosys's "Innovation Games" (Hohmann, 2007), a structured collaborative play activity in which groups, sometimes in competition with each other, create new product "artifacts" using common stationary and art materials. Ethiosys's game and most other games for business purposes require that players be physically co-located, and they aren't very scalable due either to the nature of player activities and interactions, or because analysis of their results isn't easily (or even feasibly) automatable.

We believe that on- or off-line electronic games offer the best opportunities for innovation in research practice. Our reasons include their potential scalability, and the possibility of embedding certain kinds of games in existing data collection contexts such as online surveys or focus groups. The prospect of using such games begs the question of who is likely to find playing them at least tolerable.

The Entertainment Software Association (ESA; www.theesa.com) conducts an annual survey of U.S. households to find out who is playing computer games, and how they are doing it. The ESA's 2008 study included the following findings:

1. Computer games are played by 65% of U.S. households
2. The average player age is approximately 35 years
3. 40% of players are female
4. Adult computer game players average 13 years of game-playing experience
5. 26% of adults older than 50 years of age play computer games
6. 36% of players said they played with others present
7. 36% of responding heads of households reported playing on wireless devices such as phones and PDAs

It would appear from the ESA's results that computer games are not solely the province of adolescent males, and that playing them is prevalent in U.S. households. Given their ubiquity, research participants should not find games too off-putting, assuming that they are adequately executed. It's our guess that the proportion of players who play games on wireless and mobile devices will increase as the power and flexibility of mobile computing platforms continues to evolve, and as game applications that run on them become more numerous and more sophisticated.

Theories about motives for playing computer games abound in the game design and development literatures. In some cases, purportedly causal explanations for game play are tautological, e.g. players play a game because they enjoy it, and because they continue to play they must enjoy it. There are some more thoughtful perspectives, however. Bing Gordon and his colleagues at Electronic Arts, perhaps the largest manufacturer of computer games, believe that the fundamental motives for playing games vary with age and gender (Moggridge, 2007, Chapter 5). Pre-teenage boys, for example, seek power and freedom from authority. As a result, sports and combat games are likely to be preferred by them. Teens seek to explore their identity and so tend to prefer rich and engrossing role-playing fantasy games. Adults seek mental stimulation and self-improvement, and so will prefer games like puzzles or the famous Flight Simulator that allow knowledge or skills development.

What Makes Games Go?

Over the years, advances in computing hardware, user interface and communication technologies have shaped developments in the computer gaming industry. There has been a steady increase in the level of sophistication of games through application of these technologies, and players can now choose from a wide variety of platforms to play games on, including dedicated gaming consoles, general-purpose personal computers, as well as hand-held devices and mobile phones.

The user interface of a game depends on the platform on which the game is played. Most modern games take advantage of high-resolution graphics capabilities of display devices such as television sets, computer monitors or dedicated LCD screens built into gaming devices. Game

consoles have dedicated input devices designed specifically for the console, typically with buttons providing specific game actions and a joystick to facilitate navigation. A computer keyboard and mouse serve as input devices on a personal computer. Special purpose input devices are often available to enhance playability on a computer. These devices typically connect to the computer via standard interfaces such as USB, serial or parallel ports. Hand-held gaming devices vary in their level of sophistication. They are self-contained units combining a display device, input device and a mechanism to incorporate the game module, which enables a single device to play multiple games. Modern mobile phones including smartphones, with increasingly more processing and graphics capabilities and are gaining popularity as devices for playing games.

Networking and communication technologies are also taking on an increased supporting role in gaming. Internet connectivity is being exploited not only as a means of delivering the game to players, but also to shape the interactions among players. Early forms of multiplayer games only allowed multiple, typically two, co-located players, each with their own input devices to interact competitively within a game. This social aspect has evolved, through use of high-speed Internet, and development of multiplayer and massively multiplayer online games, to where players can be geographically dispersed, and still interact cooperatively or competitively within long-running games. Such interactions among players are coordinated through servers on the Internet, which host games and also serve as a more general ecosystems for online interactions among gamers and enthusiasts.

Developing modern, sophisticated games across multiple platforms requires a complex, multidisciplinary approach sometimes taking years to take a single game from concept to market. The team often comprises of producers, game designers, artists, programmers, engineers and testers. There are, however, some common components that are required by nearly all games. Game engines provide such reusable software components and can be used to facilitate relatively rapid game development. They enable game-specific artifacts to be developed in their entirety and used along with customized, reusable components related to such aspects as rendering, sound, animation, networking etc. Game engines also abstract the platform layer, enabling a more streamlined development of code that can be targeted at multiple platforms. Special purpose engines, also called middleware are available for specific applications such as massively multiplayer online games.

Even with advances in game engines and the availability of reusable components, development of modern games for consoles and personal computers remains complicated and expensive. A class of infrastructure targeting game development on new platforms such as mobile phones and web browsers has emerged. Platforms such as Shockwave and Flash are increasingly being used since they can be used to enable games directly within web browsers using plugins. There is also increased focus on diverse and higher level development languages such as Java, Python, and PHP.

Targeting the browser as a platform has yielded a class of games, simpler than modern console based games, but with characteristics that are similar in a number of ways with more general purpose Rich Internet Applications. They are hosted on a web server, often store game and player data in a database and enable interaction of the player with server-based components as well as other players. Input devices for such games tend to be computer keyboards and mice. In the simpler cases, the web interfaces can be constructed using popular web technologies such

as dynamic HTML and Javascript, and techniques such as asynchronous Javascript and XML (AJAX) can be employed to enhance user experience. More sophisticated interfaces can be built using technologies such as Shockwave and Flash. Such games can still be developed quite rapidly, embedded within multiple websites simultaneously and can be accessed using a personal computer with Internet connectivity.

Mobile phones have seen a surge in being used as simple gaming devices. Games for these devices are developed to target the specific operating system or platforms supported on the phone. They need not necessarily be networked, however, availability of Internet connectivity on such devices can easily be exploited to deliver games that behave much like the ones in a web browser. Games for mobile devices are, however, designed to make effective use of the limited hardware and processing capabilities. Multiplayer capabilities are also somewhat limited in such mobile devices.

Serious Games

It should be obvious to the reader that the kind of games we're discussing are designed with objectives in mind other than the sole entertainment of the player. Developers and educational researchers have been combining computer game design and learning principles to grow a class of games referred to as "serious games." Serious games have "an explicit educational objective, and are not intended to be played primarily for amusement." (Michael & Chen, 2006, p. 21). Given that serious games are designed with the intent to bring about change in beliefs, attitudes, perceptions, knowledge, or behaviors, they are a kind of "persuasive technology" as defined by Fogg (2003).

Despite the newness of serious games, a number of good examples of them can be found. HopeLab of Palo Alto CA (www.hopelab.org) has been developing games that help people cope with various kinds of health issues. Their Re-Mission game is designed to help minors cope with cancer by shaping good health behaviors and attitudes.

As another example of a serious game, America's Army (www.americasarmy.com) is considered by some to be one of the most highly visible serious games to date. The game was developed with both recruiting and entertainment objectives in mind. Based on its popularity it was ported for use on consumer game consoles.

Humana Inc. launched an initiative in 2007 called games for health (www.humanagames.com). Their games, and the research program underlying them, are intended to promote physical and mental well-being. Their premise is that you can "play your way to better health."

The emerging importance of serious game applications has been noted by the academic community. A number of U.S. universities that include Michigan State, University of Southern California, Wisconsin, and Simon Frasier have graduate level curricula or degree programs on serious games. Each year there are conferences held around the world about serious games that facilitate the growth of a global interest community.

PURPOSIVE GAMES

The focus of serious games is on change in the player. What we call "purposive games" are designed with the intention of satisfying organizational learning objectives. Examples of such objectives include making predictions, and taming unstructured data in order to provide better discovery and decision support services. The distinction between serious games and purposive games can be fuzzy, since games designed for a purpose other than player pleasure can be intended to achieve multiple goals. America's Army is an example of this.

Purposive games are being deployed in a variety of domains. Hopelab has RuckusNation, a community-based on-line game designed to fight childhood obesity by generating new ideas for leading more active lifestyles. The Institute For The Future (www.iftf.org) has launched SuperStruct (www.superstructgame.org), a massive multiplayer online game ("MMOG") designed for forecasting. Free Rice (www.freerice.org) is a vocabulary game for ending world hunger and also providing some free education.

Louis ("Big Lou") von Ahn and his colleagues at Carnegie Mellon University (CMU) have developed a series of games that have been implemented by Google and elsewhere. They are generally about solving difficult computing and machine intelligence problems by harnessing human perceptual and cognitive abilities. They embed what we call "human computing tasks" in games for generating labels for images, for dealing with semantic ambiguity, and for other problems that computers have difficulty with as compared to humans. Google's implementation of some of von Ahn et al.'s games can be found at www.gwap.com. CMU versions are currently at www.espgame.org.

As far as we can tell, a widely accepted taxonomy of purposive game types has yet to emerge. We currently classify them as follows. Note that in each case, the primary intention is to generate some kind of new information or knowledge for the main stakeholder in the game, its sponsoring organization. Also, note that the boundaries of these categories are fuzzy, and that any single game may have the DNA of more than one type.

Labelling games. these are games used to classify or label exemplars. Von Ahn and Dabbish (2008) provide several examples of games we consider to be of this type. Prelec's (2001) Information Pump is an example applied in the marketing research arena.

Prediction games. These are for forecasting or predicting events that have yet to occur.

Accuracy/consistency games. These are games in which players are rewarded for the precision or reliability of their responses.

Content Generating games. In these games, players generate new content. The nature of the content is constrained by the rules of the game.

PURPOSIVE GAMES IN MARKETING SCIENCE

Academic researchers have begun to develop and test a variety of purposive games. Of them, predictive markets, also called "virtual stock markets," may be the best known. A predictive market is one in which participants, or "traders," buy and sell "contracts," or shares, based on an event that has not yet been observed (Spann & Skiera, 2003). The contracts express

some future event, such as a particular team winning a championship, or a product achieving market share dominance by a particular date. Wolfers and Zitziwitz (2004) provide a useful summary of common types of contracts. But suppose, for example, that the objective was to predict whether Boston Red Sox would win the 2009 World Series. You could define a stock, or contract, for this prediction that would be worth $1 per share if the Red Sox actually did win, with an initial offer price of, say 10 cents a share. When this stock is traded in an efficient enough market, the trading price per share is arguably the best predictor of the probability of a Red Sox win that can be had. The market would close when it was possible to know with complete certainty whether the Red Sox would win the Series. If they didn't make the play-offs, for example, the market would close then. The many issues to be considered in designing and running predictive markets are reviewed by Spann & Skierra (2003) and Wolfers and Zitziwitz (2004). Pennock (2004) proposes a procedure for dealing with inadequate liquidity and "thin" markets.

In the arena of marketing research, Ely Dahan and his colleagues have described different kinds of predictive market applications. Dahan and Hauser (2002) and Dahan, Lo, Poggio, Chan and Kim (2007) describe using markets to evaluate concepts. Dahan and Spann (2006) describe using them to evaluate concepts as well as product attributes. Note that in the applications of these authors to the case of product concepts, few or none of the concepts treated may ever be turned into real products. The markets for them are closed at a pre-defined time, and they are usually run for not more than 60 minutes. The prices at market close are the measures of interest. Gruca and Goins (2008) have examined the influence of social network characteristics on how traders price contracts in predictive markets. Not surprisingly, we consider prediction markets as prediction games.

Drezen Prelec (2001; Dahan & Hauser, 2002) has described a game that is a kind of labeling game. His "Information Pump" is a game that consists of players viewing images and asking each other "true or false" questions about them. Their interactions occur over a network. One player sees a scrambled, undecipherable image, and functions as the "dummy," or control. Prelec claims that the Information Pump can be used for generating consumer language about a product or concept. Matthews and Chesters (2006) have done conceptual replications of Prelec's procedure while having their players interact face-to-face. We consider the Information Pump to be a type of labeling game, but the case can be made that it's a content generating game.

Min Ding (2007) and his colleagues (Ding, Grewal & Liechty 2005) have extended conventional conjoint tasks into what they call "incentive-aligned conjoint." The objective is to improve the reliability of preference measurement. Their procedure creates a real financial incentive for research participants to provide their most accurate and reliable responses by offering them an opportunity to obtain a real product in a true economic exchange, the specific terms of which are determined by their modeled responses in the conjoint task. Ding and Ding et al.'s results unequivocally indicate that the financial incentives they used significantly improved data quality.

Ding, Park and Bradlow (2009) describe an alternative to traditional conjoint measurement they call "barter markets for conjoint analysis" in which players are assigned specific concept and cash, and over a series of rounds in which they are randomly paired and in which they can exchange their concepts and cash. Subsequent to this play, a round and a player are randomly selected, and the player is given the cash and concept they have at the end of that round. Ding et

al. demonstrated that barter markets can produce results with better external validity than choice-based conjoint, and that the advantage they observed persisted at least two weeks after the tasks were performed. We classify barter markets as an accuracy/consistency game, since as is the case with incentive-aligned conjoint, consistent responding on the part of players is what is rewarded in them.

Toubia (2006) designed and evaluated a kind of group ideation game in which players address a particular issue or problem, making contributions to generated content that is organized in an interface that is like a outliner. He experimented with how game points for contributions by players are allocated, and demonstrated that he could vary the extent to which particular ideas are elaborated by changing the balance of points allocated to individual contributions versus those given for contributing content that other players built from. Toubia's method is being applied to commercial applications by the firm Applied Marketing Science, Inc. (www.ams-inc.com) under the moniker "IDEALYST." This game is a content generating game. We discuss an application that is similar in spirit in the section "Discussion Games," which follows below. In our application, we used rules based on linguistics theory, a player interface metaphor consisting of a discussion forum, and incentives aligned with performance in the form of game points that converted into cash, chances to win prizes, or other rewards.

Some very recent developments include Ding and Hauser's (2009) "Sleuth Game," and Toubia et al.'s "product poker" (Toubia, Stieger, De Jong & Fueller, 2009). Ding and Hauser's game is a game of clues with a survey built into it. The players have either the role of sleuth or clue-giver, with the former having the task of inferring the preferences or other responses of the latter. Incentives are aligned with performance in these games, with the payoff for both roles depending on the accuracy of inferences made by the sleuths. Toubia et al. have adapted the game of poker to define a purposive game that has incentives aligned with measurement outcomes and that produces results analogous to conjoint measurement. Ding and Hauser's and Toubia et al.'s procedures are accuracy/consistency games.

Game Design and Implementation Issues

The superordinate goal is to define a game activity that will produce the knowledge that is sought. Accomplishing this in an effective while practical way requires addressing a number of different issues. Following is an enumeration of some of the significant issues that we have had to consider in developing game applications, or that are discussed in the game design or human-computer interaction literatures. They pertain to games that are electronic and that mostly are played over networks.

1. It must be possible to define game rules that will enable the desired observations or inferences. One implication of this is that explicit measurement objectives must be specified. The essential question is, "What is it that the game is supposed to allow us to learn?" This seems like an obvious point, but even if so it's not necessarily an easy objective to satisfy. It can be a challenge to design an activity that people will engage in. It can also be difficult to design an effective measurement task. The intersection of the two can be at least doubly difficult. It's useful to think of a purposive game as a new product. Successful launch and productive play require care in design and testing.
2. The intended players should be likely to possess the skills and knowledge that make it possible for them to play "successfully." At least some players should be able to

experience some modicum of success, and if not in terms of winning, at least in the process of playing. If the game is too hard, players won't attempt it for long. If it is too easy, they also won't play it for long.

3. If the process or outcomes of the game itself are not going to be rewarding enough to compel the desired behaviors and outcomes, rewards external to the game itself should be implemented. We'll discuss this issue further in the section that follows that is about motives and incentives. In some cases you may need to, or want to, pay players for participating or based on their performance.

4. For games in which the rules and measurement objectives require players to interact, rather than playing independently, the nature of possible player interactions should at least do no harm to accomplishing the game objectives, and in best case it should promote accomplishing them. Depending on the nature of the game, the desired interactions between players may be competitive, cooperative, or both. In some kinds of games, such as Ding et al.'s "barter markets," predictive markets, and the Information Pump, players benefit by being able to observe the in-game behavior of other players, but behind-the-scenes collusion between players in these games would be injurious to the quality of the game results. On the other hand, in other kinds of games, like Toubia's (2006) ideation game or in the Discussion Game to be described below, players can benefit by working together in ways constrained by the prevailing rules. In some circumstances it may be very difficult to prevent collusion behind the scenes.

5. The nature of the knowledge generation process underlying the design of a game determines when a game reaches its "end state," i.e., when it is finished. Some games end naturally or by design, e.g. the predictive market for a contract on the occurrence of some event by a particular time, Ding et al.'s incentive-aligned conjoint measurement. Other games, such as the discussion games described below, end when the players stop playing. In this case it can be difficult to predict with any precision how long it will take for a game to complete.

6. Whether a game in which players interact is designed to be played in "real time" or asynchronously should depend on the nature of the player's task. Play in real time can encourage player engagement, and promote excitement. A good example is Von Ahn's ESP game (www.espgame.org). When coupled with a short play duration, real time play may also discourage complex problem-solving behavior and creative ideation. A sense of urgency may be imparted in asynchronous play scenarios if there are enough players involved. In our Discussion Game, for example, a typical game is run for two to three days, and players do not need to be logged in on a continuous basis. It is clear to us that players' perceptions of the rate of competitive activity of other players motivated many to log in often. This has been particularly apparent in cases in which the rewards for performance were zero sum, or when they were unconstrained.

7. What kind of analyses will be enabled (or required) by the data produced by the game. The kinds of data produced vary greatly as does the difficulty in analyzing them. Games like incentive-aligned conjoint and barter markets produce utility measures comparable to conventional conjoint procedures. Conventional modeling procedures can be used to analyze them. Predictive markets produce aggregate level estimates, e.g. of the probability of an event occurring, as a direct result of trading activity, but little in the way

of data that can be used to understand player heterogeneity. Toubia's ideation game and our Discussion Game produce poorly structured text data. They require the most use of "human computing" to make the best use of it, and as a result are the least scalable from the perspective of knowledge extraction.

8. What kind of feedback can be provided during and after the game. Game players benefit from, and usually appreciate, feedback on their performance, as a general rule. Feedback during play can increase engagement and encourage completing a game.
9. Whether adequate usability and system performance can be attained. The player experience is important for purposive games to be as effective as possible. When games are intended to be played over networks by players using their own technologies, it is critical to design and engineer for the lowest level of capability their technologies should adequately support, or to define the player universe in terms of what their technologies are. There are both client side and server side issues for game implemented across the Web. Client side constraints include the processing capacity of players' computers and the capabilities of the various browsers they might be using. On the server side, bandwidth, processing speed, response time, and reliability (e.g. in terms of up-time) are the major concerns. Security is also an important consideration, given that the code and the data generated by using it are likely to be proprietary. These issues are not qualitatively different than those pertaining to online survey platforms, but they will generally be more critical to successful implementation.
10. Whether the case for implementation can be made based on development cost and expected useful lifecycle. Complex game systems like predictive markets and our Discussion Games require significant investment in development, and so it's important that an adequate business case can be made for them. Other, simpler games, like incentive-aligned conjoint, can be run without developing special technology, albeit at the cost of some additional administrative overhead and human effort as compared to choice-based conjoint.
11. Can the benefits be demonstrated? Marketing researchers and decision-makers often hesitate to adopt measurement or idea generating procedures that are new or unfamiliar. And clients are unlikely to fund controlled experiments to assess a game's efficacy, or even to have the patience to see them done. But it still may be necessary to provide empirical evidence that a particular game "works."
12. Is it legal? It may or may not be; whether it is depends on what and how players win, and where they play. See the next section.

GAMES CAN GET YOU INTO TROUBLE: LEGAL ISSUES[1]

When implementing purposive games where as incentives in the form of money or other real assets are at stake, it is essential to ensure that the regulations and legal requirements of where they are to be played, are taken into account. Different legal jurisdictions have different rules regarding games in which money or other assets can be won. They all make a distinction

1 The authors are not attorneys and are not in this section offering legal advice. The sole purpose is to summarize some issues that may be sources of risk for those who may implement purposive games. Readers who have particular game implementations in mind should seek the counsel of an attorney for a review of the issues relevant to their intended application.

between *games of chance* and *games of skill.* The key differentiation between these two types of games is what predominantly determines who wins, skill or chance. The distinction is often blurry and it varies across locales.

What defines predominance is often based on legal precedent and the decision-making of local court systems. For example, poker is considered to be a game of skill in some jurisdictions (e.g. South Carolina), and so where money is involved it may or may not be gambling. In other places, e.g. Illinois, any game, skill or chance, that is played for money or other winnings is considered to be gambling and is illegal. In Canada, only the "purest" of games of skill (i.e., games without chance playing any role in who wins) are arguably legal. Anything else may be considered to be a game of chance, and illegal. In many countries and all U.S. states, games of chance are illegal or are highly regulated.

One tactic to consider when implementing purposive games with money or other real assets as prizes is to mention language like "void where prohibited by law" in a terms of participation document that all players must agree to before playing. A terms of participation agreement that players must indicate acceptance of is an essential component for games implemented for commercial or research purposes. It should make explicit game rules, how prizes will be awarded, who owns what at the end, and other features of a game and its purposes.

The distinction between lotteries and sweepstakes may also be relevant in some circumstances. A "lottery" requires a purchase. Lotteries are illegal in all 50 U.S. states (unless they are run by the states themselves, of course), and in many countries. A sweepstakes is a game of chance in which winners are determined by some kind of drawing. Sweepstakes are, strictly speaking, only legal when there is no "consideration" (payment or significant expenditure by the player). Generally, consideration may be monetary in form, or in terms of effort made, e.g. playing a game or answering survey questions. Most U.S. states (Michigan is one exception) have adhered to a monetary definition of consideration. So, purposive games in which participants have to pay or make a purchase in order to play and in which chance will determine winnings, can be expected to be seen by the authorities as illegal, while those in which their investment is effort are less likely to be so. In the case where payment or a purchase is required, a common tactic is to allow some alternative means of free chance to win. Hence the frequent use of the language "no purchase required" in contest rules.

Another legal issue is whether what players do in return for monetary or real asset winnings is "work for hire." If players receive incentives for "making" their responses in a game, then it's possible that what they win is subject to tax withholding and perhaps payment of some kinds of employment benefits will be required. Game winnings of any sort are taxable as income, of course, at least they are in the U.S. A related issue is who owns the "work product" of participants. Ownership of the results, as well as confidentiality terms, should be spelled out in the participation agreement, as should the understanding that the player will not be entitled to any additional compensation beyond the specified prizes, and that the player is responsible for any required tax payments.

"What's in It for Them?" Motivations to Play and Performance-Aligned Incentives

People play games for a variety of reasons, as suggested above. In the case of purposive games, whatever enjoyment or fame[2] may be had by playing them may be insufficient to motivate enough players to do what is needed, like trying hard and being truthful. In such cases, monetary rewards may be required to inspire adequate levels of play. The work by Ding (Ding & Hauser, 2009; Ding 2007; Ding et al. 2005), Toubia et al. (2006) and others demonstrates that, not only do monetary incentives have a beneficial impact on player performance, but particularly so when the amount of incentive received by players is proportional to the extent to which they contribute to the desired outcomes of the game. Ding et al. refer to their conjoint procedure as "incentive-aligned conjoint." We refer to games in which cash or other real assets are awarded based on player performance as having "performance-aligned" incentives. The impact of financial incentives on the behavior of individuals participating in experiments can be complex (Cammerer and Hogarth, 1999), and so their use in purposive games should be given careful deliberation. More research is needed on this issue in order to derive a set of practical guidelines for use.

A Purposive Game Example: A Multiplayer Linguistic Problem-Solving and Ideation Game System

Beginning in 2005 we developed and then deployed a purposive game system designed for solving hard problems and generating new ideas by leveraging the collective efforts of participants. At the core of this system is supported a multiplayer activity that we call a "Discussion Game." In a Discussion Game, players address a problem statement, or "game topic," by making contributions consisting of a type label and explanatory text. These contributions are a player's "moves," and what they can be and where they are made in the game, are constrained by rules. A Discussion game is an asynchronous activity that is not moderated by a leader. Players receive points for their various contributions, and for the extent to which their contributions are built upon by others. The allocation of points is adjustable to emphasize different kinds of results as described by Toubia (2006).

The contribution types and some of the game rules are derived from Speech Act Theory (Searle, 1969). In Figure 1 is the state space diagram for the linguistic rules used. It shows the allowable types of contributions in the ovals, e.g. "Answer" or "Question," and the allowable relationships between them as arrows. As an example of the latter, by referring to Figure 1 you can see that an Argument can be made for or against an Answer, but neither kind of argument can be made in response to a Question. These state-space rules are enforced by the system, which only allows players to use legal types for their contributions. Adaptations of versions of them to organizing collaborative problem solving efforts have been made by others (Conklin & Begeman, 1988; Kunz & Rittel, 1970; Rittel, 1980; Wittes Shlack, 2006).

2 In some kinds of games, leader boards, or public rankings, have proved to be powerful motivators for some players.

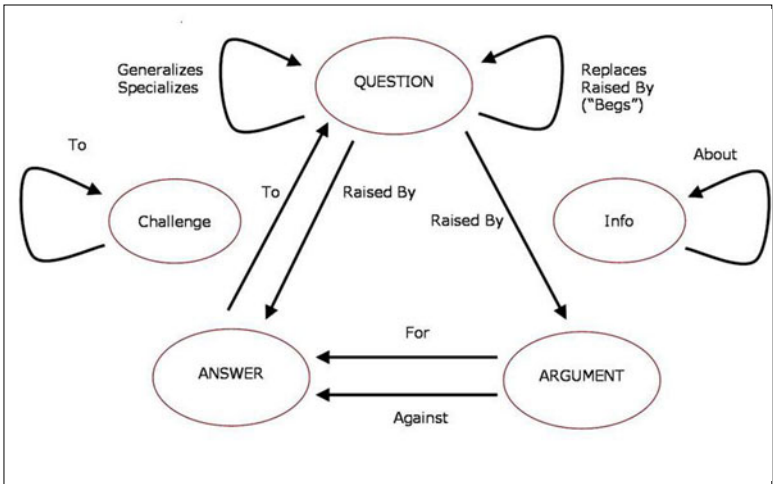

Figure 1:
State space for Discussion Game linguistic rules.
For details, see text.

The linguistic rules are just one kind of rule used in a Discussion Game. Another type of rule, which we refer to as "soft rule," is enforced by the players themselves. One kind of soft rule, for example, is that what a player contributes to a game must be new and relevant to the discussion topic or problem statement. To enforce rules such as this one, we use a "challenge system" that would reward players for detecting rule violations committed by other players. It uses a process similar to that described by Toubia (2006). Such challenges are adjudicated by a "discussion manager," a person whose role is to monitor game progress and to be the "adult at the wheel." The discussion manager has complete authority over all game activities, including ending games and getting rid of any misbehaving players. Her word is Law. Other kinds of soft rules are the contribution type and text entered to explain it must agree, and what is added as a contribution must make sense to other players; it can't be just gibberish.

Here is how a game is run. First, players are recruited if the desired type and number of them is not already registered on the game system. Next, the problem statement or discussion topic for the game is created. It typically consists of a couple of sentences given some background information, and a statement of the issue to be addressed. The issue may be in the form of a question, such as "What kind of movie plot would make for a blockbuster?" The discussion topic may include supporting content such as images or references. The game is begun by giving the players selected to play it access to it by making it visible to them when they log in to the system. Each player can then make contributions following the game rules. This is done using pull down menus and dialog boxes available in the game interface. The interface looks like an online discussion forum [3], but it also includes contribution typing menus, help and instructions, and game discourse navigation tools. Players log in and contribute at will until the game is ended by its Discussion Manager. This is usually when activity in the game ceases, or when there is no more time to let it run.

This games system as a whole is run from a multiprocessor internet server, which when properly configured is securely accessible by players and game managers from anywhere on the

3 The premise behind a discussion forum as the interface metaphor is that new players' familiarity with online discussion forums will inspire some confidence in them.

Internet using only a common web browser. It is built on open source components that include Linux, Apache, Javascript, Java, Tomcat, and PostgreSQL, and can support multiple game instances running simultaneously. The names of the contribution type that players see in a game can be customized on a per game basis. For example, the "Argument Against" contribution type can be shown to players as "Disagree." Other interface elements are configurable, as well. The system provides each player with an account page for tracking activities and their game points, and provides all players with tutorials about how to play, example games, and games for fun. It also provides some complementary game types for summarizing and scoring the results of discussion games, and player and game management functions for assigning players to particular games, player communications, managing rich media content, and so on.

Since we began to use this system for commercial purposes in 2006, we have run over 50 rounds[4] of games with applications to issues that included brand extension opportunities, product attribute definition, web site improvement, and event design and planning. The individual games have involved from a dozen to approximately 900 players. Most have run over a two to three day period. The incentives used have ranged from cash prizes based on both points earned and drawings, to discount coupons with levels of value corresponding to game points earned, to weights for votes on what charities should receive cash contributions.

Outstanding Issues and Conclusions

Purposive games in marketing research are a recent innovation, and there are many issues to be addressed regarding using them most effectively. One of these is how to choose players. For some kinds of games, like for incentive-aligned conjoint, what's probably most important is that they are a sample that the required generalizations can be made from, and that they are competent enough to understand and perform the task. For games like the Information Pump, Toubia's (2006) ideation game, or our Discussion Game, diversity and depth of topic-related knowledge and opinions may be relatively important.

Another issue is the design of incentives. It's clear (at least anecdotally) that in some applications, non-monetary rewards like recognition on leader-boards, championships, and donations to worthy causes can be effective. But from a practical perspective, and in particular where financial incentives are involved, it's not obvious how much is enough to attain results that are better in the sense of leading better policy decisions than might be obtained using conventional methods.

All in all, and despite the questions that remain to be answered about purposive games, we believe that the evidence of their efficacy is accumulating. We expect to see purposive games continue to get attention in academia as a worthy research topic. Given that there are examples like incentive-aligned conjoint that require no investment in new technology, we also expect them to be adopted by practitioners seeking to improve the quality of their results, or to generate data that otherwise couldn't be produced.

4 A "round" is a sequence of usually three or four games that are related by an overarching learning objective.

REFERENCES

Caillois, R. **Man, Play, and Games**. Urbana IL: University of Illinois Press, 2001.

Camerer, Colin F. and Robin M. Hogarth (1999), "The effects of financial incentives in experiments: A review and capital- labor-production framework," *Journal of Risk and Uncertainty*, 19(1–3), 7–42.

Conklin, J. & Begeman, M. (1988) "gIBIS: A hypertext tool for exploratory policy discussion." *ACM Transactions on Office Information Systems,* 6(4), 303-331.

Csíkszentmihályi, M. **Flow: The Psychology of Optimal Experience**. New York: Harper and Row, 1990.

Dahan, E. & Hauser, J (2002) "The Virtual Customer." *Journal of Product Innovation Management,* 19, 332-353.

Dahan, E., Lo, A., Poggio., T., Chan, N, & Kim, A. (2007) "Securities Trading of Concepts (STOC)." Los Angeles CA: University of California at Los Angeles Anderson School of Business working paper, 1-35.

Ding, M. (2007) "An Incentive-Aligned Mechanism for Conjoint Analysis." *Journal of Marketing Research,* 44(2), 214-223.

Ding, M., Grewal, R. & Liechty. J. (2005) "Incentive-Aligned Conjoint Analysis." *Journal of Marketing Research,* 42(1), 67-82.

Ding, M. & Hauser, J. (2009) "An Incentive-Aligned Sleuthing Game for Survey Research." Paper presented at the 2009 INFORMS Marketing Science conference, Univ. of Michigan, June 4th – 6th.

Ding, M., Park, Y., & Bradlow, E. (2009, in press) "Barter Markets." *Marketing Science*.

Entertainment Software Association (2008) "Essential Facts about the Computer and Video Game Industry." Washington, D.C. www.theesa.com.

Fogg, B.J. **Persuasive Technology: Using Computers to Change What We Think and Do**. San Francisco CA: Morgan-Kaufmann, 2003.

Gruca, T. & Goins, S. (2008) "The Influence of Social Networks on Prediction Market Behavior." Paper presented at the 2008 INFORMS Annual Conference, Washington D.C. October 12th – 15th.

Hohmann, L. **Innovation Games: Creating Breakthrough Products through Collaborative Play**. Upper Saddle River NJ: Addison-Wesley, 2007.

Huizinga, J. **Homo Ludens: A Study of the Play Element in Culture.** Boston MA: Beacon Press, 1955.

Kunz, W. & Rittel, H. (1970) "Issues as Elements of Information Systems." Berkeley CA: Institute of Urban and Regional Development. Working paper No. 131.

Matthews, P. & Chesters, P.E. (2006) "Implementing the Information Pump Using Accessible Technology." *Journal of Engineering Design,* 17(6), 563-585.

Michael, D. & Chen, S. **Serious Games: Games that Educate, Train, and Inform.** Boston: Thompson Course Technology PTR, 2006, p. 21

Moggridge, B. **Designing Interactions**. Cambridge, MA: MIT, 2007, Chapter 5.

Pennock, D. (2004) "A Dynamic Pari-Mutuel Market for Hedging, Wagering, and Information Aggregation." *Proceedings of EC04.* New York: ACM www.acm.org.

Prelec, D. (2001). "The Information Pump Information Packet." Cambridge, MA: MIT Virtual Customer Initiative, 1-31.

Rittel, H. (1980) "APIS: A Concept for an Argumentative Planning Information System." Berkeley CA: Institute of Urban and Regional Development. Working paper No. 324.

Searle, J. **Speech Acts**. New York: Cambridge University Press, 1969.

Spann, M. & Skiera, B. (2003) "Internet-Based Virtual Stock Markets for Business Forecasting." *Management Science,* 49(10), 1310-1326.

Toubia, O. (2006) "Idea Generation, Creativity, and Incentives." *Marketing Science,* 25(5), 411-425.

Toubia, O., De Jong, M., Fueller, J. & Stieger, D. (2009) "Measuring Consumer Preferences using Product Poker." Paper presented at the 2009 INFORMS Marketing Science conference, Univ. of Michigan, Ann Arbor MI, June 4th – 6th.

Von Ahn, L. & Dabbish, L. (2008) "Designing Games with a Purpose." *Communications of the ACM,* 51(8), 58-63.

Wittes Shlack, J. (2006) Personal communication. Watertown, MA: Communispace Corporation, www.communispace.com.

Wolfers, J. & Zitzewitz, E. (2004) "Prediction Markets." NBER Working Paper No. Q10504, NBER, www.NBER.org.