Game Design and the Challenge-Avoiding Impression Manager Player Type

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ABSTRACT

In this manuscript we propose that Challenge-avoiders, also referred to as *Impression Managers*, are a heretofore ignored but commonly occurring player type. We consider whether and how eight very different modern games accommodate Explorers, Challenge-seekers, and Challenge-avoiders and discuss implications for entertainment and learning game design.

Achievers and *Explorers* are player types found in MMOs and educational games (Bartle, 2006; Heeter and Winn, 2008). Achievers are motivated by extrinsic rewards such as leveling up and earning high scores. Explorers are motivated by intrinsic factors such as curiosity, role play, and learning. Mindset research and motivation research on learning both point to two distinctly different forms of extrinsic motivation (Lepper and Henderlong, 2000; Dweck, 2006). Dweck (2006) discovered that some learners have a Fixed mindset and others have a Mastery mindset. Fixed mindset learners avoid situations that they cannot easily do well at. Failure undermines their confidence and if they fail, they become depressed and ineffective. Having a Fixed mindset can undo a natural love of learning. In contrast, effort and learning make mastery-motivated students feel good about their intelligence; easy tasks waste their time rather than raising their self-esteem.

Gee points out that failing is part of playing a video game. Failure in video games "allow[s] players to take risks and try out hypotheses…" (p. 153). In fact, failing is a key mechanism in complex games by which players learn and improve. Players with a Fixed mindset (we will call them "Impression Managers") dislike failing and for that reason probably do not enjoy these kinds of games. Even if such players avoid complex games, there is nothing inherently wrong with enjoying easy successes and avoiding hard challenges in games for entertainment. However, in a learning game avoiding failure can interfere with learning. Perhaps because Impression Managers tend to opt out of playing complex games, player type research which has mostly been conducted on complex MUDs and MMOs has not identified them as a player type.

With the 8 games we analyzed, games tend to primarily serve either the Explorer or Achiever player type. Focusing on one of these player types (e.g. Explorers) often means that a game serves the opposite player type (e.g. Achievers) less well. Impression Managers are often but not always supported to some extent within the games, through user-selectable difficulty settings and other challenge-monitoring adaptive features.

A main take away from this work is that it is likely helpful for designers to be aware of the commonalities and differences between (as well as simply the existence of) the discussed player types. For example, Achievers learn as much as they can about a game to help them achieve more. If that learning does not connect back to achievement, Achievers will lose interest. Explorers learn as much as they can about a game because they are curious and like learning. Achievers and Impression Managers have extrinsic motivations in common. They both work towards rewards and judgments of their performance. This can alienate Explorers because they have to play through the same redundant challenges which restrains them from exploring. Since Impression Managers do not like extreme challenges (unless they succeed) and Explorers like to explore content at their choosing, games that provide easier means of progression through the game can work for both player types, but in doing so probably alienate Achievers.

Finally, another way that game designers may use understanding of player types is to introduce ways to change a player's motivation. The most logical instance of this would be to subtly nudge an Impression Manager into being more of an Achiever.

INTRODUCTION

Achievers and *Explorers* are player types found in MMOs and educational games (Bartle, 2006; Heeter and Winn, 2008). Achievers are motivated by extrinsic rewards such as leveling up and earning high scores. Explorers are motivated by intrinsic factors such as curiosity, role play, and learning. Mindset research and motivation research on learning both point to two distinctly different forms of extrinsic motivation (Lepper and Henderlong, 2000; Dweck, 2006). Some extrinsically motivated learners seek out hard challenges. *Challenge-seekers* are bored by easy tasks. They enjoy the thrill of mastering hard challenges and welcome good grades and teacher approval as just rewards (Dweck, 2006, Elliot and Church, 1997). Other extrinsically motivated learners avoid hard challenges because they do not want to risk failure. *Challenge-avoiders* are anxious about failing. When Challenge-avoiders perform graded tasks, they aspire to prove themselves, to validate their worth rather than to learn. They prefer easy challenges where success is likely over harder challenges where they might fail. In this manuscript we propose that Challenge-avoiders, also referred to as *Impression Managers*, are a heretofore ignored but commonly occurring player type. We consider whether and how eight very different modern games accommodate Explorers, Challenge-seekers, and Challenge-avoiders and discuss implications for entertainment and learning game design.

Players who play a particular game purely by choice presumably do so because they derive satisfaction from playing that game. Individual gamers differ in which games they choose to play, how often, when, and for how long (Dawson, Craig, Taylor & Toombs, 2007). The choice of whether to repeatedly play a particular game is probably associated with how satisfying each player finds the achievement and exploration pleasures provided by that game. Many genres tend to be more closely associated with one or the other of those motivations. Achievement is the central paradigm in genres such as First-Person Shooters (FPSs), Fighting, Racing, Sports, and Action. Other genres such as Adventure, Strategy, RPG, Puzzle, and Simulation probably appeal more to Explorers because they interweave imagination, curiosity, and customization.

As digital games continue to grow beyond their historically mostly young male audiences and enter spheres in which fun is not the primary intended outcome, perspectives on player types must also grow. Players who play a game because they are required to (as is the case with games for the classroom or training games) or because they should (for example, physical or cognitive exercise games) are rarely

afforded a choice of genre or of which game to play, or even whether or not to play. Games for which play is required serve reluctant as well as eager players.

The challenge of teaching students who are in school because attendance is mandatory closely parallels the challenge of designing games for players who play because they must. Motivation is often seen as a prerequisite to learning, and extensive research has been conducted on the relationship between learning and extrinsic and intrinsic motivations (Lepper & Henderlong, 2000). Individual learners may be more or less motivated by extrinsic factors (getting good grades, praise from the teacher). They may also be more or less motivated by intrinsic factors (fascination with the specific subject matter, relevant personal experiences, general love of learning). Intrinsic and extrinsic motivations can co-exist. Some learners are not motivated at all. Game players also have extrinsic and intrinsic motivations. The Achiever player type is extrinsically motivated. The Explorer player type is intrinsically motivated.

Motivation and Learning

Intrinsic Motivation and Learning

Intrinsic rewards arise from the process of learning or play and extrinsic rewards from results (grades, points, winning, or approval). Intrinsic goals internal to the act of learning can motivate learning, such as the pleasure of mastering a new topic, prior personal experiences related to the subject matter, or the sense of expertise as knowledge grows. Experimental schools such as Montessori are rare exceptions, which nurture intrinsic motivation to drive learning. Rather than structuring a learning progression through standardized curriculum and standardized grades, Montessori tries to instill an internal sense of purpose. They avoid setting learners up to compete for the highest grade in the class. According to Montessori president Tim Seldin, "Students learn not to be afraid of making mistakes; they come to see them as natural steps in the learning process." (p. 2, Seldin, 2008).

Beswick (1971, 1974) found that intrinsically motivated individuals need time to explore. He explains that intrinsically motivated individuals "tend [to] be more aware of a wide range of phenomena, while giving careful attention to complexities, inconsistencies, novel events and unexpected possibilities. They need time and freedom to make choices, to gather and process information…" (Beswick, 2007, p.1).

Extrinsic Motivation and Learning

Formal education tends to be structured to use the threat of poor grades to motivate homework and learning. At the beginning of a semester or school year, teachers describe how standardized grades will be fairly assigned. Students are expected to do what is necessary to "pass" or better yet, to excel on the exams and other kinds of performances. Report cards document standardized achievement, informing students and parents about the learner's performance. In the context of this kind of achievement-focused education, learning scientists have looked at the impact of achievement orientation on learning. Achievement or goal orientation refers to how individuals perceive and respond to achievement situations (Dweck & Leggett, 1988). People who have a high achievement motivation enjoy challenges much more than those with a low achievement motivation (Lee, Sheldon, & Turban, 2003).

Elliot and Church (1997) considered two quite different reasons individuals might have for pursuing extrinsic, performance goals such as grades. Performance-approach goals are linked to displaying competence and earning a favorable judgment. Performance-avoidance goals focus on trying to avoid failure. Elliot and Church found positive outcomes for performance-approach goals including positive emotions and absorption in the given task. Performance-avoidance prompted efforts to escape potential

consequences of failure and was associated with anxiety. Performance-avoidance interfered with mental focus, blocking the individual's ability to concentrate and become absorbed in an activity. The performance-approach goals approach enhanced mental focus.

Dweck (2006) made similar observations. She studied how people approach or avoid challenge in a school context. She found that about 42% of students has what she calls a growth, or Mastery mindset. These people believe that intelligence is malleable, that they are capable of improving if they try. Another 42% holds a Fixed or helpless mindset. They believe that intelligence is fixed at birth and cannot improve. They avoid situations that they cannot easily do well at. Failure undermines their confidence and if they fail, they become depressed and ineffective. (The remaining 16% could not be classified as either Fixed or Mastery mindset.) Having a Fixed mindset can undo a natural love of learning. In contrast, effort and learning make mastery-motivated students feel good about their intelligence; easy tasks waste their time rather than raising their self-esteem. Dweck describes the conundrum of the Fixed mindset. "If you're in a Fixed mindset, both positive and negative labels can mess with your mind. When you're given a positive label, you're afraid of losing it. When you're given a negative label, you're afraid of deserving it" (Dweck, 2006, pp 75-76).

Mangel worked with Dweck and other colleagues to measure brain activation among individuals with a Fixed and Mastery mindset (Mangel et al., 2006). Participants completed a pretest that allowed researchers to classify them as one or the other mindset. They answered a series of knowledge questions, and were given feedback about whether their answers were right or wrong and what the right answer was. Brain scans revealed people with a Mastery mindset paid close attention to what the right answer was. Those with a Fixed mindset showed activation of the limbic, or emotional system, but pad much less attention to learning the right answer. In other words, Fixed mindset people focused on their own emotional response to being told they were right or wrong, whereas Mastery mindset people paid most attention to learning new information.

Fixed mindset, performance-avoidance individuals are likely to experience anxiety when faced with achievement situations. Impression management is a psychological construct referring to ways individuals consciously and unconsciously try to influence or control other people's perceptions of them (Goffman, 1959). Those with a Fixed mindset might be considered impression managers because when called upon to perform on a test at school or in a game, they worry about how others might perceive them if they fail. This concern may motivate studying, but this preoccupation with appearing to be successful can also interfere with performance and learning.

Having a Fixed mindset is considered dysfunctional for learning because it focuses learners on performance instead of mastery. Educators who are aware of the research look for ways to ease learners out of a Fixed mindset and into a Mastery mindset. They also craft feedback to focus on ways the learner can improve, rather than on labeling the person a success or failure (Dweck, 2006, Lepper and Henderlong, 2000).

<center>Motivation, Play Style and Games</center>

Turning to the realm of games, is a Fixed mindset similarly problematic? Games and learning scholar James Gee writes that "good computer and video games are complex, challenging, and long; they can take 50 or more hours to finish" (p. 45). Gee points out that failing is part of playing a video game. Failure in video games "allow[s] players to take risks and try out hypotheses…" (p. 153). In fact, failing is a key mechanism in games by which players learn and improve. The type of game Gee describes as good is

sometimes referred to as a "hardcore" game. Players with a Fixed mindset (we will call them "Impression Managers") dislike failing and for that reason probably do not enjoy hardcore games. Even if such players avoid hardcore games, there is nothing inherently wrong with enjoying easy successes and avoiding hard challenges in games for entertainment.

Player type and play style are often used interchangeably. Player type is more often used to describe a persistent trait, whereas play styles treat motivations as a more temporary state, with an implication that players may adopt different play styles in different games or at different times in the same game. Player types are categories of game players with shared high-level gameplay motivations. Player types were initially studied in the realm of commercial games. Intrinsic explorers and extrinsic achievers consistently show up in these studies, but Impression Managers have either not been studied (perhaps because they weren't playing the games) or else they have not been noticed.

Richard Bartle was one of first researchers to observe players inside Multi-User Dungeon (MUD) games (1996) in order to create a set of player types. Based on personal observations of game players he classified players into four categories: *Achievers*, who strive for prestige in the game by leveling up and winning and *Explorers*, who seek to understand the game's environment. Two other types were unique to multiplayer games: *Socializers*, who interact with other players and *Killers*, who interfere with other players' experiences (e.g. killing new users, etc.).

Nick Yee's Daedalus Project surveyed thousands of massively multiplayer online (MMO) game players and asked what motivated them to play MMO games (2006). Although the surveys are based on self-reported responses, the resulting information found many confirmations and some contrasts with Bartle's original player types. Yee also discovered that these dimensions were not necessarily mutually exclusive. Statistically, the factors were not orthogonal. Players were not necessarily either achievement or exploration oriented but might also be motivated by both kinds of goals.

Yee's (2008) analysis of MMO play motivation based on player surveys identified three motivation domains: achievement, social, and immersion. Subcategories within Yee's *Achievement* construct included Advancement (progress, power accumulation, and status), Mechanics (numbers optimization, templating, and analysis), and Competition (challenging others, provocation, and domination). *Immersion* included Discovery (exploration, lore, finding hidden things), Role-Playing (story line, character history, roles, fantasy), Customization (appearances, accessories, style, color scheme), and Escapism (relax, escape from real life, avoiding real-life problems). Like Bartle, Yee also found a *Social* motivation included Socializing (casual chat, helping others, making friends), Relationship (personal, self-disclosure, find and give support), and Teamwork (collaboration, groups, group achievement).

Neither Bartle's nor Yee's description of Achievement appears to include Impression Managers. Impression Managers, like Achievers, are motivated by extrinsic rewards. Like their mastery-oriented counterparts, Impression Manager players seek prestige and like to win. However, Impression Managers particularly dislike losing, so much so they would prefer an easy victory to a challenge where the probability of failing is high. Such players may not have chosen to play the MMOs these researchers studied. Or they may have been quiet about their fear of failure.

Games and emotion expert Nicole Lazzaro (2007) conducted research tracking 30 emotions individuals experience during game play. She found that four emotions play the biggest role in player experiences. One of the emotions, *Mastery* or "hard fun", is most closely associated with extrinsic goals such as overcoming obstacles, creating and testing strategies, and progress toward challenging goals. Two of the

emotions relate to intrinsic goals. *Imagination* or "easy fun" includes enjoyment of uncertainty, ambiguity, iconic story through interesting failure states, joy of figuring it out, creativity through role play, player created content and experiences, and detail to explore. *Personal Values* or "serious fun" includes stimulation, practice and rhythm with goals such as relaxation, "zenning out," conceptual or physical or emotional or self learning, and accomplishing real work. The fourth emotion, *Relationships* or "people fun" is social. It includes the pleasures of player interactions and NPC interactions including cooperation, competition, mentoring, leading and performing, and personalization as an outlet for self expression. The idea of "easy fun" would appeal to Impression Managers, but these players would probably might prefer that the fun not be labeled "easy." It might be better to use a less humiliating label for players concerned about saving face.

Impression Managers and Other Player Types in Serious Games

Learning games and other serious games are often single player, removing the social dimension found in multiplayer games. Researchers have observed systematic variations in play styles, within the more narrow range of available interactions in many learning games.

Heeter and Winn (2008) proposed learning game play styles based on speed of play and problem-solving success. Adopting Ko's (2002) random-guesser and problem solver player types, they conceptualized problem-solvers as players who applied themselves to the game. Successful problem-solvers were classified as either *Achievers* or *Explorers* based on how quickly they finished the game. Random guessers were divided into those who chose to play as quickly as possible but seemingly without trying to play well, and those who did not seem motivated either by speed or achievement. Achievers played quickly, paying attention to what was necessary to succeed and hurrying to complete the game. Explorers took their time playing, checking out necessary as well as extra in-game content. Those who played quickly and made many mistakes were considered *Careless* players. Those who played slowly yet made many mistakes were labeled *Lost*. Players classified as Careless and Lost probably includes many Impression Managers. Rather than try and fail, they did not seem to bother to try at all. Failing without trying very hard would be less devastating to a Fixed mindset player than trying hard and failing.

Heeter, Winn, Winn, and Bozoki (under review) used Dweck's theory of Fixed and Mastery mindset to look for empirical evidence of Impression Manager play behavior in a memory game. They discovered that when given complete control over the difficulty level, about 4 out of 10 memory game players opted for easy victories. The easy victory players averaged higher performance scores than their Challenge-seeking counterparts. Impression Manager Challenge-avoiding players adjusted the amount of challenge they faced to consistently earn high scores, while Challenge-seeking players opted to forego near-perfect scores to attempt to achieve more difficulty goals.

Impression Manager seems to be a dysfunctional player type for learning games. Gee's celebration of the gamer ethic of learning from failure works well for Achievers but not for Impression Managers. Impression Manager is also a dysfunctional player type for cognitive exercise games. To receive cognitive benefits, players need to stretch a little beyond what is already comfortable and easy (Mahncke, H. et al., 2006). Limiting play to easy brain game challenges minimizes the games' benefits.

Game Design and Intrinsic and Extrinsic Motivation

Learning research has shown that under some circumstances, extrinsic and intrinsic motivations can coexist. In a review of 25 years of research on intrinsic versus extrinsic motivation, Lepper and Henderlong (2000) conclude that offering extrinsic rewards reduces intrinsic motivation, particularly if the extrinsic rewards are unrelated to the learning task. However, extrinsic rewards can complement

intrinsic motivation when the rewards provide information about competence (such as offering encouraging feedback about positive aspects of player performance or suggesting ways to improve) but rewards undermine intrinsic motivation when they serve only to assign status (such as grades or points).

Game designers who want to accommodate both Achievers and Explorers can try to include something for everyone, but sometimes Achievers' and Explorers' needs are incompatible, forcing design choices that privilege one or the other form of preferred play. Squire and Steinkuehler (2006) describe tensions between players with opposing goals when they posted feature requests about how to improve Star Wars Galaxy. Players with power-leveling, achievement goals wanted more pre-set story and clearly stated, fairly enforced standards for advancement. Players with a role play goal valued emergent play and freedom to invent their characters and actions.

Impression Managers and Achievers share an interest in extrinsic rewards, but are very different in their tolerance for failure. These two player types may also have conflicting needs. The mantra "easy to learn, hard to master" describes one of the holy grails of game design (Playyoo, 2008). This tenet could serve Impression Managers well and yet also satisfy Achievers. Much of the time, though, game designs to satisfy Impression Managers' desire for easy victory are incompatible with Achievers' desire to try to overcome impossible odds.

METHODS

We were curious about how well modern games are designed to serve Achievers, Impression Managers, and Explorers. Do games tend to specialize in a single player type? Are Impression Managers' needs accommodated? Eight games available in single player mode (shown in Table 1) were chosen to represent a range of genres and to include a mix of games likely to appeal to intrinsically and extrinsically motivated players. Each of the four co-authors analyzed two games. A second co-author reviewed and edited their analysis.

Table 1
A list of the eight games that were analyzed, including their genre and whether the game caters to extrinsically or extrinsically motivated players

Game	Genre	Player Motivation
Bioshock	FPS	EXTRINSIC
Guitar Hero	play along	EXTRINSIC
Keep It In Mind	brain game	EXTRINSIC
Puzzle Quest	puzzle/RPG	EXTRINSIC
Animal Crossing	virtual life	INTRINSIC
FlOw	sensory experience	INTRINSIC

Play The News	current events	INTRINSIC
Budget Hero	budget simulation	INTRINSIC

Four of the games , Bioshock, Guitar Hero, Keep It In Mind and Puzzle Quest, offer extrinsic rewards to the player and thus may support the Achiever and Impression Manager player types. The other four games, Animal Crossing, FlOw, Play the News, and Budget Hero, mainly offer intrinsic rewards. Genres covered include first person shooters (FPS), play along, brain games, puzzle/role play games (RPG), virtual life, sensory experience, current events, and budget simulation.

We provide a short of each game and its main mechanics. We discuss which player types are served by the game mechanics and conclude by envisioning specific additions or subtractions that might make the game more appealing for each player type. At the beginning of each game section, beneath the game title, a figure graphical summarizes how much each game promotes or focuses on the three player types (A = Achiever, I = Impression Manager, and E = Explorer). A black circle means that player type is highly focused upon by the game. A half black half white circle means the player type is some-what focused upon and the white circle means the game focuses very little on that player type.

RESULTS

Individual Game Analyses

Bioshock

Bioshock is an FPS that incorporates RPG game mechanics. The story takes place in a huge underwater city where the player gets caught up in a civil war that rages between the city's inhabitants. The game requires the player to fight their way through multiple levels using different types of weapons in order to win the game. Bioshock presents the player with standard firearms but also provides genetic modifiers that can give players unique powers (such as the ability to create fire). These weapons can be used alone or in combination to progress through the game. Players must figure out effective way to use them.

Bioshock is mainly an extrinsically motivated game. The main point is to gather weapons and complete levels as quickly and efficiently as possible. An Explorer may enjoy the storyline (told through in-game journal entries) and learning how to upgrade weapons; however, these features of the game primarily exist to help the player progress through each level. The game continuously rewards Achiever player types as they progress. Bioshock's dynamic difficulty system presents Achievers with ever tougher challenges but may turn away Impression Managers who take more pleasure in success than in challenge.

Adapting Bioshock for Explorers would call for less of an exclusive focus on combat and more emphasis on storyline. Explorers would prefer more choice as to when, where and whether to enter combat, which would make combat easier. This could be achieved by allowing players to purchase stealth abilities or other knowledge oriented skills they could use to out-smart rather than out-fight enemies. Adding more secret rooms and non-combative side quests could engage Explorers with the storyline. Adapting Bioshock for Impression Managers would curb the challenges of the game. Examples include letting players use stealth to gain advantage in combat, making enemies easier to kill, and quickly offering explicit instruction on how to exploit an enemy's weakness if the player fails. In this game, the needs of

Achievers and Impression Managers are incompatible. Curbing the difficulty and quickly offering help might please Impression Managers but would alienate Achievers.

Animal Crossing: Wild World (DS)

Animal Crossing: Wild World (DS) is a life/garden simulation game. The player takes charge of an embodied character in a small, contained game world. The player is given a home and then has to earn money to pay back a mortgage by planting trees, fishing, searching for treasure, talking with NPCs, creating clothing, buying and selling items, and so forth. There is no ending; the game continues for as long as the player plays.

Animal Crossing contains intrinsically motivated gameplay. The game has very few goals to achieve, leaving players to create their own goals. Explorers can enjoy playing at their own pace while discovering how the world works. When players discover how to perform certain actions the game opens up related rewards. For example, learning to fish allows players to collect all available fish. Impression Managers can easily achieve the game's main goal of paying off a mortgage while facing minimal challenge. Achievers are likely to find the lack of clear goals and hard challenges uninteresting.

Animal Crossing could be adapted to please Achievers by providing more overt goals, increasing the difficulty level, and allowing NPCs to compete with players. Stating a series of goals (such as you must pay off half your mortgage within a week) would allow Achievers to experience continuous progression. Impression Managers would enjoy less stressful goals than Achievers, but would benefit from more recognition of their accomplishments. Unlike Achievers, Impression Managers would enjoy subtle hints given by the game's NPCs to improve their performance. The game already provides myriad activities for Explorers to discover. Adding depth to these activities could increase Explorers, enjoyment.

Budget Hero

Budget Hero challenges players to set a new budget for the U.S. government. The player chooses which departmental policies to fund, such as the military or educational policies, as well as which tax plans to use. Players lay out their spending plans by choosing policy cards which equate to spending or cutting funding of specific policies. Players then submit the budget and see simulated results of their budget over the next two decades. The game provides extra information on each policy card to aid their decision and to allow the player to search through archived player budgets to see how their choices compare to other players' based on everyone's demographics.

This small serious game focuses on teaching players about various government policies and provides few extrinsic rewards . Explorers would find this game appealing because the game is rich in information. Each time a policy card is selected the user may read the card's summary, pros and cons, or the impact a certain policy will have on the country. When a policy card is added to a player's budget, the effects that the policy has on the budget is immediately shown on the screen, giving the player a clear picture of how each policy affects their budget. The game is very forgiving. Players can change their minds as often as they want before submitting a final budget. Impression Managers will enjoy the instant feedback; however both Impression Managers and Achievers will be bored by the lack of extrinsic rewards. (for instance a leader board).

Achievers will need more goals and constraints if Budget Hero were modified to serve this player type. Anonymous budgets could be replaced by nicknames and leader boards, allowing players to be recognized for their achievements. Awards could be given, such as an award for building a balanced budget with the fewest cards. Adding extra constraints that affect how the player builds their budget, such as declaring that the military spending must be cut in half, would provide extra challenges Achievers will relish. Impression Managers share the desire for more goals and recognition, but not for harder goals. Impression Managers (because it would help them succeed) and Explorers (because they are curious) would both enjoy more information on how policy cards interact with one another.

Puzzle Quest: Challenge of the Warlords (DS)

Puzzle Quest is a RPG/puzzle game that takes place in a fantasy world. Players choose a class (profession) and must improve their skill statistics throughout the game in order to face harder challenges as the story progresses. Players' skills are enhanced by items players can purchase and magic spells players can learn. All fighting and research is performed using a Bejeweled-style gameplay where players competitively match gems on a game-board to receive related points. The puzzles are one shot endeavors: the player either wins or loses and earns money and experience points for each puzzle based on their success.

As is common in RPG games, Puzzle Quest strongly supports extrinsic motivations by offering general rewards for a wide variety of player actions. All battles eventually reward players with money or general experience points. Achievers find this type of gameplay rewarding because they continually face harder challenges and must decide how to use their resources to face those challenges. Impression Managers may not enjoy this because rewarding success with a harder challenge is not their idea of a good reward. They prefer challenges they can succeed at easily. Explorers may enjoy the game much more than Impression Managers since they will get pleasure from the storyline, the many items and spells, and the ability to create their own items. Since Explorers by nature will explore and learn about what the game provides they will be better at solving challenges than Impression Managers who are not as curious.

Since Impression Managers have the roughest time playing Puzzle Quest the game could adapt to this player type by providing tailored help. For example, Impression Managers would benefit from practice turns in battle where they can see how their next move or spell will affect their enemy. The game could also list items and spells that the player has not seen yet along with hints about how to acquire the ones they need. Battles would also need to be rewarded by more than just money and experience; items and spells given automatically after battle could equip Impression Managers face future challenges. To appeal to Explorers, the game could add new Explorer-like game mechanics (such as managing a cities or trading) so long as those mechanics do not hinder the progress of the player. These mechanics could have a side effect of altering the storyline if the player uses them, such as by opening up new game areas if the player performs a certain trade.

Flow

In Flow, the player is a free-floating, free-flowing creature in the abyss of a fluid and deep space. The goal of the game is to eat and evolve by devouring smaller entities to help your creature become larger and more complex. The game contains an embedded dynamic difficult system which offers the player

intuitively customized gameplay according to their skill. This allows the player to enjoy the game at their own pace. Players also have the ability to customize the appearance of their organism based on their gameplay decisions.

Flow is Explorer oriented because of the minimal reward structure and the immersion of the game. Explorers are rewarded through evolution by eating other organisms and can play the game in multiple evolutionary forms giving them different experiences. Players wander each level discovering new creatures to eat and battle. The adaptive difficulty allows Impression Managers to progress through the game at a challenge level they are comfortable with. However, battling does not accrue reward points or awards which both Impression Managers and Achievers like to receive. Players can set their own goals such as trying to unlock all of the evolutionary forms or speeding through the levels as fast as they can. Because there are few performance metrics, Achievers and Impression Managers have no way to measure their success.

Adapting Flow to Achievers would transform the game into a traditional arcade game and would potentially drive away Explorers. Adding points, distinct levels, boss battles, and rewards will set goals for Achievers. This kind of player interface can keep Achievers goal oriented by adding constraints like a health bar or timer. Impression Managers would need a more helpful version of the player interface, perhaps including a map showing them the locations of other creatures. Making larger creatures easier to kill or allow players to replay levels would also help Impression Managers. Explorers could be allowed to switch evolutionary form freely or even to combine evolutionary forms.

Guitar Hero

In Guitar Hero the player is a guitarist in a rock band by playing songs on a special guitar-like peripheral device. The player plays through a list of increasingly difficult songs in order to be declared a "rock god". Songs are played by pressing down multiple buttons to simulate guitar finger positions while hitting another button in rhythm with the song to simulate strumming guitar strings. Difficulty settings alter the complexity and tempo of the music. Players play alone or against one another and successful play unlocks extra songs, characters, or guitar models.

Playing Guitar Hero is all about earning points and unlocking content. Players earn points for each note played correctly and gain bonuses for a succession of correct notes. Star power is an ability that is gained while playing a song. Star power doubles the points a player earns for a short period of time. The more points a player earns in single player mode, the more money they get to unlock content. The player with the most points in multiplayer mode wins that round. Achievers enjoy the rewards and challenges that Guitar Hero offers and Impression Managers like being able to play through most of the songs on the difficulty setting of their choosing. Explorers will find the game unsatisfying because of the very linear and repetitive play that is required.

When adapting for Explorers, players would need more freedom to move about the game, especially within songs. Taking away the point-oriented mechanics in the songs would allow other mechanics to be implemented such as song recording, improvisation, and practice modes. Explorers also may enjoy the chance to learn about the songs that they play (such as the history of the song writers or the cultural relevance of the song). Impression Managers may need practice modes and the ability to slow down songs or to forgive more mistakes. The negative feedback that accompanies mistakes could also be removed for both Impression Managers and Explorers, taking away the audience meter and booing which

can force a song to end in failure. Achievers would enjoy the added glory of visual cues when the player is close to breaking the high-score or the added challenge removing the guitar pitch feedback during a song to force the player to remember them.

Play the News

Play the News helps players become more informed about issues of the day. A player selects an issue to play, for example election coverage or regional skirmishes, and is presented with background information about the issues. Once a player has examined the background information they are asked a question about the outcome of that issue. They are asked what outcome they believe *should* happen and they are asked to predict what outcome *will* happen. Each player is ranked as to how whether their "should" votes match the votes of other players (popular opinion) and the game keeps statistics on how accurately the player predicted what actually happens. (The accuracy of the prediction cannot be tabulated until the issue is resolved in real life. This typically occurs in one to a few weeks after game play.) Players can also generate content in the form of creating their own games (based around a current event) and by writing or responding to other players' comments about the news.

The game oriented to Explorers. Play the News requires players to understand the ideas behind each issue they are presented with in order to do well in the game. Thus, being able to predict the outcomes with a high accuracy is a by-product of learning about the issues being presented. Explorers likely enjoy generating games and discussing the issues with other players. Achievers may end up playing every issue in order to level up and become well known in the game's community. Impression Managers will be deterred by that very same fact, they will not enjoy being wrong so will probably stick to issues that they know a lot about. The game does include badges and awards such as Predictor of the Week or Streak (correctly predicting 3 issues in a row) to add extrinsic rewards.

Play the News could be adapted to appeal more to Impression Managers by allowing players the option of hiding their prediction accuracy. This would allow those players to give out information when they feel comfortable doing so. Helpful hints, such as a list of answers that a player's friends gave, would help Impression Managers make wiser (and more correct) decisions. For Achievers, adding gambling style mechanics to the game could add more risk, for instance letting players state how sure they are about their answer or letting players vote without seeing any information. Explorers would enjoy receiving up-to-date information about issues that they have previously voted on.

Keep it in Mind

Keep it in Mind is a short tem memory game. Players select the category of items with wish to remember (numbers, letters, words, patterns, objects) and the difficulty level (easy, medium, hard). The player is initially shown two items from their selected category and is asked to remember them, in the order shown. When trying to remember the items in a round the player is then shown 8 items for easy rounds and 16 items for medium and hard rounds which include the items they are trying to remember. The player picks out the items they remember. After each round players have the option of repeating the current number of items, advancing to try to remember one more item, or starting over at 2 items.

Of the 8 games, Keep It In Mind is the most oriented to Impression Managers because of its combination of extrinsic rewards and how easy it is to keep the challenge level low. Achievers and Impression Managers can both enjoy the frequent extrinsic rewards of genius percent (accuracy) and speed that are shown after every challenge. Achievers can choose advanced difficulty level and work to remember all 7 items. Impression Managers can stick with challenges they succeed at easily. Explorers needs are met only by being able to try a variety of cognitive domains and subcategories of items to remember.

Keep it in Mind could adapt to Explorers by allowing more customization and player generation of content. Players could add their own set of items to remember or allow them to mix and match sets of items to play with. For Achievers the game could include more awards and goals during gameplay. Adding leader boards and multiplayer player would extend these awards giving Achievers more challenges to overcome.

Across Game Synthesis

Design for Individual Player Types

There are commonalities between the games that we have analyzed above that can lead us to make general prescriptions for games designed for each of the three player types. Each player type affords different design decisions and examples of what can be provided for each player type include:

Achievers need an increasing set of challenges and strict goals to follow. This includes: building dynamic difficulty systems, having specific points in the game that are extremely challenging, and performance metrics that rank players. Achievers should also be provided with goal-specific and unique constraints to overcome, and should be rewarded as they complete those goals.

Impression Managers need easier challenges where the game adapts to the skills players like to use most and rewards players implicitly as they make progress through the game. Impression Managers also need forgiving games, ones that give them gameplay hints, allow practice sessions, avoid negative feedback and enable them to hide bad performances.

Explorers do not necessarily need challenge, but if challenge is included it should revolve around in-depth game content. This can include more storyline information and greater number of mechanic choices. Explorers also enjoy having the means to test hypotheses and study the game-world through customization and free access to more game content.

Considering the games we have analyzed, games tend to primarily serve either the Explorer or Achiever player type. Focusing on one of these player types (e.g. Explorers) often means that a game serves the opposite player type (e.g. Achievers) less well. In terms of how well games serve the three player types, we tend to see either (E) (I) (A) or else (A) (I) (E) . Impression Managers are often supported to some extent within each game, through user-selectable difficulty settings and other challenge monitoring adaptive features. However, not every game we analyzed supported our player types in this order. Puzzle Quest, Keep it in Mind, and Play the News either focused on the Impression Manager type as their main player type or as their weakest type.

Overlap Between Player Types

In addition to understanding how each game serves one or another player, developers also can consider how these player types connect to one another. In the sections below these connections and the mutual traits of each player type pair are discussed.

Achievers and Explorers

Both of these player types enjoy learning as much as they can about a game, just for different reasons. Achievers learn as much as they can about a game to help them achieve more. If that learning does not connect back to achievement, Achievers will lose interest. Explorers learn as much as they can about a game because they are curious and like learning. A pure Explorer (one who is not also an Achiever) has no need for goals or achievement in a game. Puzzle Quest, an RPG, serves Achievers and Explorers by giving them a large content set and many goals to reach or explore. This leaves Impression Managers lost because they are faced with a game that has enormous depth, which the player must dive into in order to succeed, without sufficient help.

Achievers and Impression Managers

These two player types have extrinsic motivations in common. They both work towards rewards and judgments of their performance. They are also similar because Achievers, while they wish to perform as best as they can, have to start somewhere, usually at the challenge level that Impression Managers enjoy. Therefore, games like Bioshock and Guitar Hero can provide a spectrum of difficulty where both player types can enjoy playing the game. This can alienate Explorers because they have to play through the same redundant challenges as the other two player types which restrains them from exploring.

Explorers and Impression Managers

Since Impression Managers do not like extreme challenges (unless they succeed) and Explorers like to explore content at their choosing, games that provide easier means of progression through the game can work for both player types. Also, Explorers like to study and play with the mechanics provided within games, including customization. This feature also helps Impression Managers to set the difficulty of the game's challenges to a level that is comfortable. This leaves Achievers unfulfilled because players can progress through the game and earn rewards without any significant skill or mastery. It is not a fair competition when the same goals are made easier for players who want them to be easy.

Must Players Be A Single Type?

As we already discussed, motivation research on learning and game research on play style show that extrinsic and intrinsic rewards are not necessarily mutually exclusive (Lepper and Henderlong, 2000, Yee, 2008). Among the four co-authors of this manuscript, one is a pure Explorer and the other three are self-described Achiever-Explorers. In different games and at different times when playing the same game a player may orient more towards one primary type. Impression Manager and Achiever motivations are the least likely to coexist. It would be contradictory for a player to prefer easy successes and hard challenges.

Changing How Players Play

Finally, another way that games may use player types is to introduce ways to change a player's motivation into a different one. The most logical instance of this would be to subtly nudge an Impression Manager into being more of an Achiever. Dweck's (2006) research has shown than mindsets can be changed. Since Impression Managers focus on whether they are being judged favorably or unfavorably rather than on whether they are learning, an adaptive system might be designed to nudge them to focus

more on mastery. This could include giving them hints throughout the game about how learning from failure can greatly increases players chances of future success. Focusing players' attention more on nuanced strategies and context and giving feedback that helps players improve could move them towards playing as an Achiever rather than an Impression Manager. Also, enabling them to review their progress and to replay content would improve understanding and encourage them try new ideas and techniques.

DISCUSSION

Implications for Learning and Other Serious Game Design

Games for learning are more likely to be played by Impression Managers than are games for entertainment because players are often forced to play and because success in the game tends to be linked to sensitive constructs such as intelligence, ability, and real world advancement. Unlike entertainment games in which a player's performance can be private, the teacher or supervise may monitor in-game achievement. All of these factors encourage potentially susceptible players to adopt an Impression Manager approach. The Impression Manager Fixed mindset interferes with classroom learning and with learning in games. Rather than "lowering the stakes" and offering easy challenges, learning game designers may instead want to dampen the sting of failure. This can be done by careful attention to the tone and content of player feedback for both success and failure. Feedback that focuses on player performance (for example, in Budget Hero, "you completed the Health and Wellness and the Competitive Advantage budget badges but did not complete the Energy Independence badge") rather than feedback that evaluates the player (for example, in Budget Hero, "you're almost a budget hero") can help nudge Impression Managers towards a mastery orientation.

The benefits from cognitive games can best be realized if the player can be enticed into taking on hard challenges. Thus, game designers want to discourage players adopting an Impression Manager play style, without driving players away. Careful crafting of feedback might help nudge players into an Achiever style. If players are seriously concerned about their cognitive health, the feedback can be quite prescriptive. Here is a hypothetical example of feedback designed to entice Impression Managers to play like Achievers. "You correctly remembered 3 items (quartz, tiger eye, and granite) and missed two (azurite and jade). Trying hard challenges helps keep brains healthy. Repeat the 5 item challenge and earn two-for-one points or go back to the easier challenge of 4 items."

Serious games can also add content and depth to interest Explorers and to encourage players to experience intrinsic rewards from playing and learning.

Implications for Game Design

A main take away from this work is that it is likely helpful for designers to be aware of the commonalities and differences between (as well as simply the existence of) the discussed player types. While it is not an exhaustive review of all player motivations (e.g. social or physical health goals are not taken into account), it does offer a clear picture of the kinds of game mechanics in various game genres that map to these player types.

This illumination can be put to use in two different ways. The first is simply to help designers and producers make a more informed decision on how to make games for target audiences. Further research needs to be done on exploring the distribution of these player types in different populations (e.g. what percentage of 18-25 year old males are Achievers?); however, having a clearer idea of the motivations of a target audience can influence the design process for a given game. Inversely, understanding how a

game's design relates to the motivations of different audiences can help a team understand which audiences are likely to play it.

The second use of this work is in the application of our knowledge of player types to the intelligent adaptation of games. As described by Magerko (2008), games have the potential to be intelligently adapted based on models of the player interacting with it. Designers do not have to necessarily build incredibly large or complex games that have something for everyone (e.g. World of Warcraft arguably has game features for most player types) in order to target multiple player types. The deconstruction of multiple games done earlier in the paper illustrates of how games have multiple possible versions of the core game idea that can appeal to multiple types of players. Therefore, games have the potential to be designed as flexible media experiences that adapt based on the type of player interacting with it. For example, if an Explorer is playing Guitar Hero, then it may alter the gameplay to incorporate the kinds of recommendations we make above (e.g. including music history content to explore about the songs in the game). This adaptive approach to games has the potential to provide a powerfully individualized experience to game players. Our current work on designing games that provide this kind of adaptivity is described in Magerko et. al (under review).

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