

Flow in Games: Proposing a Flow Experience Model

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ABSTRACT

When discussing fun in games, one will ultimately have to discuss the matching of skills and challenges as proposed in Csikszentmihalyi's flow theory, an influential concept in game design. In this position paper, I want to give a brief overview of flow theory and its application in game research, as well as propose a model for further discussion that synthesizes common streams in game flow research. I hope this synthesis will be challenged and can serve as a discussion point for flow theory and player experience in games.

Author Keywords

Player Experience, Flow, Gameflow, Model Proposition.

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INTRODUCTION

Much what can be read in the modern game design literature about creating games that are “fun to play” can be attributed to an idea of mastering the skills necessary to play a game well [3]. Fundamentally, games are considered most fun if we feel that we are making meaningful decisions and that we are facing increasing challenges that will allow us to learn and train skills [10]. This concept is called flow. It was first introduced by Csikszentmihalyi [5] based on studies of intrinsically motivated behaviour of artists, chess players, musicians and sports players. This group was found to be rewarded by executing actions *per se*, experiencing high enjoyment and fulfilment in the activity itself. Csikszentmihalyi describes flow as a peak experience, the “holistic sensation that people feel when they act with total involvement” [5]. Thus, complete mental absorption in an activity is fundamental to this concept, which ultimately makes flow an experience mainly elicited in situations with high cognitive loading accompanied by a feeling of pleasure. According to Nakamura &

Csikszentmihalyi [12], we can find common conditions that need to be met when entering flow. For example, in a game the following requirements should be met for flow to exist:

- A player performs a challenging activity that requires them to train a skill.
- This activity provides clear and close goals with immediate feedback about progress.
- The outcome of the activity is uncertain, but is directly influenced by player actions.

It seems that some of the core requirements of flow are also requirements of good game design. For example, to sustain interest in a game, it provides immediate clear goals, such as levels or missions, and high scores, health bars or life indicators. This allows players to evaluate individual progress. In addition, player actions directly and visibly impact the game world (e.g. pressing a button triggers shooting a weapon), a concept that has been labeled “effectance” [9, 15]. The following section will present concepts of flow theory in game research. These concepts will be framed in light of emotional and cognitive factors of gameplay experience.

Csikszentmihalyi's Flow

Given that an individual is in a situation where all prerequisites for flow are present, it is possible to enter flow [12] as having the following components:

1. Concentration focuses on present moment.
2. Action and consciousness merge.
3. Self-awareness is lost.
4. One is in full control over one's actions.
5. Temporal perception is distorted.
6. Doing the activity is rewarding in itself.

Since the original description of flow was held very general to be applied to a number of activities, game researchers have revisited the original components and redefined them for the analysis of digital games.

JONES'S FLOW FOR GAME-BASED LEARNING

Jones [8] adjusted flow theory for use in game research and, for example, uses it for understanding engaging computer-based learning environments.

1. Facing a task that can be completed. Game levels provide small sections of missions and tasks, which

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make up the entire task of the game.

2. Player is able to concentrate on a single task from multiple tasks in a game. In digital games, convincing worlds are created that draw users in.
3. Tasks in the game have clear goals. Clear goals can be survival, collecting or gathering objects, or solving a puzzle.
4. Game tasks provide immediate feedback on progress. This relates to subjectively felt immediate effectance in games, e.g. clicking mouse triggers a shot, which hits enemy/monster to cause damage or exterminate.
5. Players feel deeply and effortlessly involved in the game. Game environments are far removed from individual realities. It is interesting to note here that this description only accommodates the notion of deep involvement, but gives no indication how this should be effortless.
6. Exercising a sense of control over the game world. Mastering game input and controls of the game.
7. Concern for self disappears during flow experience in a game session. Representation (e.g. death in game is different from death in real life), game problem (e.g. the level of challenge), and control over game systems (e.g. mastering input schemas) collaboratively cause this.
8. Sense of time duration is altered during play. People stay up all night to play games.

Elements (2) and (5), as well as elements (7) and (8) significantly overlap in their manifestations in games [4]. Element (1) should only be restricted the amount of aspiration a player has to play a certain game (i.e., by a player's internal motivation to complete a game task, not by external factors like game level structure). Cowley et al. [4] also criticize that immediate feedback in games must be suitably patterned for a player to comprehend the information presented by the game world. Thus, although effectance is certainly a driver for game enjoyment [9], as a factor of flow in games, feedback must be presented in a manner that accounts for cognitive, attentional capacities of players.

COWLEY'S RESTRUCTURED FLOW IN GAMES

Cowley et al. [4] also present an updated mapping of flow elements to gameplay elements:

1. Game should feature challenging, but controllable tasks to complete. This is meant to account for the complete gameplay experience including elements of social interaction.
2. Players experience full immersion in the task. High motivation for playing is to feel immersed in a game, but immersion itself is a concept that is roughly defined [7].

3. Players feel in full control. The positive emotion for feeling control follows from cognitive processes enabling control by developing gameplay competence, understanding interaction semantics, and developing a cognitive script.
4. Players have complete freedom to concentrate on a task. Concentration on a task is nothing more than a persistent shift of attention to this task. Thus, the task must be perceptually incentive.
5. Task has clear unambiguous goals. Missions, plot, levels, quests, and explicit structures allow evaluating success of a gaming session. This relates to the ability of the human brain to only process a limited amount of information at a given time.
6. Game gives immediate feedback on player actions. A game may time the delivery of suitable rewards appropriately.
7. Players are less conscious about time passing. Games should focus on a vicarious, temporally-independent environments, enabling subjective perception of time to be altered.
8. Sense of identity lessens during gameplay, but is reinforced afterwards. Identification with player characters might facilitate cognitive shifts from individual identities to in-game identities [14], allowing for a transfer of empathy and emotion between the virtual identities and the player [1].

When we look at our systematic restructuring of these elements into cognitive and emotional components, we find that cognitive elements are central to describing flow-inducing gameplay. Being able to control a challenging task is largely a cognitive effort, but may contain subtasks that can be matched to schemas known from other game or media interactions or developed by playing the game. The full immersion in the task is largely achieved by mental and sensory loading of a player's cognitive resources. The presence-inducing freedom to concentrate on a task at hand may be guided by a player's motivational state, their gaming environment as well as any emotional disposition that they might have developed during prior exposure to playing games.

In contrast to this, the focus on clear goals is largely a game design effort to support cognitive processing of in-game information, by dividing gameplay elements into groups and clusters that can be mentally processed by players. The temporal distortion of flow in games depends on cognitive load and the amount of attentional resources an individual allocates to passage of time [16]. Our brain is diverting all focus and attention to gameplay features, which results in a subjective disconnect from real-world time. Finally, the changed efficacy of players when entering and influencing a game world leads to a lessened sense of individual identity, since this is projected on the representative identity

within the game world. The exerted cognitive effort to sustain a vicarious identity could be mediated by the positive emotion accompanying this identification, partly due to the possibility to engage in actions deviant from and likely impossible in reality. Emotion could be a driver of projective identification in a game.

SWEETSER'S AND WYETH'S GAMEFLOW

Sweetser and Wyeth [13] have developed their own mapping of *GameFlow* criteria for player enjoyment in games. The most significant difference from the other models presented here is that it adds a dimension of social interaction, which is heavily critiqued by Cowley et al. [4], who question whether social interaction needs to be a necessary or desirable part of every game. The *GameFlow* components [13] are:

1. **Concentration** is largely a *cognitive* effort that refers to the allocation of a player's resources of attention and an increase in cognitive, perceptual and memory *workload* [11]. This description is similar to the engagement phase of immersion [2].
2. **Challenge** is connected to both, *cognitive* processing to recognize challenging game problems and to an *emotional* reaction that accompanies challenge as it may be related to prior play experiences that are connected to certain feelings or memories of failure or success. Challenge in gameplay is central in studies of playability, where it is very important to distinguish challenges arising from bad interface and controls from challenges that are part of the game design.
3. **Player skills** relate to learning, development and mastery of a game-related skill set. This is a chiefly a cognitive effort, since it is likely related to the formation of gameplay schemas that are stored in memory and administered to gameplay situations governed by cognitive processes. Thus, the development of basic effective playing skills in the interaction between designed game features and player's *a priori* knowledge can be seen as an important precursor for flow.
4. **Control** again relates to the felt effectance of player action. Thus, while mastering control is a *cognitive* process, control mentioned in this context rather refers to the felt experience of control and is therefore connected to *emotional* evaluation of the cognitive ability to exert game control. This kind of control could then relate to both internal game-challenge oriented control and user-interaction related control.
5. **Clear goals** is connected to a player's ability to have enough mental resources for *cognitively* processing and clustering missions, levels, quests or game sections, so that their progress in the game is always apparent.
6. **Feedback** should be handled by the game to appropriately inform players at all time about their progress. This makes this element overlap with the prior

“clear goals” and if we relate this to *cognitive* capacities of the player, a statement like “avoid cognitive overloading of players” would suffice for both concepts.

7. **Immersion** refers to a game's capability to cognitively absorb players by stressing their mental processing in a way that is still enjoyable. Thus, immersion in this context is *cognitive* immersion, governed by an emotional evaluation that decides how much processing of game information is still pleasant.
8. **Social interaction** is not labelled as an element of flow, but as a strong element of game enjoyment. However, social components are crucial for experience.

In overview, the *GameFlow* model most notably adds the concept of immersion as a component of flow. It is questionable whether human opponents have any influence at all on a player's flow experience and as Cowley et al. [4] note, Csikszentmihalyi's original flow studies already included chess players, so that social interaction may have already been a part of their flow experience.

A SYNTHESIZED FLOW MODEL FOR GAME RESEARCH

Flow Elements	Effectance	Identification	Transportation	Mental Workload
[12]	Action-awareness merging (2), control (4)	Self-awareness lost (3)		Concentration/ focused attention (1), action-awareness merging (2), temporal distortion (5)
[8]	Clear goals (3), feedback (4), control (6)	Self-concern lost (7)	Effortless involvement (5)	Task completion (1), focused attention (2), temporal distortion (8)
[4]	Challenge/ skills for task (1), control (3), clear goals (5), feedback (6)	Identity/ self-awareness weakened (8)	Immersion (2)	Challenge/ skills for task (1), focused attention (4), less temporal perception (7)
[13]	Challenge (2), skills (3), control (4), clear goals (5), feedback (6)		Immersion (7)	Concentration/ focus (1), challenge (2), skills (3)

Table 1. Synthesis of flow models according to their main components into four categories.

The categories of game experiences related or inherent in synthesized flow are the following:

1. **Effectance:** Possibly a very important driver of enjoyment in digital games [9], effectance describes the feeling of empowerment rising in players' when they can witness the impact of their actions. This can be

experienced when challenge of the game match the player's skills, feedback provides immediate information about progress in terms of goals, the interaction semantics of the game system can be mastered. A possibly more complicated mapping is that of action-awareness merging to effectance, but acquisition of gameplay competence can lead to this merging. This is motivated by effectance.

2. **Identification:** The changed perception of identity was noted as important for flow experience, but it might also be related to concepts of escapism and identifying with a character in a game world [1, 6]. The ability to test out other identities in a game might lead to the reinforced return to the own identity after a play session, described as the reinforced sense of identity [4].
3. **Transportation:** This is described mainly as the feeling of immersion in games [4, 13]. However, since immersion itself is ill defined and has been described as a progression [7] rather than a state (potentially leading to the state of presence), a more general description of transportation will be used here. Transportation can account for immersion as the process of transporting the player's mind and for presence as the state of the player's mind as being inside the virtual world.
4. **Mental workload:** Many elements of flow contribute to or result from mental workload of players. The distortion of temporal perception that is witness in flow is likely a result from the loading of players' cognitive resources in a continuous manner during gameplay. The concentration of attention initiates the loading of players' cognitive information processing. Resulting from this intense concentration is the creation of cognitive scripts for developing skills necessary to overcome present challenges.

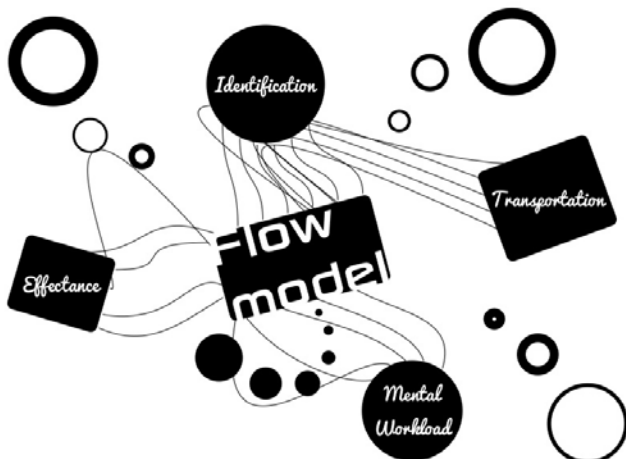


Figure 1. A synthesized Flow model for game research.

CONCLUSION

These four gameplay components (see Figure 1) omit the discussed items *social interaction* [13] and *self-motivation* [12]. The latter can be a result from experiencing either of

the states described above, while social interaction might have an impact on *identification* and *transportation*, since *mental workload* and *effectance* are concepts primarily resulting from the direct interaction of a player with a game system. While this categorization presents a first step toward understanding game experience in more detail, the categories in their current refinement are certainly still very open to interpretation and I hope this approach to synthesizing the flow models in the game research literature will lead to interesting discussions.

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