Modeling the Structure of the Flow Experience Among Web Users

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1) The Flow Construct

The *flow* construct (Csikszentmihalyi 1977) has recently been proposed by Hoffman and Novak (1996) as essential to understanding consumer navigation behavior in online environments such as the World Wide Web. Previous researchers (e.g. Csikszentmihalyi 1990; Ghani, Supnick and Rooney 1991; Trevino and Webster 1992; Webster, Trevino and Ryan 1993) have noted that flow is a useful construct for describing more general human-computer interactions. Hoffman and Novak define flow as "the state occurring during network navigation which is: 1) characterized by a seamless sequence of responses facilitated by machine interactivity, 2) intrinsically enjoyable, 3) accompanied by a loss of self-consciousness, and 4) self-reinforcing." To experience flow while engaged in an activity, consumers must perceive a balance between their skills and the challenges of the activity, and both their skills and challenges must be above a critical threshold. Hoffman and Novak (1996) propose that flow has a number of positive consequences from a marketing perspective, including increased consumer learning, exploratory behavior, and positive affect.

Despite its obvious relevance to computer-mediated environments, flow has proven to be an elusive construct to define. Appendix A provides definitions of flow from 16 different studies. As one reads through this list, the phrases listed make intuitive sense, for example: flow is "a holistic sensation where one acts with total involvement, with a narrowing of focus of attention." However, the exercise of reading through these phrases in an attempt to define flow can be frustrating. One is not left with a central definition of flow, but rather a wide variety of constructs which may be experienced when one experiences flow. Some of these constructs define or cause flow, and some of these are experienced as a result of being in the flow state. Hoffman and Novak (1996) propose, for example, that centering of attention is a necessary antecedent of flow, as are congruent skills and challenges above a critical level.

Consider two definitions that have been proposed by Trevino & Webster (1992) and by Csikszentmihalyi & Csikszentmihalyi (1988). Trevino and Webster (1992) operationally define flow as the linear combination of four characteristics: control, attention, curiosity, and intrinsic interest. But, it is not clear why these four characteristics should be used. Do these define flow, or are they better thought of as its antecedents or consequences?

A second definition, from Csikszentmihalyi & Csikszentmihalyi (1988) is quite different, focusing upon the congruence of a person's skills in a given activity, and their perceptions of the challenges of the activity. The definition also states that there is a critical value that skills and challengers must be above. Thus, it is not simply enough to require that skills and challenges are congruent; they must also be high. This is different than many early definitions of flow in terms of skills and challenges, which considered low skill and low challenge activities (take bubble gum chewing as an extreme example) to also produce flow (Csikszentmihalyi 1977).

In Hoffman and Novak (1996), flow is defined in terms of the *experience* of flow (intrinsic enjoyment, loss of self-consciousness), *behavioral properties* of the flow activity (seamless sequence of responses facilitated by interactivity with the computer and self-reinforcement), and its *antecedents* (skill/challenge balance, focused attention, and telepresence). We retain such a framework in this paper, as we attempt to model the *structure* of the flow experience. This structure is composed of:

- The core *experience* of flow;
- Close *correlates* of the flow experience, such as playfulness;
- *Antecedents* of flow, including skill, challenge, interactivity, focused attention, arousal, telepresence;
- *Consequences* of flow, including positive affect, exploratory behavior, and control.

The objective of this modeling exercise is twofold: 1) establish a base of empirical support for the theoretical construct of flow in computer-mediated environments; and 2) demonstrate its utility for understanding consumer navigation in online commercial environments. The research has significance for both academic marketing scientists and industry practitioners interested in the commercialization of the World Wide Web. For example, knowledge of the relationship between the antecedents and consequences of flow may lead to better Web site design.

In this abstract, we first discuss a series of conceptual models of flow, and its antecedents and consequences. We then describe two studies, both involving questionnaires administered as Web fillout forms. We discuss the constructs measured in the first study, which fits structural equation models to provide a preliminary evaluation of Hoffman and Novak's (1996) conceptual model of flow. Based upon results from the first study, the questionnaire was revised, and data collection for the second study was completed on November 17, 1997. The second study represents work in progress, which will be completed by February 1997. In this abstract, we identify the constructs measured in the second study, and describe the base models to be tested.

2) Conceptual Models of Flow

Flow Channel Segmentation Models.

Flow channel segmentation models are based upon Csikszentmihalyi's definition of flow in terms of skills and challenges. However, the segmentation models attempt to account for all possible combinations (channels) of high/low skills and challenges. Underlying all of the flow channel segmentation models is the central role of skill and challenge as predictors of flow. We present two simple models. The early three channel model shown in Figure 1 identified flow as congruent skills and challenges, both high and low. Anxiety is identified as high challenges and low skills, and boredom as high skills and low challenges.

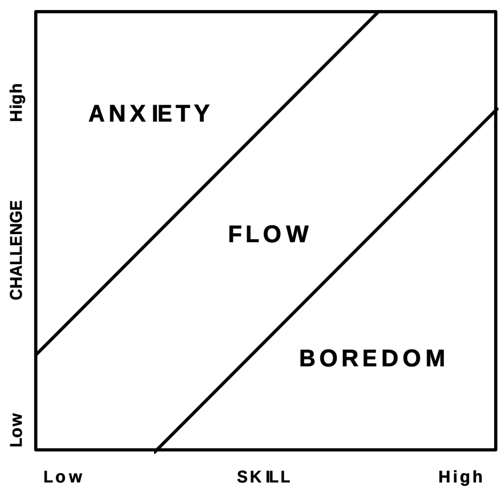

Figure 1 - Three Channel Flow Model

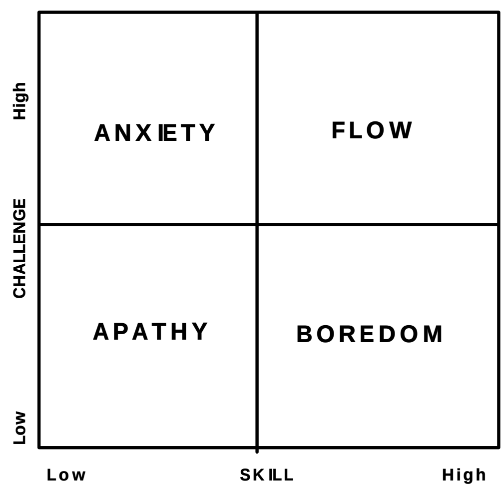

Figure 2 - Four Channel Flow Model

Greater empirical support has been found for the reformulated four channel model shown in Figure 2, where flow is defined as high skills and high challenges, and apathy as low skills and low challenges. Numerous researchers (e.g., Ellis, Voelkl & Morris 1994; LeFevre 1988; Nakamura 1988; and Wells 1988) have found clear patterns of differences among the four "flow segments."

A natural extension of the four channel model is the eight channel model (Massimini & Carli 1988; Ellis, Voelkl & Morris 1994), which also allows for intermediate (moderate) levels of skills and challenges, and identifies four additional channels: arousal, control, relaxation, and worry. As the arousal/relaxation distinction is collinear with challenge, and the control/worry distinction is collinear with skill, the eight channel model does not provide any additional information that allows one to predict flow, over and above the four channel model based upon skill and challenge.

Causal Models.

Causal models fit by various researchers have incorporated skill, challenge and additional constructs related to flow. Ghani, Supnick & Rooney (1991) found that control and challenge predicted flow, which was operationalized by four items for enjoyment and four for concentration. Control and flow predicted exploratory use, which in turn predicted extent of use. In a later study, Ghani and Deshpande (1994) included skill as well as challenge. The resulting causal model is simple, but quite interesting, in that skill leads to control which leads to flow. Skill also directly affects flow, as does perceived challenge. This model provides empirical support for definitions of flow that specify that flow occurs when challenges and flow are both high, since skill and challenges independently contribute to flow. A third causal model was fit by Trevino and Webster (1992). A different operational definition of flow is used in this research, consisting of four items measuring control, attention focus, curiosity, and intrinsic interest. Skill was measured, but not challenges. Ease of use was identified as an intermediate variable between skill and flow.

One difficulty with the above research is the operational definition of flow. Constructs of enjoyment, concentration, control, attention focus, curiosity and intrinsic interest are used to define flow, rather than being considered as potential antecedents or consequences of flow.

Hoffman and Novak's (1996) Conceptual Model of Flow.

A general conceptual model of flow in computer-mediated is described in detail by Hoffman and Novak (1996). Key features of this model are that flow is determined by high skills and challenges and focused attention, and is enhanced by interactivity and telepresence. A simplified version of Hoffman and Novak's conceptual model is shown in Figure 3.

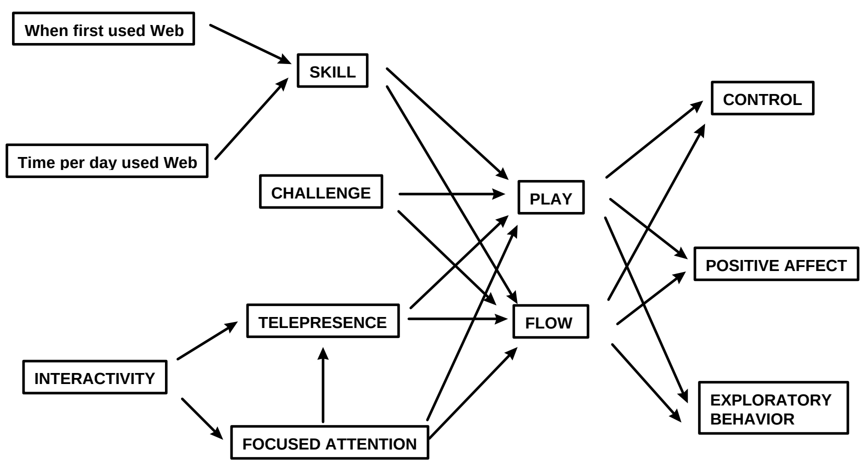

Figure 3 - Hoffman and Novak's (1996) Conceptual Model of Flow

In Figure 3, we indicate the construct of *play* as a parallel measure of *flow*. Control in Figure 3 refers to Azjen's (1988) construct of *perceived behavioral control*, and is indicated as a consequence, rather than antecedent, of flow. Two additional variables, when the respondent first reported using the Web, and the amount of time per day the respondent reported using the Web, are included as predictors of skill.

3) Study 1: Preliminary Evaluation of Hoffman & Novak's (1996) Conceptual Model of Flow

Questionnaire Development and Data Collection

Our objective was to develop a comprehensive instrument for measuring the constructs discussed in the conceptual model from Hoffman and Novak (1996). The process of questionnaire development involved a) construction of a preliminary questionnaire based upon a literature review; b) a series of four pretests; and c) the final field survey. We describe each in turn.

Preliminary Questionnaire. Based upon the 16 studies in Appendix A, a comprehensive list of 100 items was compiled that have been previously used to measure the following constructs: flow, skill, challenge, control, attention focus, concentration, telepresence, curiosity, intrinsic interest, extrinsic interest, play/fun, affect, activation, ease of use, self-reinforcement, interactivity, self esteem, outer structure of task, and performance.

Pretesting. A series of four pretests was conducted over a four month period, which drew from and refined the items from the preliminary questionnaire. The major objective of the pretests was to refine items used to measure skills and challenges for using the Web, plus other constructs from the conceptual model shown in Figure 3.

Final Survey for Study One. The final survey consisted of 77 items, and was administered as a Web fillout form[1] on the Project 2000 Web server, which was posted from April 10 to May 10, 1997 in conjunction with the 7th WWW User Survey fielded by the Graphic, Visualization, and Usability Center (GVU) at the Georgia Institute of Technology[2]. Respondents who registered to participate in the 7th WWW User Survey were given a unique identifying code, and were presented with an online list of 13 different surveys, including our survey, which they could potentially fill out.

The GVU WWW User Survey employs non-probabilistic sampling and self-selection (GVU 1997), and is therefore not representative of the general population of Web users. Comparison with population projectable surveys of Web usage (e.g. Hoffman, Kalsbeek and Novak 1996) shows the GVU User Survey sample to contain more long-term, sophisticated Web users than the general population. Participants were solicited by announcements placed on Internet-related newsgroups, banner ads placed on specific pages on high exposure sites (e.g. Yahoo, Netscape, etc.), banner ads randomly rotated through high exposure sites (e.g. Webcrawler, etc.), announcements made to the www-surveying mailing list maintained by GVU, and announcements made in the popular media.

19,970 respondents filled out at least one of the 13 surveys that comprised the 7th WWW User Survey, and 4,550 filled out the Project 2000 survey. Of the 4,550 respondents, we retained 4,232 for analysis purposes, eliminating 318 respondents who:

- had more than 5 of 77 items missing (135 respondents)
- had constant responses throughout (i.e. all 1's or all 7's, only 2 respondents)
- did not have a valid GVU identifying code (17 respondents)
- had strong evidence of responding randomly to survey items by either a) responding with all 5's to one of two sets of semantic differential items, or b) by having large variability (top 5%) on summed rating skills for flow, play, and challenge (164 respondents).

Appendix B details the individual items used in our structural equation models. While the process of model fitting resulted in eliminating some items not shown in Appendix B, space in this abstract does not permit a full discussion of the process of fitting the structural equation models

[1] http://www2000.ogsm.vanderbilt.edu/gvusurvey/project2000.gvu.html
[2] http://www.gvu.gatech.edu/user_surveys/survey-1997-04/

Structural Equation Model Results

Test of Hoffman and Novak's (1996) Conceptual Model. A random sample of 572 respondents with complete survey data was selected as a calibration sample for model development purposes[3]. The covariance matrix of the items listed in Appendix B (plus when the respondent first used the Web and time per day spent using the Web) was input to EQS for Windows, version 5.5 (Bentler 1995) to test the model diagrammed in Figure 3.

As in Figure 3, *flow* and *play* were treated as separate latent factors, with identical antecedents and consequences assumed. Figure 4 presents a simplified representation of the EQS solution, showing the significance of the path coefficients among each of the latent factors in the model. The path coefficients from the latent factors to the measured variables (items shown in Appendix B), and error or disturbance terms that predict the latent factors beyond the observed variables are not shown.

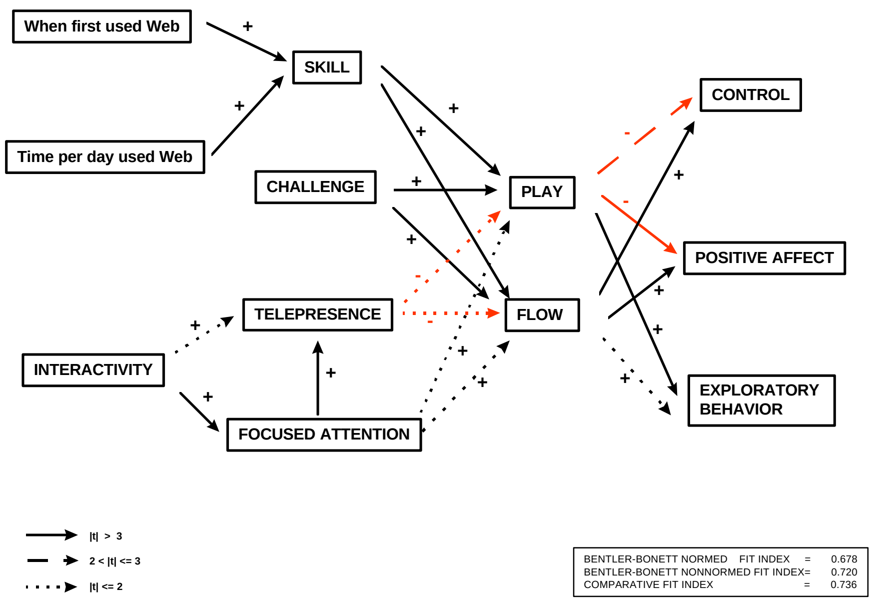

Figure 4 - EQS fit to Hoffman and Novak's (1996) Conceptual Model

The model converged in 32 iterations; however model fit is not good. The CFI (comparative fit index), plus the Bentler-Bonett Normed/Nonnormed Fit Indices, tell us how well this solution represents the covariance matrix of all of the variables used in the model. The CFI should be around .9 for a good fit (Bentler 1992) - here it is .736, indicating that the model does not fit as well as we would like.

In addition, a number of the paths are not significant (dotted lines) and some paths are negative. For example, play seems to lead to lower control and positive affect. Focused attention and telepresence do not seem to predict flow or play. The role of flow and play in the model do not seem to be the same. Thus, the model as it stands requires some modification.

Revised Conceptual Model. We next fit a series of exploratory structural equation models, in an attempt to identify a reasonable, good-fitting model, and uncover obvious problems with our model. We used the Lagrange multiplier tests and the largest residuals to identify potential paths to include in the model, and

[3] Initially, a second survey was not planned. However, as we examined the results of our initial analysis of the first survey, we decided it would be beneficial to refine the measure of our constructs and collect additional survey data. Thus, the models from the first survey have not been fit to the holdout sample from study one. In study two, we will independently develop models with a new calibration sample, and test these models in a holdout sample from study two.

Wald tests to identify potential paths for deletion. A conservative approach was taken, in which only a small number of paths were added/deleted at each of six total revised models. Certain latent variables - skill, challenge, interactivity, telepresence, arousal, and focused attention - were always assumed to antecedents (and never consequences) of flow. Other latent variables - positive affect and exploratory behavior - were always assumed to be consequences (and never antecedents) of flow. The role of control was unclear, as the role of perceived behavioral control in Hoffman and Novak's (1996) conceptual model conflicts with the role of control as an antecedent of flow in other research. Thus, we allowed control to be either an antecedent or consequence of flow. Play, while initially hypothesized to function identically to flow, was also allowed to be an immediate antecedent of flow.

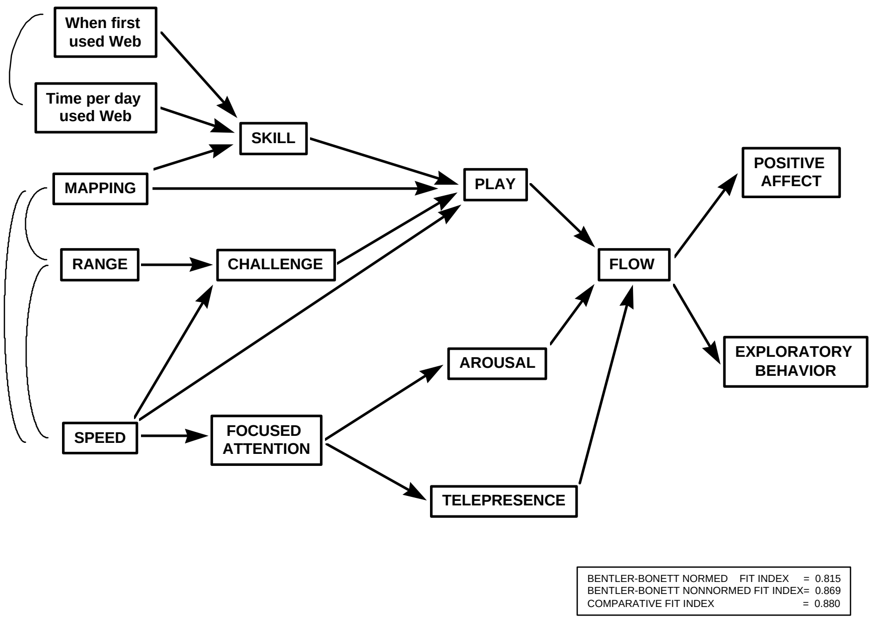

Figure 5 - Revised Conceptual Model

Given the above restrictions, Figure 5 presents the final revised conceptual model. The CFI is quite good, at .88. In many ways, this revised model is quite consistent with our original model, but it differs in a number of interesting ways:

- We had to remove control from the model. The observed variables which were our indicators of the latent construct for control exhibited significant correlations with virtually all other latent constructs in the model. Removing control improved the model fit.

- Each of the three components of interactivity (speed, range, and mapping) are somewhat correlated, but impact different constructs:

    a) Speed affects challenge, play, and focused attention
    b) Range (the number of actions available at a given time) affects challenge
    c) Mapping (the naturalness of the interaction) affects play and perception of skill

- Skill and challenge lead directly to play, rather than to flow.

- Focused attention leads to arousal and telepresence, which both lead to flow.

- Positive affect and exploratory behavior are outcomes of flow (not play).

4) Study 2: Research in Progress

Constructs to be Measured

We chose to field a second survey for a variety of reasons. First, the coefficient alphas for a number of our scales were close to or less than .6 (Appendix B, see interactivity, focused attention, relaxation/arousal, exploratory behavior, and control). As noted, the *control* construct was removed from our final model. In the first study, our intention was to capture the control vs. worry and arousal vs. relaxation distinction of eight channel flow models. Due to the low coefficient alpha, and the improvement noted by not including our measure of control, we chose to repeat the survey using established scales for control and arousal (Mehrabian and Russell 1974; Havlena and Holbrook 1986). At the same time, to facilitate comparison with previous research, we substitute these authors' scale for positive affect for the scale used in our first study.

We originally conceptualized interactivity as unidimensional, with three categories of items defined by Steuer (1992). However, our revised model suggested interactivity was best thought of as three separate components, so we modified our original interactivity items to include two items for speed, range, and mapping.

While alphas for telepresence and exploratory behavior were between .6 and .7, we modified items for these scales in hopes of obtaining increased reliability for these measures. And, while alpha for flow vs. apathy was .722 (3 items), we were concerned about the face validity of two of the measures **-** "active vs. passive" and "the Web challenges my capabilities to their limits vs. I don't use the Web much and don't care to." The former item does not capture the essence of flow, any more than it does interactivity. The latter is accurate, but too closely tied to the construct of challenge.

Finally, our original survey instrument included a set of items that were discarded (these items dealt with comparing unipolar and bipolar measures of the eight channel flow model). This allowed us to incorporate items for additional constructs that have been hypothesized to relate to flow: time distortion, involvement (importance), and optimum stimulation level. Items for skill, challenge, and playfulness were left unchanged. Table 1 summarizes the constructs and existing sources, if any, used in the second survey.

Data Collection

The second survey consisted of 75 items, and was administered as a Web fillout form which was posted from October 10 to November 17, 1997 in conjunction with the 8th WWW User Survey fielded by the Graphic, Visualization, and Usability Center (GVU) at the Georgia Institute of Technology. In five weeks, 2206 completed surveys were received. The number of responses to our second survey was less than the first survey, because of increased difficulty in obtaining free banner advertising on major Web sites to promote the survey. The same procedures used in the first study to discard respondents with a high proportion of missing data, or respondents who appear to be responding randomly, will be applied to the second survey.

Table 1 - Constructs Measured in Second Survey

Construct:	Source:
Skill	4 items used in 7th GVU Survey
Challenge	4 items used in 7th GVU Survey
Playfulness	7 items from Webster and Martocchio (1992)
Focused Attention	4 items from Ghani and Deshpande (1994)
Interactivity*	6 items, based upon Steuer (1992) and modified from 7th GVU Survey items, with two items measuring constructs of speed, mapping, and range.
Telepresence*	4 items, based upon Steuer (1992) and modified from 7th GVU Survey items.
Time Distortion*	2 items (not included in 7th GVU Survey)
Arousal*	4 items from Mehrabian and Russell (1974) used by Havlena and Holbrook (1986)
Positive Affect*	4 items from Mehrabian and Russell (1974) used by Havlena and Holbrook (1986)
Control*	4 items from Mehrabian and Russell (1974) used by Havlena and Holbrook (1986)
Involvement (importance)*	5 items from McQuarrie and Munson (1991)
Flow*	4 items modified from 7th GVU Survey
Exploratory Behavior*	8 items, modified from Baumgartner and Steenkamp (1996)
Optimum Stimulation Level (OSL)*	7 items from Steenkamp and Baumgartner (1995)

* items were either not included in 7th GVU Survey or were substantially modified

Base Models To Be Tested

The data will be split into calibration and holdout samples, and as before, Hoffman and Novak's (1996) conceptual model of flow shown in Figure 3 will be fit. Based upon our prior results, we do not anticipate adequate fit of this model. Consequently, a new base model, shown in Figure 6, will be fit.
This base model includes five second-order latent factors, specified by the constructs skill/control, challenge/arousal, play/flow, telepresence/time distortion, and consequences of flow (positive affect and exploratory behavior). If the fit of the base model in Figure 6 is not adequate, we will engage in a series of exploratory structural equation models to identify a good-fitting model that is consistent with theory.

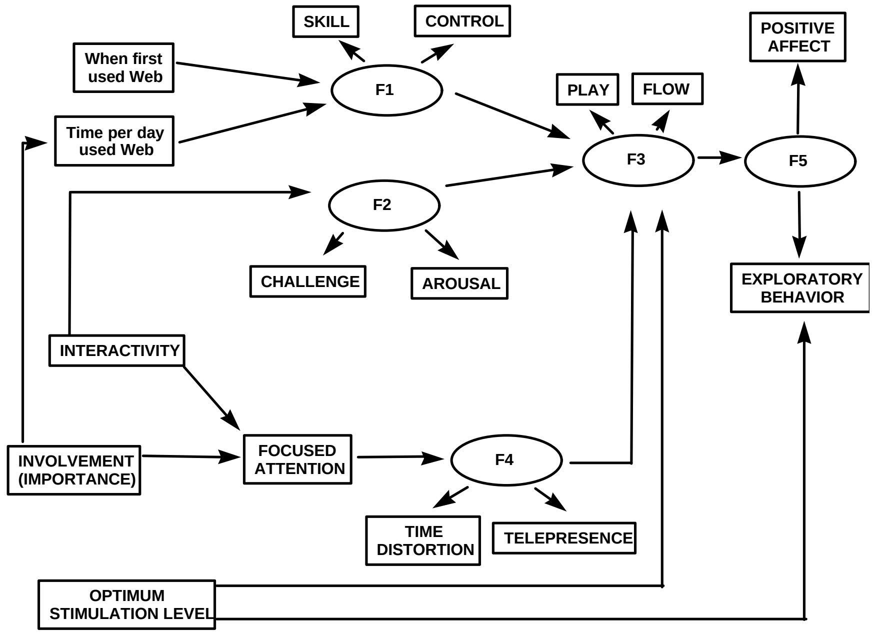

Figure 6 - Base Model for Study Two

Figure 7 specifies a somewhat more complex conceptual model, which will be used to provide guidance in additional model -fitting. The primary difference between Figure 6 and Figure 7 is a more detailed specification of the relationships among skill, challenge, control, arousal, play and flow. Due to the complexity of the conceptual model, and the key role of these six constructs, we plan on modeling the relationships among these six constructs separately, as well.

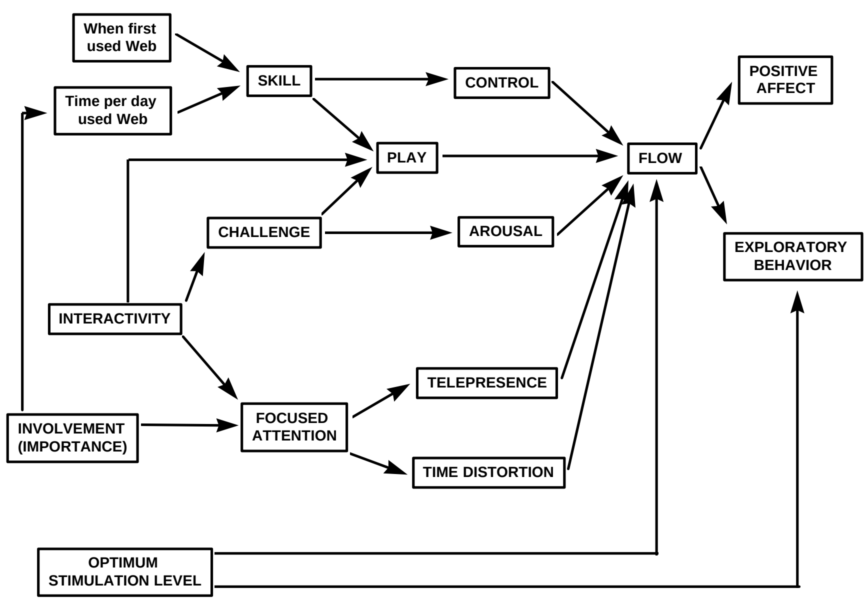

Figure 7 - More Complex Conceptual Model for Study Two

In our completed manuscript, we will provide theoretical motivation for the relationships in Figures 6 and 7, in terms of a series of hypotheses to be tested. It is our hope that this research will result in a more comprehensive understanding of the nature of the flow experience than has been provided by previous research. While our application is to users of the Web, the results will also be of interest to those researchers studying flow in other settings.

Appendix A - Definitions of Flow

Reference:	Conceptual or Operational Definition:
Csikszentmihalyi (1977)	"the holistic sensation that people feel when they act with total involvement" (p36) when in the flow state "players shift into a common mode of experience when they become absorbed in their activity. This mode is characterized by a narrowing of the focus of awareness, so that irrelevant perceptions and thoughts are filtered out; by loss of self-consciousness; by a responsiveness to clear goals and unambiguous feedback; and by a sense of control over the environment...it is this common flow experience that people adduce as the main reason for performing the activity" (p72)
Privette and Bundrick (1987)	"Flow..., defined as an intrinsically enjoyable experience, is similar to both peak experience and peak performance, as it shares the enjoyment of valuing of peak experience and the behavior of peak performance. Flow *per se* does not imply optimal joy or performance but may include either or both." [p316]
Csikszentmihalyi and Csikszentmihalyi (1988)	"The flow experience begins only when challenges and skills *are above a certain level,* and are in balance." [p260]
Mannell, Zuzanek, and Larson (1988)	"Csikszentmihalyi (1975) describes the flow experience as 'one of complete involvement of the actor with his activity' (p. 36), and he has identified a number of elements that are indicators of its occurrence and intensity. These indicators include: the perception that personal skills and the challenges provided by an activity are imbalance, centering of attention, loss of self-consciousness, unambiguous feedback to a person's actions, feelings of control over actions and environment, and momentary loss of anxiety and constraint, and enjoyment or pleasure." [p291] "Flow was operationalized by measuring the affect, potency, concentration, and the perception of a skill/challenge balance ." [p292]¨
Massimini and Carli (1988)	congruent skills and challenges that are above each subject's average weekly levels
LeFevre (1988)	"a balanced ratio of challenges to skills above average weekly levels" (p307)
Csikszentmihalyi and LeFevre (1989)	"When both challenges and skills are high, the person is not only enjoying the moment, but is also stretching his or her capabilities with the likelihood of learning new skills and increasing self-esteem and personal complexity. This process of optimal experience has been called flow."
Csikszentmihalyi (1990)	we feel "in control of our actions, masters of our own fate...we feel a sense of exhilaration, a deep sense of enjoyment" (p3) "the state in which people are so intensely involved in an activity that nothing else seems to matter; the experience itself is so enjoyable that people will do it even at great cost, for the sheer sake of doing it."
Ghani, Supnick and Rooney (1991)	"two key characteristics of flow: the total concentration in an activity and the enjoyment which one derives from an activity...the precondition for flow is a balance between the challenges perceived in a given situation and skills a person brings to it" (p230) "a related factor is the sense of control over one's environment" (p231)

Trevino and Webster (1992)	"flow characterizes the perceived interaction with CMC technologies as more or less playful and exploratory"..Flow theory suggests that involvement in a playful, exploratory experience - the flow state - is self-motivating because it is pleasurable and encourages repetition. Flow is a continuous variable ranging from none to intense." [p540] "Flow represents the extent to which (a) the user perceives a sense of control over the computer interaction, (b) the user perceives that his or her attention is focused on the interaction, © the user's curiosity is aroused during the interaction, and (d) the user finds the interaction intrinsically interesting.." [p542]
Webster, Trevino and Ryan (1993)	"the flow state is characterized by four dimensions...(a) the user perceives a sense of control over the computer interaction, (b) the user perceives that his or her attention is focused on the interaction, © the user's curiosity is aroused during the interaction, and (d) the user finds the interaction intrinsically interesting. [p413]
Clarke and Haworth (1994)	"the subjective experience that accompanies performance in a situation where the challenges are matched by the person's skills. Descriptions of the feeling of 'flow' indicate an experience that is totally satisfying beyond a sense of having fun." [p511]
Ellis, Voelkl and Morris (1994)	"..an optimal experience that stems from peoples' perceptions of challenges and skills in given situations. Situations in which challenges and skills are perceived to be equivalent are thought to facilitate the emergence of such indicators of flow as positive affect and high levels of arousal, intrinsic motivation, and perceived freedom" [p337]
Ghani and Deshpande (1994)	"The two key characteristics of flow are (a) total concentration in an activity and (b) the enjoyment which one derives from an activity...There is an optimum level of challenge relative to a certain skill level. ...A second factor affecting the experience of flow is a sense of control over one's environment." [p383]
Lutz and Guiry 1994	"Psychologists use the term 'flow' to describe a state of mind sometimes experienced by people who are deeply involved in some event, object or activity...they are completely and totally immersed in it...Indeed, time may seem to stand still and nothing else seems to matter while engaged in the consump†ion event." [from respondent instructions]
Hoffman and Novak (1996)	"the state occurring during network navigation which is 1) characterized by a seamless sequence of responses facilitated by machine interactivity, 2) intrinsically enjoyable, 3) accompanied by a loss of self-consciousness, and 4) self-reinforcing"

Appendix B - Survey Items From Study One

SKILL	
I am very skilled at using the Web. I consider myself knowledgeable about good search techniques on the Web. I know less about using the Web than most users. (-) I know how to find what I want with a search engine.	alpha = .864 (4 items)
CHALLENGE	
Using the Web challenges me. Using the Web challenges me to perform to the best of my ability. Using the Web provides a good test of my skills. I find that using the Web stretches my capabilities to the limits.	alpha = .876 (4 items)
PLAYFULLNESS	
I feel unimaginative when I use the Web. (-) I feel flexible when I use the Web. I feel unoriginal when I use the Web. (-) I feel uninventive when I use the Web. (-)	alpha = .782 (4 items)
INTERACTIVITY (SPEED)	
When I use the Web there is very little waiting time between my actions and the computer's response. Interacting with the Web is slow and tedious. (-)	alpha = .712 (2 items)
INTERACTIVITY (MAPPING)	
Navigating the Web with today's Web browsers is: unnatural vs. natural. Interacting with the Web is: intuitive vs. unintuitive. (-)	alpha = .508 (2 items)
INTERACTIVITY (RANGE)	
The number of different ways that one can interact with the Web today is limited. (-)	
FOCUSED ATTENTION	
I think about other things when I use the Web. (-) When I use the Web I am totally absorbed in what I am doing. I can be easily distracted when I use the Web. (-)	alpha = .638 (3 items)
TELEPRESENCE	
I feel I am more in the "computer world" then the "real world" around me when I use the Web. I forget about my immediate surroundings when I use the Web. I feel like I am in a "virtual reality" when I use the Web.	alpha = .692 (3 items)
RELAXATION vs. AROUSAL	
calm vs. excited stimulated vs. relaxed (-) alert vs. soothed (-)	alpha = .531 (3 items)
APATHY vs. FLOW	
"in flow" vs. apathetic (-) the Web challenges my capabilities to their limits vs. I don't use the Web much and don't care to. (-) active vs. passive (-)	alpha = .722 (3 items)
POSITIVE AFFECT	
happy vs. sad (-) irritable vs. cheerful friendly vs. hostile (-) lonely vs. sociable	alpha = .831 (4 items)
EXPLORATORY BEHAVIOR	
usually: browse or explore without a specific goal in mind vs. have a specific goal in mind (-) I like to experiment when I use the Web. I enjoy browsing the Web to see what is out there. I like to click on a link just because it looks interesting.	alpha = .638 (4 items)
WORRY vs. CONTROL	
worried vs. in control clearly know the right things to do vs. feel confused about what to do (-) frustrated vs. not frustrated	alpha = .664 (3 items)

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