

In Pursuit of Optimal Gaming Experience: Challenges and Difficulty Levels

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Abstract

Researchers have identified different components of game fun in the past, but the objective of this contribution is to analyze game challenges and difficulty levels, and their effects on player enjoyment and emotions. This paper presents basic principles for designing game challenges as well as the requirements and qualities required to achieve maximum enjoyment. Special emphasis is given to the accumulated knowledge of Wizards of the Coast (and formerly TSR) in designing role-playing games. Different player types are discussed, the nature of the difficulty curve is examined, and the relationship between player satisfaction and different levels of difficulty is analyzed with a case study.

Computer Games and Enjoyment

From *Spacewar!* to the persistent multiplayer worlds of the 21st century, video games have moved from subculture to mainstream industry and various different genres have emerged. The paradigm shift towards interactive media has offered a seamless flow between the virtual and actual, but one question has remained the same: Why do people play games? The different motivations identified by researchers for playing computer games are learning, fantasy/exploring, nose-thumbing, proving oneself, social lubrication and exercise (Crawford, 1982); curiosity, control, challenge, recognition, competition, fantasy and cooperation (Malone & Lepper, 1987); teamwork, fantasy, advancement, relationship, discovery, customization, competition and escapism (Yee, 2006); and competence, autonomy and relatedness (Ryan & Deci, 2000). The diversity of the motivational variables indicates that although each study is relevant in its own context, an integrated model of player motivations is still nonexistent. In this regard, this article is not concerned with why people play computer games, but with how gaming challenges and difficulty levels effect enjoyment and the emotional state of the user.

Being inside a virtual world is an activity of selective attention and a psychological process, and the cognitive complexity of enjoyment in a computer game arises from the fact that filtering and organizing artificial sensory information of the virtual world is not a simple task. Enjoyment is thus defined as a complex construct with physiological, affective, and cognitive dimensions, and is the core of entertainment media (Vorderer, Klimmt & Ritterfeld, 2004). The popularity of computer games has inspired many communication researchers and media psychologists to investigate the factors of enjoyment with special emphasis on the interactive nature of gameplaying (Vorderer, Hartmann & Klimmt, 2003). In an interactive setting the user is no longer a passive witness of ongoing events and does not interpret but experiences the medium. Extensive research into what makes experiences enjoyable was also conducted by Csikszentmihalyi (1990), and based on this study, Sweetser and Wyeth (2005) proposed a model of enjoyment named GameFlow.

Identifying player motivations is one of the important considerations for designing and evaluating computer games, but an optimum experience has other components as well. According to Bekker et al.(2004), a successful computer game considers both the initial and the extended use, and thus should be easy to learn (initial use) and hard to master (extended use). Players are intrinsically motivated to place themselves in situations that increase their pleasure and in a given situation optimal experience requires a balance between the perceived challenges and the skills of the user (Csikszentmihalyi, 1990). A mismatch between the skills of the user and the difficulty results in frustration (too difficult for the player) or boredom (too easy for the player). Thus, computer games should provide different levels of challenges for different types of players that match their skill levels.

Role Playing Games and Gaming Challenges

A gaming experience provides various forms of challenges. According to Feil and Scattergood (2005), standard game challenges can be classified into six groups: time challenges, dexterity challenges, endurance challenges, memory/knowledge challenges, cleverness/ logic challenges, and

resource control challenges. Role-playing games offer all these forms of challenges uniformly. Thus, among the various computer game genres, they require special attention. Missions and tasks in RPGs offer various time, memory/knowledge, and cleverness/ logic challenges; defeating enemies in a virtual world offers different dexterity and endurance challenges, and character progression and object acquisition are actually resource control challenges.

Before analyzing the various dimensions of gaming challenges offered by RPGs, readers of this article should be familiar with the concept of role-playing. Role-playing games are interactive worlds where players assume the roles of fictional characters and determine their own actions based on the character they play. Players typically follow a storyline in a fictional world and interact with other player (PCs) or non-player characters (NPCs) to complete missions and achieve various goals. As the player completes quests and overcome conflicts, his/her character advances in levels and becomes stronger. Table-top fantasy role-playing games have parallels to wargames and educational simulations but they focus more on the *role* and player choices are virtually unlimited (Fine, 1981). The key difference between table-top RPGs and computer RPGs is that the game is no longer a collectively produced fantasy and takes place within strictly defined parameters (Apperley, 2006).

Since this article aims to provide insights to game designers by delineating gaming challenges and difficulty levels of computer RPGs, it should be beneficial to take a look at the best practices of the industry. According to the GameRankings.com¹ user vote averages, the three best games released so far are *Elder Scrolls IV: Oblivion*, *Baldur's Gate II: Shadows of Amn*, and *Star Wars: Knights of the Old Republic*. Based on the average scores of computer gaming website reviews, the three best RPGs are *Baldur's Gate II: Shadows of Amn*, *Elder Scrolls IV: Oblivion*, and *Star Wars: Knights of the Old Republic*, also known as *KOTOR*. User vote averages and computer gaming websites point out to the same three games.

Gaming dynamics of the two best RPGs, *Baldur's Gate II: Shadows of Amn* and *Star Wars: Knights of the Old Republic*, are based on the famous AD&D table-top role-playing game. Developed by Wizards of the Coast, Advanced Dungeons and Dragons or AD&D is a game of imagination, as well as a game of tactics and strategy, which has set the standard for role-playing for more than 30 years. *Elder Scrolls IV: Oblivion* uses its own unique gaming system, which offers different techniques for character advancement. In conducting a study of gaming challenges and difficulty levels, we organize the discussion as follows: (a) first, we analyze the character creation process and character progression in Advanced Dungeons & Dragons (AD&D) system, and explore specific concepts such as experience-based progression, challenge rating system, and encounter levels; (b) we devote the second part to different player types, the nature of the difficulty curve and the skill acquisition phases of the player; and (c) in the third part, we provide a case study of player satisfaction and game difficulty, and the associated emotions.

Character Creation and Progression: Advanced Dungeons & Dragons

The core mechanic of this role-playing game is the d20 Game System, which is named after the 20-sided dice frequently used in fantasy role-playing games. The game is usually played with four to six players, which make up the adventuring party, and the one who controls the game is called the Dungeon Master (DM). Character creation in the game starts with the determination of ability scores. After selecting a race and determining abilities, every character chooses a class, which is actually a profession or vocation that determines what a character is capable of doing. Every class has certain skills and feats. Skills represent a variety of abilities each governed by an attribute. Feats are special features that either give a character a new capability or improve an already known one.

Understanding table-top role-playing games and the mechanisms behind them can be useful in enhancing the development of computer role-playing games (Tychsen et al., 2005). In this regard, these games have also drawn the attention of interactive storytelling systems. Peinado and Gervás (2007) applied the game mastering laws used by a human DM controlling a role-playing game to an automatic director for interactive digital storytelling applications. According to Louchart and Aylett (2003), participative forms of narrative such as table-top role-playing games, live role-playing games or improvisational theatre provide an interesting and entertaining narrative structure where control of the narrative is distributed between actors who use their dramatic experience to make choices.

Character progression in AD&D games is governed by experience points (XP) that measure how much a character has learned during the game sessions. Dungeon masters assign XPs to the characters at the end of each adventure/encounter or at the completion of each quest. Experience awards are usually given for defeating monsters. Story awards and role-playing awards are given for noncombat

¹ <http://www.gamerankings.com/itemrankings/simpleratings.asp> (Accessed on 20th November, 2008).

encounters where skill usage, spellcasting, puzzle solving and so on also account for XPs. The amount of XPs awarded depends on the challenges and matches the difficulty levels. As the player's level increases, the amount of XPs required to level up also increases. When the experience point of a character reaches a certain number, the character advances a level. Level advancement gives attack bonuses, save bonuses, ability bonuses, hit points, skill points, feats, spells, and class features to a character.

Experience gained by defeating adversaries is calculated with the help of the Challenge Rating (CR) of each opponent compared with the party level. A monster's CR determines the level of the party for which that monster is a good challenge. If the players are of higher level than the creature they get fewer XPs but if they are of lower level than the creature they get more XP awards. However, players usually face more than one monster or enemy in an AD&D game. Multiple-monster situations are called encounters and their difficulty is calculated by an Encounter Level (EL) which is a combination of the CLs of the individual monsters. Encounters with an EL lower than the average party level are considered easy encounters. If the EL matches the party level, it is a challenging encounter for the players. Very difficult encounters are those with an EL of one to four levels higher than the party level and those with an EL 5+ are overpowering encounters where the players will almost certainly lose the battle.

Environmental factors also affect gaming challenges. Enemies with cover or higher elevation, conditions that make it difficult for the players to see or hear or move, or conditions that require delicate maneuvering increase the difficulty of an encounter. The difficulty level also depends on the individual classes of party members. For example, encounters involving evil outsiders are more difficult without a paladin or cleric, and tight quarters make things more difficult for rogues. All these are considerations for the DM when running a game. The *Dungeon Master's Guide* (Dungeon Master's Guide, 2003) states that a well-constructed adventure has a variety of encounters at several different levels of difficulty and parties with five or more members can often take on monsters with higher CRs while parties of three or less are challenged by monsters with lower CRs.

Player Types and the Difficulty Curve

There have been many attempts to define play styles of computer gamers. Bartle (2004) identified the famous four playstyles as: socializers, achievers, killers and explorers; Salen and Zimmerman (2004) defined five player types: the standard player, the dedicated player, the unsportsmanlike player, the cheat & the spoil-sport; Mulligan and Patrovsky (2003) introduced a grouping based on the relations between players: general players, barbarians, tribesman and citizens; Pohjola (2004), in the context of live-action role-playing, defined four categories: immersionist, dramatist, gamist, and simulationist; Dena (2008) defined the three tiers of hardcore gamers as: puzzle players, story players and real world players. These are general computer gamer categories that can be used to profile a player, but there are also other approaches such as using game play schemas (Lindley & Sennersten, 2006) and scenarios (Ermi & Määyrä, 2004) for player modeling. Since researchers defined many different play styles, gaming challenges should be capable of satisfying the majority of these types, taking into account the differences in player preferences. Miller (2004) and Rouse (2004) also emphasize the need to balance the game challenges for all player types to provide the best level of satisfaction without frustrating them. Computer games should also account for cultural contexts and gendered preferences in terms of gaming pleasures (Carr, 2005).

Regardless of the player types, game challenges should ideally increase when the player advances in levels. Games should employ progressive difficulty levels, multiple goals, and a certain amount of informational ambiguity to ensure an uncertain outcome (Garris et al. 2002). As the player becomes more proficient with the game and his/her character becomes tougher, the amount of experience or any other metric needed to advance a level should be more than the amount needed on the previous leveling up. For example, in an AD&D game (3.5 edition), a character advances to the 2nd level when his experience total reaches 1000 XPs. To advance to the 3rd level, he needs 2000 more experience points. When he reaches 3rd level at 3000 XP total, he needs 3000 more XPs to advance to the next level. Similar techniques are applied in almost all RPGs to adjust the experience point gap for leveling up automatically. AD&D formula for leveling up is,

$$\text{XP (Total) } N = \text{XP (Total) } N-1 + (1000 * \text{Current Level})$$

where, XP (Total) N = Experience points total for progressing into Level N.

From a cognitive science perspective, game playing is a skill acquisition process in which the player becomes more familiar with the user interface and the gaming dynamics with time. Skill acquisition is defined as the process of acquiring fluency in the use of knowledge. According to Fitts (1964) and Anderson (1982), skill acquisition in the real world consists of three phases. The first stage is the cognitive stage, where the learner often works from instructions or an example of how the task is to be performed. The second stage is called the associative stage, where the learner makes a transition from a slow and deliberate use of knowledge to a more fluid and error-free proficiency. The third stage is the autonomous stage. Skills in this stage become automated and rapid, the learner using the skill without second thought. Game playing also consists of these three phases and gaming challenges throughout the game should be consistent with these skill acquisition stages. The same structure should also be reflected on the nature of difficulty curve.

The difficulty curve of a game is drawn with two parameters: the metric used in character progression and the character level. A linear difficulty progression may frustrate casual gamers among early and serious gamers at later levels (Lopez, 2006). To allow both casual and serious gamers to progress without being discouraged, the difficulty curve should be convex-shaped. This ensures that at the cognitive stage, challenges are relatively easy; at the associative stage, challenges are moderate in difficulty; and at the autonomous stage, challenges become more difficult. Level progression in AD&D table-top games are constantly revised through editions. In the 2nd edition of the game, almost every class has its unique progression and the curves are more linear in nature. The 3.5 edition uses a single level progression table for all classes and the new curve is convex-shaped. The amount of experience needed to advance a level is also decreased. While a fighter character needs 3,000,000 XPs to become a level 20 character in the 2nd edition, the same fighter character now needs only 190,000 XPs.

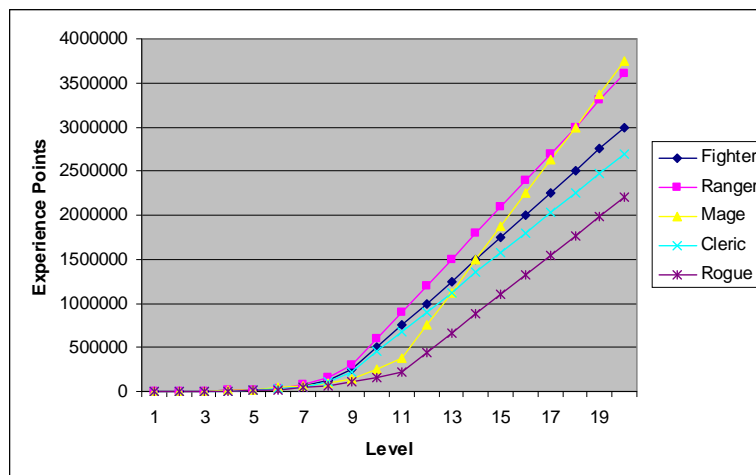


Figure 1: Character progression in AD&D 2nd edition

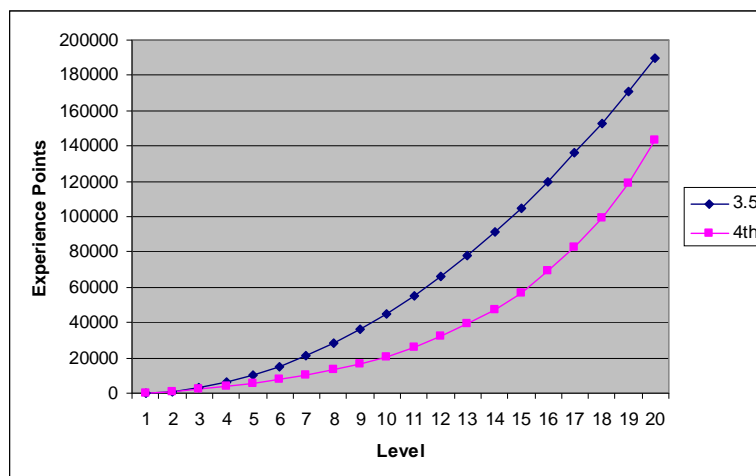


Figure 2: Character progression in AD&D 3.5 and 4th editions

Figure 3 below illustrates the difficulty curves of three RPGs. The AD&D difficulty curve is used by many RPGs, such as *Knights of the Old Republic* series, *Baldur's Gate* series and *Neverwinter Nights* series. Besides AD&D and *Oblivion*, the third sample is given from a contemporary RPG released recently: *Two Worlds*. Since these games use different metric values for character development, percentage of maximum obtainable experience points is used to draw the graphics. Since AD&D is the most frequently used RPG system for more than 30 years (even before computer role-playing games exist), it can be used as a guideline to compare difficulty levels. From this point of view, progression in *Oblivion* is more difficult than an AD&D system both at earlier and later levels. On the other hand, it is easier to progress in *Two Worlds* at all stages.

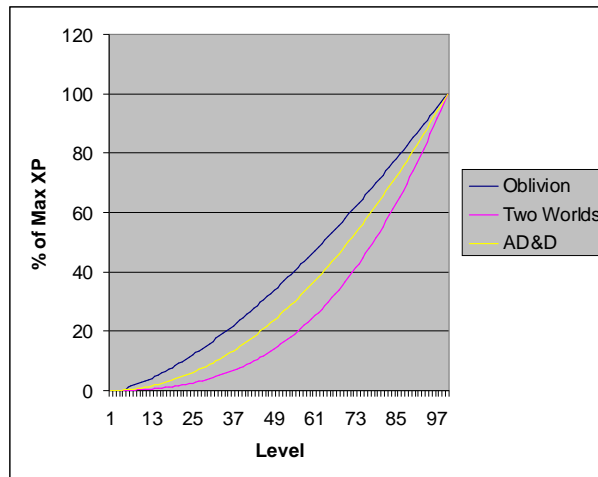


Figure 3: Difficulty curves of Oblivion, Two Worlds, AD&D

Player Satisfaction vs. Game Difficulty

To test different levels of challenges for different types of players, table-top RPG sessions were organized and two adventuring parties consisting of five players each were selected from former and current members of various university-level RPG student clubs in Turkey. Players were selected on the basis of a basic divide in player preferences: role-players and power gamers (Slavicsek & Baker, 2006). Role-players are those players who prefer encounters where they can talk and role-play rather than fight. They create detailed histories about their characters and prefer interesting or flavorful options instead of pure combat options. Power gamers are those players who prefer fights to role-playing encounters. They optimize their character's race, class, feat, and spell choices carefully. Discussions with different DMs were used to assess each player's style of play. In the end, the first party consisted of five role-players and the second party consisted of five power gamers.

Three different difficulty levels were selected for the case study: easy, challenging and very difficult. The adventure selected for gaming sessions was *Expedition to the Demonweb Pits*, an AD&D campaign adventure for characters of levels 9-12. This plane-hopping adventure starts in the Material Plane and takes the players to Sigil, City of Doors. The players then visit different planes of existence and end up at dangerous levels of Abyss. Besides optional random encounters at each location, the adventure has various major encounters especially designed for the story. Most of these (almost 70%) are multiple-creature encounters and the EL of each encounter is chosen to match an average party level of 9-12. Majority of the encounters in the story were selected from those with an EL that matched the average party level, or those with an EL of one level lower or one level higher than the players.

If we assume that a group of five players starts the adventure with 9th-level characters, the XP award each player receives from a challenging encounter that matches their average party level is 540. Since parties with five or more members can often take on monsters with higher CRs, if they face an EL 10 encounter, each player will receive 810 XPs. The players need 9000 XPs to advance from level 9 to level 10. Thus, 11 to 16 encounters are adequate for them to level up. Such is the pacing of gaming challenges. The graph below shows the XPs given by encounters in different gaming sessions. The blue line represents the 10 encounters that advance the players from level 9 to level 10 and the purple line represents the 12 encounters that advance the players from level 11 to level 12. How many steps or encounters it takes for the players to level up is up to the DM, but there should not be too many or too few, and a well-constructed adventure should have a variety of encounters at different levels of difficulty.

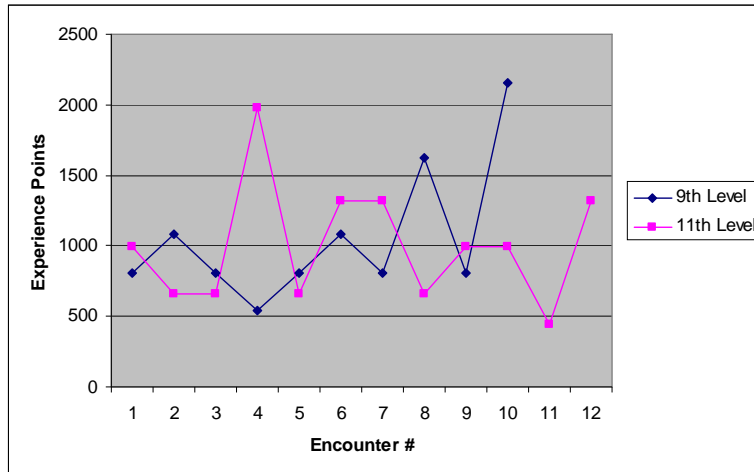


Figure 4: Experience awards by encounter

Each adventuring party played three 4-hour gaming sessions with different difficulty levels. The gaming sessions were run by the primary author of this article who has 15 years of AD&D gaming experience, both as a player and a DM. The order of difficulty levels was randomly selected. The role-players group started with challenging encounters in the first session, continued with easy encounters in the second session, and finally faced very difficult encounters in the last session. The power gamers started with very difficult encounters in the first session, continued with challenging encounters in the second session, and finally faced easy encounters in the last session. After each session, the players rated their level of satisfaction on a 0-100 scale. We began the sessions with the hypothesis that combat difficulty is not the sole criterion of role-players in determining their level of satisfaction, whereas it should have a meaningful impact on the power gamers' level of satisfaction. Given below are the reported player satisfaction levels for each session for each group.

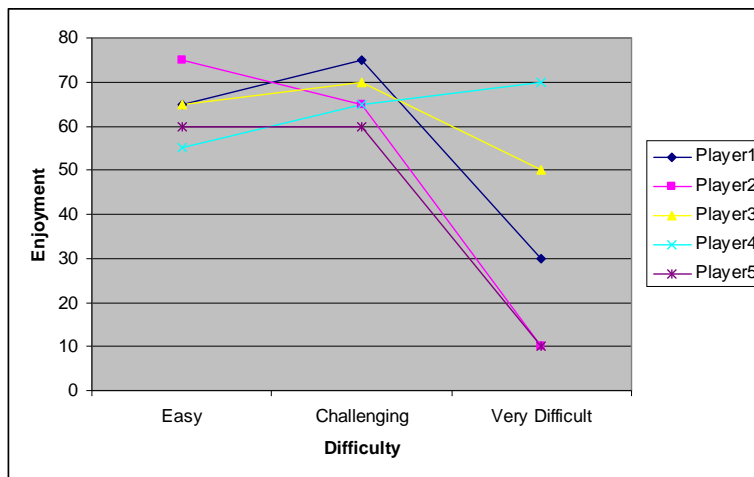


Figure 5: Player satisfaction vs. encounter difficulty – role-players

The reported level of satisfaction for role-players did not change significantly between easy and challenging sessions. They were more interested in the geography and visual appearance of the environment, and quite capable of handling easy and challenging monsters. However, their degree of satisfaction was quite low when they played the very difficult session because the group was easily annihilated by the monsters in their first encounter. They describe their emotions as “frustration”, “misery”, and “boredom”. The one that reported a high degree of satisfaction stated that outer planes were dangerous places to roam and very few adventurers should survive in these hostile environments. From a role-playing perspective, he found the very difficult encounters believable and enjoyable, even if his character faced a quick and gruesome death at the end. All players commented that it was an interesting and sensuous gaming experience for them to adventure on different planes of existence, regardless of the difficulty of encounters.

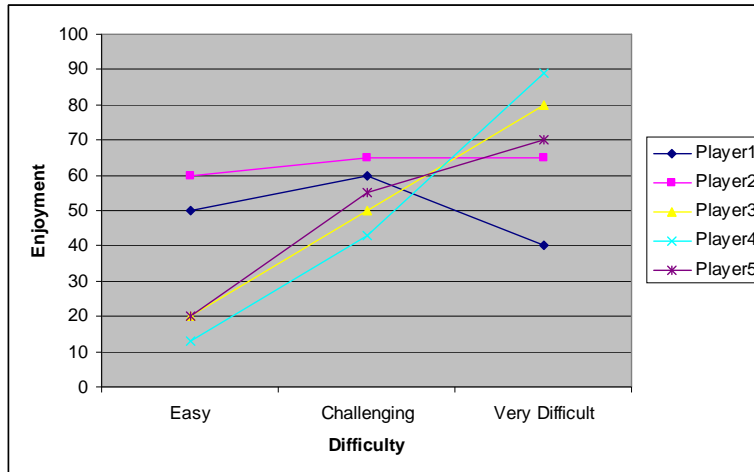


Figure 6: Player satisfaction vs. encounter difficulty – power gamers

Power gamers showed an expected increase in satisfaction as the difficulty of the encounters increased. They were more interested in coming up with possible defensive and offensive strategies, arguing about the possible weaknesses and attack routines of the monsters lurking in the planes. Their degree of satisfaction was quite low when they played the easy session because the monsters were not even a match for them. After the session, they all commented that encounters in the planes should not be too easy. Their level of satisfaction was higher on challenging encounters but they describe their emotions after the very difficult session as “triumph”, “jubilation”, and “euphoria”. It took them all their resources, spells and magical items to prevail in the very difficult encounters but they all managed to survive in the end. The only player who reported a low level of satisfaction in the very difficult session was the mage of the party, who found it very difficult to bypass the immunities and magical resistances of the formidable monsters and felt himself pretty useless (associated emotions of “despair” and “defeat”) during combat.

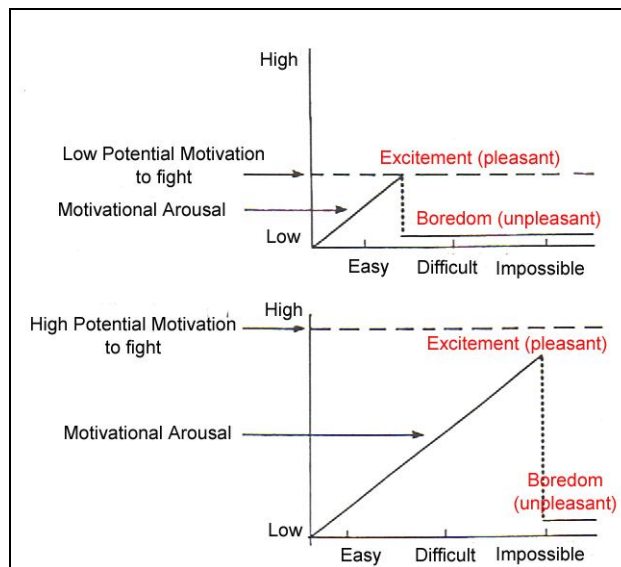


Figure 7: Motivational arousal under different levels of task difficulty
Adapted from Pervin, 1989, p. 171

Player satisfaction under different difficulty levels shows a similar structure to the motivational arousal under different levels of task difficulty. Role-players have a lower potential motivation to engage in battle, whereas power gamers have a higher potential. Motivational arousal is thought to be a function of instrumental difficulty. It increases with the perceived difficulty of motive satisfaction up to the point at which either potential motivation is reached or motive satisfaction is perceived as impossible, and beyond this point motivational arousal should be low (Pervin, 1989). According to

reversal theory (Apter, 1981), low arousal (role-players) with unpleasant hedonic tone (failure to defeat enemies or death) results in boredom and high arousal (power gamers) with pleasant hedonic tone (success in defeating enemies) results in excitement.

Conclusion

Maximizing enjoyment in computer games is possible by optimizing gaming challenges and adjusting difficulty levels, but it should not be forgotten that player psychology is also affected by personal factors such as needs, motives and goals, as by situational factors such as opportunities and possible incentives provided by the environment (Bostan, 2009). Although they are not the only criteria for an optimum gaming experience, gaming challenges and difficulty levels are an integral and crucial part of the process. Keeping the pace of a game moving and keeping it fun can be achieved by uniformly adjusting gaming challenges. Thus, keeping in mind different play styles and player types, computer games should provide various challenges that should be achievable, adjustable, consistent, and believable. The case study in this article also shows that different levels of difficulty are interpreted in different ways if the players have different styles of play.

Game designers can adjust the difficulty of a game dynamically or they can leave the choice to players, providing static difficulty levels. These two techniques can be applied separately or jointly, but the most important design issue is keeping the game believable. To achieve believability, designers should consider three qualities: agency, consistency and fidelity (Kamal, 2003). Players should see the results of their decisions and choices in a meaningful way (agency) and given the same circumstances, actions or choices should lead to the same sort of behavior (consistency). And the level of realism that a simulation presents (fidelity) should be high enough to make these adjustments believable. Challenges should also be in harmony with the feel and pace of the game, and the players should be encouraged to face opponents that match their skills and resources. The difficulty curve of the AD&D may be used as a reference for game studies, and the Challenge Rating and Encounter Level systems of AD&D are innovative game mechanics that act as an auto-control mechanism, forcing the players to engage in encounters that are neither too easy nor too difficult for them.

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