Perception vs. Reality: Challenge, Control And Mystery In Video Games

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Abstract
Long have studies attempted to bridge the gap between perception and reality for video games attributes. This study highlights the relationship between what a player perceives about certain game attributes (Challenge, Control and Mystery) and how those elements are actually portrayed in the game. We measured user perception with a post-game questionnaire and compared that to the answers of pointed questions about those attributes at different times during the game-play. We found high correlation for the Challenge attribute but lower correlation for the Control and Mystery attributes.

Author Keywords
Game Attributes; Game Elements; Challenge; Mystery; Control; Player Perception.

ACM Classification Keywords
Human Factors; Measurement; Design.

Introduction
Game attributes are essential elements that affect a player's gameplay experience. However, since that experience is personal and unique to each player, their performance and how they perceive their performance is equally unique.

With respect to motivation, some studies branded three primary elements: Challenge, Curiosity and Fantasy [5]. That breakdown was later expanded to two categories: Intrapersonal (Challenge, Curiosity, Control and Fantasy) and Interpersonal (Competition, Cooperation and Recognition) attributes [6]. Alternatively, another approach was dividing the game structurally into Visuals, Interactions, Rules and Goals [2]. Past findings also studied the Task, User, Goals and Control as the essential elements to a game [4]. Most recently, intrapersonal category is later expanded and defined into six different Game Dimensions [3]. For this study, we analyze the difference between a player's perception of some of these attributes (Challenge, Control and Mystery) and the values of those attributes, based on our definition. Such analysis will help bridge the gap between reality and perception for those elements. For this study, we analyze the difference between a player's perception of some of these attributes (Challenge, Control and Mystery) and the values of those attributes, based on our definition. Such analysis will help bridge the gap between reality and perception for those elements.

Game Attributes

We determined our definition and classification of the different game attributes from our previous study [1], which described, in detail, the case for these definitions. Of these attributes, we chose to examine Challenge, Control and Mystery.

For Challenge, our definition was, "the number of attempts a player needs to finish a level." This definition is ideal for a First-Person Shooter game or even an Arcade game or RPG game, but not for other genres like Racing and Sports. So we mapped this definition to those genres by replacing "attempts" with "possessions" (Sports) and "races" (Racing) and also replaced "finish a level" with "score" (Sports) and "win a race" (Racing).

Control is more complex to define and measure. We define Control as the number of choices of Directions and Objectives provided to the player at any given time, also known as self-determination [6]. Directions are those the player can choose to change the flow of the game. Objectives are tasks to choose from during the game. These definitions are universal across all genres.

We defined Mystery as the level of determinism or information complexity [1]. Basically a player's knowledge of their progress and what to expect next in the game is how we measure Mystery in video games. We feel successful games provide a balance of information to the player to understand their progress and an unknown future within the game.

Participants

For this study, we recruited 60 participants, divided evenly between games. Out of that total, ten were expert game designers, each covering at least one game in a genre. The population from which we chose these subjects was both student game designers with previous experience and professional game designers. They were exposed to the same experience as the other 50 subjects but they each played five games (one per genre) instead of one and they were asked a few extra questions relevant to their design experience.

Sessions	100
Male	81
Female	19
Age	21.89
High School Graduates	70
Associate Degree	9
Bachelors Degree	19
Graduate Degree	2
Playing Experience (Years)	14.85
Playing Frequency (Times a Week)	4.95

Table 1. Demographic data for all sessions.

Perception of Difficulty	Attempts
1	1.25
2	1.5
3	1.43
4	1.5
5	3.19
6	2.55
7	3.86
8	5.27
9	4
10	5.33

Table 2. Post-game difficulty perception versus the number of attempts.

Methodology

Games were played in individual gaming sessions. Regular subjects took part in one session while expert subjects participated in five separate sessions, each for a different game in a different genre. During each gaming session, the subject played a predetermined subset of one game. These subsets were established to represent a continuous level, game or match during which a player can experience a full complement of the game features and to have a clear beginning and end. The specific nature of each game subset was determined during the play testing process. Establishing a clear subset was a factor in whether a game was suitable for our study or not. An example of a subset would be an entire level in a First-Person Shooter game or an entire game of basketball or football in a Sports game.

For each gaming session, a subject played exactly one subset of that game. First, we asked each subject a small list of pre-test, demographic questions. After each session we also asked the subjects a list of ten post-test questions about their experience. Each subset was also broken down into intervals during play testing. Those intervals are considered break points in the game where we paused the game in order to ask the subject a few questions about the nature of the game-play experience.

Results

The 100 sessions accumulated in this study provided a large data set to analyze for the purposes of this paper. The demographic data is displayed in Table 1. The main question we are concerned with in this study is the difference between the in-game questions, which establish values for Challenge, Control and Goals, and the post-game perception responses. The in-game questions were established using our definition stated in the Game Attributes section.

The results for the Challenge attribute, shown in Table 2, show a high correlation of 0.925 between the number of attempts and the perception of difficulty. Data shows that as the perception of difficulty increases for a player, their number of attempts increases as well.

Unlike the Challenge attribute, data for the Control attribute, shown in Table 3, was less informative. Part of the reason for the difficulty establishing a correlation is that the Control attribute is measured by two variables rather than one (Directions and Objectives). Objectives values did not change throughout the entire range of Control with a low negative correlation of -0.13. The Directions values provided a slightly higher correlation of 0.634. However, the data for Directions seemed to be very sporadic. For example, the highest number of Directions perceived were reported at perception of Control of both 10 and 4 while the lowest number of Directions perceived were associated with perceptions of Control of 1 and 8.

The Mystery attribute, summarized in Table 4, did not provide any informative trends either, with a low negative correlation of -0.35. The perception of Mystery was based on a post-game question about the level of Mystery within the game while the Mystery column refers to the in-game question. For that value, we asked the player at different in-game intervals "What happens next?" If the player was able to correctly describe what to expect, we logged a value of 1 for the

erception f Control	Directions	Objectives
0	0	1
1	4.67	4.33
2	8	11.5
3	7.33	3.66
4	19.71	3.57
5	11.86	3.5
6	6.88	3.5
7	17.87	3.33
8	6.8	3.8
9	13.17	4.133
10	19.3	3.7

Table 3. Perception of Control versus Directions and Objectives.

Perception of Mystery	Mystery
0	1
1	0.89
2	0.81
3	0.67
4	0.86
5	0.75
6	0.57
7	1
8	0.5
9	1
10	0.6

Table 4. Perception of Mystery.

response, otherwise we logged a value of 0. Using this metric, the Mystery column should decrease as the perception of Mystery values increase, but that was not the case.

Based on the results of this study, we were able to draw a high correlation between a player's perception of difficulty and the actual difficulty level of that game. For the other two attributes we examined (Control and Mystery), low correlation was detected. We encourage future studies into this topic to investigate this correlation for other game attributes, like Fantasy, Sound, Goals, etc. Findings from such studies, coupled with this study, can provide a comprehensive framework for measuring these attributes based on user perception.

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References

[1] Alkhafaji, A, Grey B., Hastings P.: Establishing a New Framework to Measure Challenge, Control and Goals in Different Game Genres, Games + Learning + Society Conference 8.0, (2012).

[2] de Felix, W., & Johnston, R. T. (1993). Learning from video games. *Computers in the Schools, 9,* 199-233.

[3] Garris, R., Ahlers, R. & Driskell, J. (2002). Games, motivation and learning: a research and practice model. Simulation and Gaming, 33: 441-467.

[4] Gredler, M. E. (1996). Educational games and simulations: A technology in search of a (research) paradigm. In D. H. Jonassen (Ed.), *Handbook of research on educational communications and technology* (pp. 521-540). New York: Macmillan.

[5] Malone, T. W. (1980). What makes things fun to learn? Heuristics for designing instructional computer games. In *Proceedings of the 3rd ACM SIGSMALL symposium.* Palo Alto, CA.

[6] Malone, T. W., & Lepper, M. R. (1987). Making learning fun: A taxonomic model of intrinsic motivations for learning. In R. E. Snow & M. J. Farr (Eds.), *Aptitude, learning, and instruction: Cognitive and affective process analysis* (3, 223-253). Hillsdale, NJ: Erlbaum.