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# EXAMINATION OF FOUR CHANNELS OF FLOW

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## Abstract

The four channels of flow (Csikszentmihalyi & Csikszentmihaly, 1988) posit that high and low levels of skills and challenges comprise flow, boredom, frustration, and apathy. This theory has been frequently applied to explanation of flow formulation. This theory, however, lacks empirical evidences on if high/low skill/challenge formulates the four channels. Empirical evidence of the formulation of the four channels of flow is necessary for ensuring its validity.

This study thus sampled 253 online gamers to examine whether skills and challenges formulate the four channels of flow. Consistent with the theory of the four channels of flow, this study found that gaming skill is positively related to flow and boredom, whereas negatively related to frustration and apathy. Challenge encountered in gaming is positively related to flow, frustration, whereas negatively related to apathy. However, this study did not observe a theoretical negative relation between challenge and boredom, indicating the necessity for future research.

**Keywords:** flow theory, four channels of flow, skill, challenge, boredom, frustration, apathy.

## Introduction

Csikszentmihalyi & Csikszentmihalyi (1988) proposed the theory of the four channels of flow, encouraging the subsequent studies on flow (Hsu & Lu, 2004; Mathwick & Rigdon, 2004; Teng *et al.*, 2008). This theory posits that highly skilled individuals encountering high challenges will experience flow (the experience in which individuals highly concentrate on activities that are intrinsically enjoyable) (Csikszentmihalyi, 1997). Highly skilled individuals encountering low challenges will experience boredom (unpleasant feeling of lack of interest and concentration on current engaged activities) (Fisher, 1993). Lowly skilled individuals encountering high challenges will experience frustration (the unsatisfying or insecure feeling associated with inability to solve problems and meet needs) (Merriam-Webster Online Dictionary, 2009). Finally, lowly skilled individuals encountering low challenges will experience apathy (the feeling of unconcern, unwillingness to pay attention to certain activities) (Merriam-Webster

Online Dictionary, 2009).

The flow construct has been applied to multiple contexts (Hsu & Lu, 2004; Mathwick & Rigdon, 2004; Teng *et al.*, 2008). The theory of the four channels of flow was also frequently utilized for explaining the formulation of flow. However, this theory needs more empirical evidences that support its validity in multiple contexts. This study thus investigates if skill and challenge create the four channels as the theory states.

## Literature and Hypotheses

Csikszentmihalyi (1975) may be the pioneering work proposing flow, which is a highly enjoyable experience in which individuals concentrate in currently engaged activities. In flow experience, individuals also feel control and intrinsic pleasures (Hsu & Lu, 2004). The flow construct was characterized by eight elements: a clear goal, feedback, challenges that match skills, concentration and focus, control, loss of self-consciousness, transformation of time and the activity becoming autotelic (self-reinforcing). (Csikszentmihalyi, 1997).

Flow has received plenty of attentions, partly because of its positive influences on individual intention and behavior. Individuals experience ultimate happiness when they experience flow (Csikszentmihalyi, 1997; Chen, Wigand, & Nilan, 1999) that strongly motivates them to repetitively engage in the associated activities (Chung & Tan, 2004). In marketing terms, flow may improve user loyalty (Choi & Kim, 2004; Teng *et al.*, 2008).

The literature on flow has identified skill and challenge as two prominent antecedents of flow (Hoffman & Novak, 1996; Skadberg & Kimmel, 2004). Skill refers to the capability to engage in current activities (Novak, Hoffman, & Yung, 2000) and challenge indicates the competition and obstacles encountered in activities (Rollings & Adams, 2003). Skill may come from the accumulation of gaming knowledge and familiarity. Challenge may come from the uncertainty and suspense. The suspense in online games is a driver of online game enjoyment (Klimmt, Rizzo, Vorderer, Koch, & Fischer, 2009).

The four channels of flow have three other channels except for flow, that is, boredom, frustration, and apathy. The theory of the four channels of flow (Csikszentmihalyi &

Csikszentmihalyi, 1988) has also predicted their formulation. Basing on this theory, this study developed the specific hypotheses that describe their formulation.

Flow is an experience of total concentration and intrinsic enjoyment (Csikszentmihalyi, 1997) and skill is the capability to engage in current activities (Novak, Hoffman, & Yung, 2000). High skills thus enable individuals to overcome or resolve the difficulties, creating intrinsic enjoyment. High skills may thus foster flow, consistent with the literature on flow (Hoffman & Novak, 1996; Skadberg & Kimmel, 2004; Teng *et al.*, 2008).

Boredom is the unpleasant feeling of lack of interest and concentration (Fisher, 1993). Highly skilled individuals may regard themselves as experts who know everything, reducing their interests. Highly skilled individuals may also feel themselves top experts and thus lose concentration, boosting their feeling of boredom.

Frustration indicates the unsatisfying or insecure feeling associated with inability to solve problems and meet needs (Merriam-Webster Online Dictionary, 2009). Lowly skilled individuals are likely blocked by difficulties or obstacles and left their achievement needs unmet, increasing their feeling of frustration.

Apathy refers to the feeling of unconcern, unwillingness to pay attention to certain activities (Merriam-Webster Online Dictionary, 2009). Lowly skilled individuals lack sufficient capabilities to attain achievements, which discourage them to further concern or attend to the associated activities, that is, create the feeling of apathy.

**H1: Skill is (a) positively related to flow, (b) positively related to boredom, (c) negatively related to frustration, and (d) negatively related to apathy.**

Challenge is the competition and obstacles encountered in activities (Rollings & Adams, 2003). Challenge thus may inspire individuals to win in competitions and to overcome obstacles for attaining a sense of achievements. For winning in competitions and overcoming obstacles, individuals are forced to concentrate to fully display their capabilities. The elevated concentration is a key element creating flow (Csikszentmihalyi, 1997). Thus high challenges are likely associated with a high likelihood of experiencing flow.

Challenges inspire individuals to win and to overcome obstacles. Individuals are thus motivated to have interests in understanding what can lead to victory, reducing their boredom. Contrary, challenges are obstacles that may be too tough to be overcome, preventing achievement need satisfaction of users and increasing frustration.

Finally, challenges involve competitions in which individuals are invited to win, attracting attentions or reducing feeling of apathy.

**H2: Challenge is (a) positively related to flow, (b) negatively related to boredom, (c) positively related to frustration, and (d) negatively related to apathy.**

## Method

Cross-sectional design was utilized. This study used a web form for collecting data. This study chose to survey online gamers. Totally 309 online gamers participate in this study and 253 returned usable responses, yielding an effective response ratio of 81.9%.

Items measuring skill, challenge, and flow were modified from Novak *et al.* (2000). Items measuring boredom, frustration, and apathy were developed basing on the scales of Kozma and Stones (1980) and Kammann and Flett (1983). All items involve a response option ranging from 1: very disagreeable to 5: very agreeable.

Items measuring each construct had a Cronbach's  $\alpha > .68$ , a composite reliability (CR)  $> .69$ , and an average variance extracted (AVE)  $> .45$ , indicating the tolerable reliability, basing on the criteria of Bagozzi and Yi (1988). All except one item measuring boredom had indicator loadings  $> .59$  and  $t$  values  $> 5.16$ , satisfying the convergent validity criteria of Anderson and Gerbing (1988). Squared correlations between any pair of constructs exceeded AVE of related constructs, meeting the discriminant validity criterion of Fornell and Larcker (1981).

## Results

Of the participants, 64% were male, 82% had attended to colleges or universities, and 45% had monthly income  $> \$100$  US. Participants had played online game for 15.2 months in average.

This study utilized structural equation modeling techniques to test hypotheses. Testing results indicated that skill was positively related to flow and boredom (path coefficient  $> .14$ ,  $p < .05$ ), supporting H1a and H1b. Skill was negatively related to frustration and apathy (path coefficient  $< -.22$ ,  $p < .05$ ), supporting H1c and H1d.

Challenge was positively related to flow and frustration (path coefficient  $> .13$ ,  $p < .05$ ), supporting H2a and H2c. As hypothesized, challenge was also negatively related to apathy (path coefficient =  $-0.42$ ,  $p < .05$ ), supporting H2d. This study did not observe a negative relation between challenge and boredom (path coefficient =  $-0.01$ ,  $p > .05$ ). Potential explanation is that new challenges surely reduce boredom. Existing

challenges, however, may increase boredom, offsetting the hypothesized negative relation between challenge and boredom.

This study further elucidates the mechanism of the formulation of the four channels. Skill and challenge may independently contribute to the formulation of the four channels, or interactively contribute to their formulation.

This study thus employed analysis of variance (ANOVA) to test the interaction of skill and challenge on the four channels. This study utilized median split method to separate the sample into high-skill, low-skill, high-challenge, and low-challenge groups. The factors high vs. low skill and high vs. low challenge were employed as independents. Flow, boredom, frustration, and apathy were utilized as dependents.

Analytical results did not observe any significant interaction of skill and challenge on four channels ( $F(1, 249) < 1.29, p > .26$ ). Such phenomenon supported that skill and challenge contributed to the four channels independently, rather than interactively.

### Conclusions

This study initiated to examine the formulation of the four channels of flow, supporting the validity of the theory of four channels of Csikszentmihalyi & Csikszentmihalyi (1988). Most of this theory was supported by the empirical data obtained from online gaming contexts. One exception was observed that challenge is not significantly related to boredom, encouraging future investigations.

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### References

- [1] Anderson, J. C., & Gerbing, D. W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin*, 103(3), 411-423.
- [2] Bagozzi, R. P., & Yi, Y., (1998). On the evaluation of structural equation models. *Journal of the Academy of Marketing Science*, 16(1), 74-94.
- [3] Chen, H., Wigand, R. T., & Nilan, M. S. (1999). Optimal experience of Web activities. *Computers in Human Behavior*, 15, 585-608.
- [4] Choi, D., & Kim, J. (2004). Why people continue to play online games: In search of critical design factors to increase customer loyalty to online contents. *CyberPsychology & Behavior*, 7(1), 11-24.
- [5] Chung, J., & Tan, F. B. (2004). Antecedents of perceived playfulness: An exploratory study on user acceptance of general information- searching websites. *Information & Management*, 41(7), 869-881.
- [6] Csikszentmihalyi, M. (1975). *Beyond boredom and anxiety*. San Francisco, CA: Jossey-Bass.
- [7] Csikszentmihalyi, M., & Csikszentmihalyi, I.S. (1988). *Optimal Experience: Psychological Studies of Flow in Consciousness*, Cambridge: Cambridge University.
- [8] Csikszentmihalyi, M. (1997). Happiness and creativity: Going with flow. *Social Report on Happiness*, 31(5), 8-12.
- [9] Fisher, C. D. (1993). Boredom at work: A neglected concept. *Human Relations*, 46, 395-417.
- [10] Fornell, C. & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement errors. *Journal of Marketing Research*, 18(1), 39-50.
- [11] Hsu, C.-L., & Lu, H.-P. (2004). Why do people play on-line games? An extended TAM with social influences and flow experience. *Information & Management*, 41(7), 853-868.
- [12] Kammann, R., & Flett, R. (1983). Affectometer 2: A scale to measure current level of general happiness. *Australian Journal of Psychology*, 35, 259-265.
- [13] Klimmt, C., Rizzo, A., Vorderer, P., Koch, J., & Fischer, T. (2009). Experimental evidence for suspense as determinant of video game enjoyment. *Cyberpsychology & Behavior*, 12(1), 29-31.
- [14] Kozma, A., & Stones, M. J. (1980). The measure of happiness: Development of the Memorial University of Newfoundland Scale of Happiness (MUNSH). *Journal of Gerontology*, 35, 906-912.
- [15] Mathwick, C., & Rigdon, E. (2004). Play, flow, and the online search experience. *Journal of Consumer Research*, 31, 324-332.
- [16] Merriam-Webster Online Dictionary (2009). Frustration and apathy. Retrieved on July 5th, 2009.
- [17] Novak, T. P., Hoffman, D. L., & Yung, Y.-F. (2000). Measuring the customer experience in online environments: A structural modeling approach. *Marketing Science*, 19(1), 22-42.
- [18] Rollings, A., & Adams, E. (2003). *Andrew Rollings and Ernest Adams on game design*. Indianapolis, IN: New Riders.
- [19] Skadberg, Y. X., & Kimmel, J. R. (2004).

- Visitors' flow experience while browsing a web site: Its measurement, contributing factors and consequences. *Computers in Human Behavior*, 20(3), 403-422.
- [20] Teng, C.-I., Huang, L.-S., Jeng, S.-P., Chou, Y.-J., & Hu, H.-H. (2008). Who are loyal customers in online games? Paper presented at the meeting of 2008 International Consortium for Electronic Business, Waikoloa, Hawaii.