Optimal experience of Web activities

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Abstract

This paper reports on Web users’ optimal flow experiences (Csikszentmihalyi, 1975b) in the Web environment. The concept of flow was employed to see if there were some positive aspects of Web experiences that could be linked to theory applied to other media and then incorporated into Web design to enhance its utility to users. The notions of the Web as a ‘multi-activity medium’ and a view of the Web as a ‘situated experience’ are proposed and verified in this study in order to demonstrate evidence of flow phenomena in the Web environment. Further, in order to overcome methodological hurdles inherent in previous studies, this study employed content analytic procedures to analyze open-ended questionnaires to directly elicit 304 Web users’ perceived flow experiences on the Web. Results of this study provide baseline data on the existence of the flow phenomenon in the Web environment, such as factors and conditions associated with the flow experience, causes of Web users’ perceived challenges and controls, and Web users’ flow feelings and enjoyments. This study also establishes the groundwork for building a situational measuring instrument which may be used to identify Web users’ flow experience for further exploration. We conclude that the concept of flow is a fruitful area for research that aims at improving Web design practice. The data suggest that additional research under more rigorous methodological conditions can further specify the factors and conditions associated with flow experiences on the Web. © 1999 Elsevier Science Ltd. All rights reserved.

Keywords: Optimal flow experiences; Web design; Content analytic techniques

1. Introduction

Some of the recent research on the World Wide Web (hereafter, Web) suggests that the Web is associated with negative experiences such as addiction behavior (Young, 1998) or destructive forces upon psychological well-being (Kraut et al.,
Given the relative newness of the Web, we feel that most of the activities of current users are necessarily constrained by design and use approaches that have been carried over from publishing and broadcasting media. Rogers (1983) has shown that in virtually any kind of technology adoption period, innovators basically do what they are used to doing but employ the emerging technology. It is not until the second half of the adoption period that adopters begin to take advantage of the technology’s unique characteristics. We believe that research attention to some of the positive experiences associated with Web activities, if linked to research on existing theory from other media, will facilitate design approaches that will help to shorten the adoption period for the Web so that its unique interactive communication characteristics can be more productively employed by users.

We have chosen Csikszentmihalyi’s concept of flow as a possible theoretic foundation for looking at Web experiences because the concept has been fruitfully employed in other areas. Here we argue that the best way to explore Web users’ flow experiences is to view the Web as a multi-activity medium. Our primary justification for this view is that the Web is not a monolithic phenomenon and we would not expect to find evidence of flow experiences present in a variety of all Web activities. Our general question is: In which activities do we see evidence of flow and what are the factors and conditions associated with these activities?

Researchers have suggested that the Web is an activity that can facilitate the occurrence of flow (Chen, Wigand & Nilan, 1998; Hoffman & Novak, 1996; Novak, Hoffman & Young, 1998). The concept of flow refers to those optimal, extremely enjoyable experiences when an individual engages in an activity with total involvement, concentration and enjoyment, and experiences an intrinsic interest as well as a sense of time distortion during his/her engagement. As a result, when an activity produces such enjoyable experiences, even without any extrinsic motivation or material reward, individuals are willing to duplicate their experience whenever possible. Today, people frequently report their Web use behavior with the phrases describing “an absorbed interest”, “a feeling of discovery”, “immersed pleasure”, and “time going very fast”. If we could design Web activities that facilitated these perceptions, Web content would improve significantly over what exists today.

The virtual hypermedia environment of the Web incorporates interactivity with both people and computers and possesses unique characteristics which distinguish it from the physical world (Hoffman & Novak, 1996). The interactivity, involvement, and its distinction from everyday activity may provide Web users with an environment to experience flow.

As the content and format of the Web evolves, this virtual hypermedia environment involves more and more serious functions among its diverse activities. The Web is turning into an environment which involves different activities, such as entertainment, exploration, communication, knowledge and learning. We argue that this virtual hypermedia environment is a multi-activity medium and many of the activities focus on interactive communication among users.

Given that we view the Web as a multi-activity medium, in the following sections we argue two additional points. First, the traditional way of measuring the flow state through matched challenges and skills does not accommodate the unique
features of the Web as a multi-activity medium. A serious measurement problem would exist if we simply replicated the methods employed in previous studies. Second, flow on the Web should not be limited to a single dimension of interactivity by employing a static view of Web activities—navigation, surfing and hyperlinks. Taking this view, which suggests the importation of thinking relevant to earlier media, may fail to explain some Web flow activities and flow phenomena.

Methodologically, this study explores those factors and conditions associated with the flow activities in the Web environment without adopting constraints from publishing, broadcasting, or interactive gaming. This is consistent with our overall goal of trying to link users’ experiences on the Web with an existing theoretical base. Second, this study will attempt to establish the groundwork for a more robust and practical research instrument for further exploration of the Web.

1.1. Optimal flow experience

In the literature, flow, or optimal experience, is comprised of nine characteristic dimensions (Csikszentmihalyi, 1990, 1993). In this section we categorize these nine dimensions into three stages: antecedents, experiences, and effects. In the latter part of this section we focus on antecedents, the perquisite conditions of flow on the Web, and the condition that is likely to be affected by Web designers.

Flow is used to describe the best feelings (Csikszentmihalyi, 1975b) and the most enjoyable experiences possible in human lives as “the bottom line of existence” (Csikszentmihalyi, 1982, p. 13). By definition, flow is a psychological state in which an individual feels cognitively efficient, motivated, and happy (Moneta & Csikszentmihalyi, 1996, p. 277). When in the flow state, people become absorbed in their activities, while irrelevant thoughts and perceptions are screened out. If flow were absent in humans’ experience “there would be little purpose in living” (Csikszentmihalyi, 1982, p. 13).

Flow has been conceptualized as an optimal experience that stems from people’s perceptions of challenges and skills in given situations. Csikszentmihalyi (1975b, p. 50) referred to the flow state as a situation where the perceived challenges of an activity are matched by the person’s perceived skills. At a given moment, individuals are aware of a certain number of opportunities challenging them while they assess how capable they are to cope with the challenges. If the challenges of an activity are beyond the individual’s skill level, demanding more than the individual can handle, a state of anxiety ensues. On the contrary, when the challenges are lower than the individual’s skill level, boredom, not flow, may be the result. Situations in which challenges and skills are perceived to be equivalent are thought to facilitate the emergence of flow. However, when challenges and skills are perfectly balanced but an individual’s perceived challenges are less than his/her day-to-day experience and an individual’s skills are underutilized, he might feel apathy, not flow; i.e. reaching the flow state requires a balance between a high level of challenge perceived in a given situation by an individual and a high level of skills an individual brings to that situation. Fig. 1 shows these dynamic relationships between challenges and skills.
In Fig. 1, flow is characterized by a match between perceived challenges and perceived skills. Whether one is in flow or not does not depend upon an objective view of the challenges posed by an activity nor an objective view of the skills a person has. Rather, it is solely determined by the individual’s perceived state of how challenges and skills match each other (Csikszentmihalyi, 1975b, p. 50). Therefore, over time, the same activity may make a person feel anxious one moment, bored the next, and in a state of flow immediately afterward.

According to Moneta and Csikszentmihalyi (1996), flow theory has two distinctive features. The first is that the function for the optimization of experience is defined on two entirely subjective experiential variables: challenges and skills. The second is that the hypothesized function of the individual’s experience with the activity does not have a maximum or equilibrium point. Flow theory assumes no limit because through flow experiences, individuals conduct a continuous search for greater complexity and greater enjoyment.

1.2. Flow dimensions and flow stages

Csikszentmihalyi (1975b, 1993) summarized those factors related to flow experiences into nine dimensions: (1) clear goals; (2) immediate feedback; (3) personal skills well suited to given challenges; (4) merger of action and awareness; (5) concentration on the task at hand; (6) a sense of potential control; (7) a loss of self-consciousness; (8) an altered sense of time; and (9) experience which becomes autotelic. These nine dimensions have become important determinants of flow, in part because they clearly point out those factors relating to internal experience and external environmental factors, including the dynamic linkage and interaction between a task and a person’s motivation and ability.
These nine dimensions can be categorized into three stages: antecedents, experiences and effects. The antecedent stage includes the perceptions of clear goals, immediate feedback, and matched skills and challenges. This stage describes the qualifying factors of the activity itself for reaching the flow state (i.e. clear goals and immediate feedback), and the prerequisites (i.e. matched challenge and skill levels) for provoking the emergence of the optimal experience.

The second stage, experiences, is comprised of the merger of action and awareness, concentration, and a sense of potential control. This stage describes those characteristics which are perceived during the flow state.

The final stage, effects, includes loss of self-consciousness, time distortion, and experience which becomes autotelic. This stage describes an individual's inner experience, focusing on the effects after entering the flow state.

In the Web environment, the antecedents stage suggests the pre-conditions for a Web activity (clear goals and immediate feedback) and the pre-existing capacity of a Web user (skills required to match perceived challenges). On one hand, in order for a Web activity to facilitate the occurrence of flow, this activity should provide a relatively clear goal. A person cannot become immersed in an activity if s/he does not know what s/he wants to achieve eventually or how to assess his/her own performance (Csikszentmihalyi, 1988a, p. 32). The activity itself must provide clear rules for the person to follow and offer a goal for the person to pursue. In addition, this Web activity must provide enough information in real time or near real time for the person to recognize his/her current status, such as how much s/he has achieved, how well s/he has progressed, or how the activity is proceeding. According to the theory, if these pre-conditions do not exist, it is unlikely that a Web user would experience flow in that Web activity.

On the other hand, a Web user's pre-existing capacity (skills) required to engage in a Web activity is related to the complexity and dynamics of the activity itself. In order for a Web user to reach his/her optimal experience on the Web, the perceived skill level should be in equilibrium with the challenge level provoked by the activity. In addition, to reach the flow state, an activity should provide its users with varied and controllable challenges commensurate with the users' skills levels, and the complexity of that activity should not be easily exhausted.

Therefore, we argue that in order for a person to experience flow on the Web, an activity should include the following qualifying factors:

1. it must provide immediate feedback;
2. it must offer clear rules allowing Web users to follow, and clear goals to pursue;
3. it must provoke enough complexity which should not be easily exhausted; and
4. it must create dynamic challenges, not static ones.

1.3. Web as a multi-activity medium

The Web represents a rich interactive environment that transcends traditional media like publishing, broadcasting, and gaming. The significant technology is much more the networks behind the Web pages than either the browsers or the computers
employed or the content being moved about. Therefore, we feel that the Web should not be viewed as a single-dimension activity as most traditional media are viewed. In this section we first define the concept of Web as ‘multi-activity medium’ and then explain why an exploratory study into the flow phenomenon on the Web is needed.

Using the Web as a major resource for information seeking and problem solving is just part of what the Web is capable of facilitating. For example, today a Web browser can read and send e-mail, retrieve and post in newsgroups, download and upload files, create or play games, broadcast or receive broadcasting, listen to audio clips or create audio clips, create movies or watch video clips, and chat with friends or converse verbally via Internet telephony. The activities in the Web environment can no longer be defined as merely ‘navigating via hyperlink’, ‘surfing on the Net’, or ‘searching for information’. There are many possibilities on the Web that involve new creative, communicative and collaborative activities. This makes the range and perception of challenges and skills inherent to theoretical formulations of flow different in different situations—the combinatorial possibilities are not well understood yet and we do not want to limit the possibilities. The following examples demonstrate how perceived challenges and skills situate in time and space:

1. The function of reading/sending e-mail via Web browsers offers Web users a new communication style. Usually, the challenges provoked and skills needed are relatively low and it is not likely to generate an optimal experience. However, the activity of reading intriguing e-mail or replying to debate e-mail which provokes creative thinking may easily create a flow experience.
2. When a Web user chats with other Web users via Internet Relay Chat (IRC), s/he could experience flow through the intense and interesting interactions. In this case, if we want to identify the match between perceived challenges and required skills, the answer is probably not related to the Web technology itself or to the chatting environment but to the behavior of interacting with others.
3. When a Web user, who has used the Web environment for years, tries to locate needed information via browsing and search engines, s/he may still feel challenged in part due to his/her unfamiliarity with the topic. In this example, the feeling of challenge actually is not related to search engines or Web environments but to the user’s situated movement bounded by time and space. The challenges are perceived as the gap between his/her situation and his/her goal (see Dervin & Nilan, 1986, for a discussion of situationality in information seeking and use).

The meaning of ‘challenges and skills’ on the Web is necessarily situated in time and space, dependent on what it is that the user is doing and the goal(s) that s/he is pursuing. We believe that any exploratory study into the flow phenomenon in the Web environment should be conducted with caution due to our limited understanding of the interaction between flow dimensions and Web activities. During the last decade, more and more researchers with a variety of backgrounds have sought to apply the flow construct to different activities. Following the popularity of the Web in the late 1990s and its tremendous potential to business and marketing,
researchers (Chen et al., 1998; Hoffman & Novak, 1996; Novak, Hoffman & Yung, 1998) have started shifting their focus to the flow phenomenon in the Web environment. However, since applying the flow construct to the Web is a new research issue and not much has been done, there is a need to establish some groundwork before any further steps are taken.

As pioneers of flow studies on the Web, Hoffman and Novak (1996, 1997) provided a conceptual framework for applying the flow construct to the Web but did not verify their flow model through empirical processes until recently (Novak et al., 1998). In their recent survey of Web users, they employed 13 constructs measured by 75 items which were operationalized via nine-point Likert scales and semantic differential scales in a structural equation model. Two thousand and thirty-seven respondents of the eighth WWW User Survey (GVU, 1997) successfully filled out their questionnaire. From their analysis, they declared that flow can be defined as a set of directed relationships among 12 unidimensional constructs (i.e. importance, skill, challenge, interactive speed, arousal, playfulness, positive affect, exploratory behavior, time distortion, OSL (optimum stimulated level), focused attention, and an unknown construct) and three Web usage variables (i.e. years of using the Web, time of using the Web, and expected use in the coming year). They reported in their study that the role of skill in Web use and the challenges presented by that use were key antecedents of flow experiences. The study also reported that skill, challenge, and focused attention may lead to the consequences of positive affect, more exploratory behavior on the Web, and greater expected Web use in the future.

We have several concerns with this study. First, the concept of flow was not operationalized as a situated experience. Instead, they studied Web users’ flow experience as a general experience of Web users. The respondents in their study could report any Web use experience they had before. Second, they did not operationalize the concepts of perceived challenges and skills as dynamic counterparts to each other. Instead, static views were used to define skills as the ability to use the Web and browsers, and challenges as the feelings of challenge felt by Web users. Third, measuring the same individual repeatedly at different times would provide the optimal approach to studying experience characterized by perceived conditions. The quality of the data and the amount of insight provided by a single questionnaire may not provide enough data for researchers to explore subjects’ inner world over time, as Novak et al.’s (1998) study used a one-shot survey.

Similarly, in the study conducted by Chen et al. (1998), by employing the experience sampling method (ESM) (Larson & Csikszentmihalyi, 1983) in the Web environment, they had problems with the operational definitions of flow dimensions due to their limited understanding of flow dimensions of a multi-activity medium like the Web. Their data were collected from 100 individual students in a northeastern university who were using the Web as part of their day-to-day experience. Subjects browsing on the Web in the computer clusters during the research period were asked to participate in this study. A computer application was developed and installed onto subjects’ computer. Subjects then continued their navigation behavior as usual. With a random schedule ranging from 5 to 7 min, a questionnaire popped up on
their computer screens asking subjects questions regarding their situational experiences at that specific moment. A total of 201 data points were collected for this study. Whether subjects were in the flow state or not was determined by the differences between challenges and skills perceived in each situational moment. Chen et al. (1998) asserted that they had demonstrated that flow is an optimal experience in Web navigation and the flow construct is a useful and practical tool to understand users’ perceived experience. By employing the ESM technique, Chen and his colleagues were able to tap into Web users’ subjective experiences situated in time and space.

We feel that both the conceptual and methodological approaches employed in these two studies illustrate the need to deal with the nature of flow experiences in the Web environment in a valid and reliable manner, as characterized by the nature of the Web itself and the theoretic foundation for the flow phenomenon. In this regard, we see this study as an exploratory study which is attempting to generate some basic description of the flow phenomenon consistent with prior theoretical work.

1.4. Research questions

We feel we need to enhance our understanding of the flow experience on the Web in the context of its ‘multi-activity’ nature. In their conceptual paper of flow on the Web, Hoffman and Novak (1996) suggested that flow activity on the Web is a seamless sequence of responses facilitated by interactivity with the computer and self-reinforcement. However, we feel that this is too narrow a view.

According to flow theory, flow can occur when an activity challenges an individual enough to encourage playful, exploratory behaviors without the activity being beyond the individual’s reach. This suggests that to understand the flow experience in the Web environment, we should first seek the challenges Web users perceive and the skills Web users employ. Unfortunately, challenge and skill are extremely complex variables. Past operationalizations of flow have employed measures that ask subjects about ‘challenges’ they perceive and their ‘skills’ in meeting and overcoming the challenges. We think that these operationalizations are unlikely to be understood by subjects in all but the most mundane activities (e.g. playing a physical sport), thereby generating unreliable definitions. Further, because the Web is a multi-activity environment which is very complex, subjects’ interpretations of ‘challenges’ and ‘skills’ are likely to be even more confused. Given the central role of challenges and skills in the conceptualization of flow, we feel that operational definitions of these concepts are critical to the success of the research enterprise. Therefore, we employed an inductive, descriptive approach by asking what users experience when in the flow state in the Web environment. Responses to this question, which we feel subjects could respond to more reliably and which was content-analyzed according to the deductive notions of challenge and skill, enabled us to develop more precise and valid operationalizations of these two concepts as one of the products of our effort. A descriptive approach also allowed us to capture the language that users themselves employ to talk about their flow experiences in the Web environment which will help to improve subsequent measures.
By exploring the factors surrounding Web users’ flow experience during Web activities, it then becomes possible to categorize those factors contributing to the occurrence of flow. The knowledge obtained from this study should provide some basis for further exploration of this topic, and will justify the juxtaposition of the Web and the flow construct as a powerful, timely, and fruitful area of inquiry. Therefore, the research questions for this study are:

1. What kinds of Web activities contribute to the occurrence of flow in the Web environment?
2. What kinds of descriptions of flow experiences do Web users report?
3. How do Web users interpret the constructs of ‘challenges’ and ‘sense of control’ in the Web environment? If they understand the terms ‘challenges’ and ‘sense of control’, what are their justifications?
4. Do Web users feel enjoyment through Web activities? What are the sources of enjoyment they report?

2. Methodology

The descriptive methodology employed in this study involved the development of an open-ended survey instrument that allowed a wide sample of Web users to describe their flow experiences in their own terms. We wanted a very diverse range of respondents to insure coverage of the ways that users talk about their flow experiences during their Web-based activities. The unit of analysis in this study is the situated Web use experience encountered by each individual respondent in this study.

2.1. Sample

There are two different kinds of samples in this study. The demographics of the two samples used in this study will be reported in the Results section of this paper. The way we selected samples follows:

1. A convenience sample of Web users was selected from 30 Internet discussion groups. The sample was selected based on three constraints. First, only the most active newsgroups (defined as “more than 1000 posts in 5 days”) were selected. Second, only frequent contributors (defined as “more than three posts in 10 days”) were selected. Third, only those contributors who put their e-mail addresses in their posts were selected. A total of 1200 e-mail addresses were collected from the pool of those persons who met these constraints. The reason for choosing the frequent contributors of the most active newsgroups was to decrease the feeling of intrusion that might ensue by receiving our unsolicited e-mail invitation to participate in the study.
2. In order to increase the diversity of sample used in this study, we subscribed to 20 Internet- or Web-related on-line discussion mailing lists. An e-mail calling for participation was sent to each mailing list. People who were
interested in this study were asked to visit our Web site to fill out the on-line questionnaire.

2.2. Procedures

All communication with respondents was in digital form through the Internet. The survey to the first sample was implemented either by e-mail or by a Common Gateway Interface (CGI) Web fill-out form. An explanation letter was sent to the selected respondents, along with the questionnaire. Respondents could use the “reply” function of their e-mail application to return the questionnaire once finished, or simply visit the researchers’ Web site, which was listed in the e-mail, to fill out the CGI form and submit their results. All data were sent to the researchers either by e-mail or by CGI form from the Web page. To the second sample, only the Web CGI fill-out form was available.

2.3. Questionnaire

The questionnaire consisted of several groups of self-administered questions tapping users’ situated flow experience on the Web, their enjoyment of Web activities, their perceived challenges on the Web, their sense of control, and their perception of time distortion in the Web environment (see Appendix for the entire questionnaire). Since ‘perceived skills’ is the counterpart of ‘perceived challenges’, we believed that once we understand the meaning of challenges to Web users, we can then capture the meaning of skills in the Web environment. Therefore, in this study, only the question of perceived challenges was included in the questionnaire.

Respondents were first asked whether they have ever had an experience in the Web environment as described in three quotations devised by Csikszentmihalyi, (1975b). These descriptions were used because they provide a general description of the phenomenon in non-technical language. These definitions of flow came from the descriptions of prior flow study respondents themselves, and were used in some other studies (Csikszentmihalyi, 1982; Han, 1988; McQuillan & Conde, 1996) to describe the flow phenomenon. Here are the three descriptions, taken from a rock climber, a composer, and a dancer, respectively:

My mind isn’t wandering. I am not thinking of something else. I am totally involved in what I am doing. My body feels good. I don’t seem to hear anything. The world seems to be cut off from me. I am less aware of myself and my problems.

My concentration is like breathing. I never think of it. I am really quite oblivious to my surroundings after I really get going. I think that the phone could ring, and the doorbell could ring, or the house burn down or something like that. When I start, I really do shut out the whole world. Once I stop, I can let it back in again.

I am so involved in what I am doing. I don’t see myself as separate from what I am doing.
If respondents replied “yes” to any of these three quotations, indicating that they have had such experiences on the Web, they were asked to describe the contextual and situational conditions that existed when they encountered these experiences in their Web activities. In order to elicit specific data situated and bounded in a specific time and space (Dervin & Nilan, 1986), this study asked respondents to describe their “last experience”. The questionnaire was designed and structured explicitly to elicit Web users’ flow experiences and those Web activities they were engaged in when the flow state occurred. From the description of users’ contexts and situations, it was possible to elicit which Web activity respondents were discussing. Content analysis of the user descriptions allowed us to characterize factors, activities, etc., that were ‘present’ during respondents’ flow experiences, and allowed us to look for evidence of casual relationships for further research.

2.4. Data collection and coding

The total number of replies received was 327 (111 from the sample of newsgroups, and 216 from mailing lists). After a careful review, 304 valid respondents were retained by eliminating 23 due to duplicate submissions or extensive empty data fields. Data received from the 304 completed questionnaires were compiled using standard qualitative content-analytic techniques to categorize contextual and situational factors as well as conditions relating to flow experiences.

Several content analytic schemes were created to code the Web activity of respondents’ flow experiences. One of the advantages of using content analytic techniques in this study was the ability to inductively categorize contextual and situational factors and conditions relating to flow in the Web environment. The other, of course, was to enable respondents to describe their experiences in their own words rather than to reply to forced choice questionnaire items. To determine coding reliability, all content analytic schemes were independently coded by two trained coders, who were graduate students in the field of information science. Inter-rater reliabilities were calculated for each content analysis scheme and are listed in Table 1. Although content analysis reliability coefficients reported in refereed journals regularly fall as low as 0.85 (or 85% agreement between two coders), we set our minimum reliability at 0.90.

3. Results

In general, as expected, respondents identified several different kinds of Web activities where flow experiences were reported. The activities associated with flow tended to be associated with communication or interaction as well as information retrieval. Most of the challenges were not associated with the hardware or software that enables Web use but rather were associated with the situational conditions inherent in the respondents’ interests and goals.
3.1. Demographics

Since the sample of this study was selected from the pool of newsgroups and mailing lists, it probably does not adequately represent the whole range of Web users. In this study, about 50% of the respondents reported 12 hours or more of Web use each week. Compared to the results of the Graphic, Visualization, and Usability (GVU) Center’s WWW users survey in April 1998, our respondents have a higher educational background than average Internet and Web users, probably due to their intellectual interests in reading and posting in newsgroups (58% of respondents in this study reported a bachelors degree or above vs. 50% in GVU’s study). Further, 76% of respondents reported 2 years or above of Web use experience. Respondents’ age level and gender in this study are similar to users in GVU. About 61% of respondents were 20–40 years old (21–30, 29.9%; 31–40, 30.9%; 41–50, 19.1%) and 66.6% were male while GVU reported 52.6% users were between 20–40 years old and 61% were male.

3.2. Flow experience

Flow experience on the Web does not appear to be an uncommon experience. In our study, 39.8% of respondents \((n = 96)\) reported an experience characterized by at least one of the three flow quotations described above. Among these reports, the two most frequently reported flow symptoms were feelings of inspired involvement (37.5%; e.g. “Just that my whole concentration is focused in what I am doing — I

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<table>
<thead>
<tr>
<th>Question</th>
<th>Definition</th>
<th>Reliability coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow feelings</td>
<td>Determine respondents’ inner experience when in the flow state</td>
<td>0.92</td>
</tr>
<tr>
<td>Flow activities</td>
<td>Determine the type of activity respondents were involved in when reporting a flow state</td>
<td>0.94</td>
</tr>
<tr>
<td>Causes of challenges</td>
<td>Determine the causes of respondents’ feeling of challenge when engaged in the Web activity</td>
<td>0.96</td>
</tr>
<tr>
<td>Activities involved with challenges</td>
<td>Determine the type of activities respondents were involved in when being challenged</td>
<td>0.92</td>
</tr>
<tr>
<td>Causes of control</td>
<td>Determine the causes of the sense of control when engaged in the Web activity</td>
<td>0.90</td>
</tr>
<tr>
<td>Causes of enjoyment</td>
<td>Determine the causes of the enjoyment when on the Web</td>
<td>0.92</td>
</tr>
<tr>
<td>Activities involved with enjoyment</td>
<td>Determine the type of activities respondents were involved in when experiencing enjoyment</td>
<td>0.95</td>
</tr>
</tbody>
</table>
become the words I’m typing or reading.’’) followed by lost self-consciousness (20.8%; e.g. “I become the person I present in the newsgroup, not my ‘real’ self. It’s my other identity.’’) Other reported symptoms included excitement and enjoyment (16.7%), and timelessness (10.4%; e.g. “Time went by extremely fast. Two hours had passed before I had ever realized it. I was shocked that so much time had passed without me being aware of it.’’) (see Table 2 for other inner experiences).

Table 3 reports the content-analytic results of respondents’ reported Web activities when in a flow state. The four most frequently reported Web activities were information retrieval on the Web (60.6%), reading and posting on newsgroups (9.2%), reading and replying to e-mail (8.3%), and creating Web pages (5.5%).

3.3. Challenges and its sources

When asked about perceived challenges, 52.9% (n = 128) of the respondents reported having the perception of positive challenges during their Web use. In the first sample from newsgroups, we offered only “Yes” and “No” options to respondents for the question “Have you ever experienced the feeling of ‘positive challenge’ during your Web navigation?” In the second sample from mailing lists, we added another option, “I don’t understand what ‘positive challenge’ means” to the question. Among those reporting challenges from the first sample, 13.9% of respondents explicitly wrote comments informing us that they did not understand the term “challenge”. In

Table 2
Reports of flow feelings during Web use (n = 96)

<table>
<thead>
<tr>
<th>Flow feelings</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inspired involvement</td>
<td>36</td>
<td>37.5</td>
</tr>
<tr>
<td>Lost self-consciousness</td>
<td>20</td>
<td>20.8</td>
</tr>
<tr>
<td>Exciting; fascinated</td>
<td>16</td>
<td>16.7</td>
</tr>
<tr>
<td>Timelessness</td>
<td>10</td>
<td>10.4</td>
</tr>
<tr>
<td>Peacefulness</td>
<td>3</td>
<td>3.1</td>
</tr>
<tr>
<td>Powerfulness</td>
<td>2</td>
<td>2.1</td>
</tr>
<tr>
<td>Relaxed</td>
<td>2</td>
<td>2.1</td>
</tr>
<tr>
<td>Pleasure</td>
<td>2</td>
<td>2.1</td>
</tr>
<tr>
<td>Others</td>
<td>5</td>
<td>5.1</td>
</tr>
</tbody>
</table>

Table 3
Activities associated with flow during Web use (n = 109)

<table>
<thead>
<tr>
<th>Flow activities</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Researching on the Web; information retrieval</td>
<td>66</td>
<td>60.6</td>
</tr>
<tr>
<td>Reading/replying/debating in newsgroups</td>
<td>10</td>
<td>9.2</td>
</tr>
<tr>
<td>Reading/replying e-mail</td>
<td>9</td>
<td>8.3</td>
</tr>
<tr>
<td>Creating Web pages</td>
<td>6</td>
<td>5.5</td>
</tr>
<tr>
<td>Playing games on the Web</td>
<td>5</td>
<td>4.6</td>
</tr>
<tr>
<td>Chatting on the Internet</td>
<td>4</td>
<td>3.7</td>
</tr>
<tr>
<td>Others</td>
<td>9</td>
<td>8.2</td>
</tr>
</tbody>
</table>
the second sample, when the other option was added, 38% of respondents chose the new option (“I don’t understand what positive challenge means”). The reported sources of challenges in these two samples were very diverse (Table 4). Information tracking/locating and trying to solve an information problem or surfing on the Internet were reported most often (39.8 and 13.3%, respectively). Configuration of hardware or software problems and Internet connections constituted a surprisingly small number of challenges reported by respondents (3.9 and 3.1%, respectively).

Activities associated with reported challenges are listed in Table 5. The activity of information retrieval accounted for 74.6% of challenge-provoking Web activities, followed by reading/debating in newsgroups (8.5%) and creating Web pages (5.4%).

### 3.4. Sense of control

The concept of control is an important element of the theoretic flow construct and this has been empirically verified. In our study, about 48% ($n = 139$) of respondents

<table>
<thead>
<tr>
<th>Table 4</th>
<th>Source of challenges on the Web ($n = 128$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Challenges on the Web</td>
<td>Frequency</td>
</tr>
<tr>
<td>Trying to locate the information; surfing</td>
<td>51</td>
</tr>
<tr>
<td>Looking for information to solve a problem</td>
<td>17</td>
</tr>
<tr>
<td>Building research strategies or queries</td>
<td>11</td>
</tr>
<tr>
<td>Engaging in debate</td>
<td>6</td>
</tr>
<tr>
<td>Learning more; eager to learn new knowledge</td>
<td>6</td>
</tr>
<tr>
<td>Computer configuration; slow connections</td>
<td>5</td>
</tr>
<tr>
<td>Building a Web site</td>
<td>5</td>
</tr>
<tr>
<td>Software problems</td>
<td>4</td>
</tr>
<tr>
<td>Playing games</td>
<td>4</td>
</tr>
<tr>
<td>Re-evaluating personal knowledge</td>
<td>3</td>
</tr>
<tr>
<td>Solving problems; offering help</td>
<td>3</td>
</tr>
<tr>
<td>Writing letters</td>
<td>3</td>
</tr>
<tr>
<td>Web page design and representation</td>
<td>2</td>
</tr>
<tr>
<td>Browsing stimulating sites</td>
<td>2</td>
</tr>
<tr>
<td>Others</td>
<td>6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 5</th>
<th>Challenges of activities of Web use ($n = 130$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Challenges</td>
<td>Frequency</td>
</tr>
<tr>
<td>Researching on the Web; information retrieval</td>
<td>97</td>
</tr>
<tr>
<td>Reading/replying/debating in newsgroups</td>
<td>11</td>
</tr>
<tr>
<td>Creating Web pages</td>
<td>7</td>
</tr>
<tr>
<td>Playing games on the Web</td>
<td>4</td>
</tr>
<tr>
<td>Reading/replying e-mail</td>
<td>2</td>
</tr>
<tr>
<td>Chatting on the Internet</td>
<td>1</td>
</tr>
<tr>
<td>Others</td>
<td>8</td>
</tr>
</tbody>
</table>
reported having a sense of control during their Web use. Three frequently reported sources of the sense of control were from the Web itself, “always in control” (38.1%), Web users’ skill level, “successful navigation” (29.5%), and Web users’ knowledge, “having confidence in how to search” (13.7%). In addition, 10.8% of respondents reported that their feeling of control was from “information found”. Causes of the sense of control are listed in Table 6.

As with the question of “challenges”, in order to verify our assumption that respondents might be confused by ‘the sense of control’, we added a third option, “I don’t understand what ‘feeling of control’ means” in the questionnaires to the second sample. Among those who reported perceiving challenges from the first sample, 24.6% of respondents explicitly reported that they did not understand the term ‘sense of control’. In the second sample, 17.7% of respondents chose a new option we added: “I don’t understand what positive challenge means.”

3.5. Enjoyment

A majority of respondents ($n = 241$ or 81%) experienced the feeling of enjoyment, which is an important effect of the flow state. The activities that involve enjoyment are reported in Table 7 and researching on the Web/information retrieval is the most prevalent (74%). None of the other activities were reported by more than 10% of the sample although reading/replying/debating in newsgroups came close with 9.9%.

<table>
<thead>
<tr>
<th>Causes of sense of control</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Always in control</td>
<td>53</td>
<td>38.1</td>
</tr>
<tr>
<td>Successful navigation; intuitive browsing, knowing where to go</td>
<td>41</td>
<td>29.5</td>
</tr>
<tr>
<td>Having confidence in how to search</td>
<td>19</td>
<td>13.7</td>
</tr>
<tr>
<td>Information found</td>
<td>15</td>
<td>10.8</td>
</tr>
<tr>
<td>Reading discussion and posting</td>
<td>6</td>
<td>4.3</td>
</tr>
<tr>
<td>Others</td>
<td>5</td>
<td>3.6</td>
</tr>
</tbody>
</table>

Table 7

Activities involving enjoyment of Web use ($n = 241$)

<table>
<thead>
<tr>
<th>Flow activities</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Researching on the Web; information retrieval</td>
<td>178</td>
<td>74</td>
</tr>
<tr>
<td>Reading/replying/debating in newsgroups</td>
<td>24</td>
<td>9.9</td>
</tr>
<tr>
<td>Chatting on the Internet</td>
<td>7</td>
<td>2.9</td>
</tr>
<tr>
<td>Playing games on the Web</td>
<td>7</td>
<td>2.9</td>
</tr>
<tr>
<td>Reading/replying e-mail</td>
<td>3</td>
<td>1.2</td>
</tr>
<tr>
<td>Creating Web pages</td>
<td>3</td>
<td>1.2</td>
</tr>
<tr>
<td>Others</td>
<td>19</td>
<td>7.9</td>
</tr>
</tbody>
</table>
The causes that respondents reported for their feeling of enjoyment are listed in Table 8. Three of the most important causes of enjoyment that respondents reported were information retrieval-related (24.4%), reading (17.5%; e.g. “I derive great pleasure from checking out sites of interest to me”), and discovering new knowledge (13.7%; e.g. “I love the sense of seeking new information. It is a feeling of being a detective, tracking down pieces of the story, or clues”). Doing research and information retrieval on the Web are the two most important activities causing the feeling of enjoyment on the Web.

4. Discussion

Results of data analysis of this study strongly support our assumptions that the environment of the Web is a multi-activity medium and that several kinds of Web activities are associated with the flow state as defined by Csikszentmihalyi (1988c). The issues of ambiguity of ‘challenges’ and ‘control’ were verified because between 20 and 40% of respondents could not interpret the meaning of challenge or sense of control, the pivotal concepts in Csikszentmihalyi’s conceptualization of flow. This finding supports our argument that employing the terms challenges and sense of control directly in the questions would attenuate the ability of respondents to reliably report on their flow experiences. The following section will discuss the findings related to our research questions.

4.1. Multi-activities on the Web

Addressing our first research question, our results suggest that several Web activities can be associated with flow because 39.8% of respondents reported having had at least one flow experience while on the Web. Activities, which were associated with a flow experience on the Web, were classified into six categories. Among them, information seeking, which is the dominant activity the Web is used for, were reported by 60.6% (Table 3) of respondents who reported a flow experience on the

<table>
<thead>
<tr>
<th>Causes of enjoyment</th>
<th>Frequency</th>
<th>Ratio (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information found</td>
<td>57</td>
<td>24.4</td>
</tr>
<tr>
<td>Reading intriguing articles, reading jokes</td>
<td>41</td>
<td>17.5</td>
</tr>
<tr>
<td>Discovering new things and knowledge, learning</td>
<td>23</td>
<td>13.7</td>
</tr>
<tr>
<td>The activity itself of utilize the Web</td>
<td>32</td>
<td>9.8</td>
</tr>
<tr>
<td>Tracking interesting and exciting information</td>
<td>23</td>
<td>9.4</td>
</tr>
<tr>
<td>Communication, interactivity; good feedback</td>
<td>22</td>
<td>8.1</td>
</tr>
<tr>
<td>The activity of posting</td>
<td>6</td>
<td>2.6</td>
</tr>
<tr>
<td>Playing games</td>
<td>6</td>
<td>2.6</td>
</tr>
<tr>
<td>Accomplished</td>
<td>6</td>
<td>2.6</td>
</tr>
<tr>
<td>Others</td>
<td>22</td>
<td>9.5</td>
</tr>
</tbody>
</table>
Web. However, two more interactive and more communicative styles of Web functions, reading/replying to e-mail and reading/debating in newsgroups, accounted for another 17.5% of flow experiences. This verifies our assumption that activities on the Web are not limited to traditional views of ‘navigating via hyperlink’, ‘surfing on the Internet’, or ‘searching for information’. Therefore, the Web should be viewed as a multi-activity medium. Further research into the flow phenomenon on the Web should not limit its activity to mere interactivity.

4.2. Flow experience

Addressing our second research question, respondents in this study most often gave us a picture of their internal experience when in the flow state. These descriptive findings of Web users’ inner experiences during the flow state are important because they provide us with a key to understanding the relationship between activities of Web users’ and the processes by which an individual reaches a harmonious state in his/her consciousness (i.e. flow). The reported internal experiences during the flow state, such as engrossment, exploration, excitement, timelessness and supportive (Table 2), are very similar to those phenomena described conceptually in Csikszentmihalyi’s work. It seems that these descriptions of experiences in the Web environment are not too different from other flow activities, such as dancing and rock climbing.

4.3. Challenges

According to our conceptual framework, the match between challenges and skills is one of three necessary antecedents to the flow state and is the focus of our third research question. This study explicitly asked respondents to identify their perceptions of ‘challenge’ encountered on the Web. Many respondents were able to report on their perceived challenges but a non-trivial number were confused by the use of the term directly as an operationalization of the concept. We would like to suggest that the variety of activities which make up the Web (i.e. multi-activity) is in part responsible for this confusion but, obviously, this operationalization needs more work. We tried to address this confusion by employing an open-ended questionnaire and content analysis in order to discover additional language that would help us re-operationalize the concept. Even with two different approaches to facilitate respondents’ reports, if combined with both samples, 24.7% in total, who tried to respond to the challenge question, reported that they did not understand the term. Even so, 42.1% of respondents found a way to talk about the sources of their challenges on the Web. For us, the most important finding was that the reported feelings of challenge were generally not associated with hardware or software problems or the individual’s ability to manipulate hardware and software. Instead, causes of challenges were reported in the context of the individual’s interests and other intellectual sources, such as tracking or retrieving information (Table 4). Therefore, in the Web environment, skills needed to match challenges should not be viewed in terms of the ability or capacity to use Web browsers, the knowledge to post on newsgroups,
the skills to communicate via e-mail, or the familiarity with search engines. Instead, skills should be viewed as internal, situated concerns of the individual to meet the level of challenge.

4.4. Sense of control

The sense of control is a central characteristic of defining flow as set forth in our third research question. Note that, conceptually, sense of control that is critical to attaining a flow state should be seen as a kind of confidence rather than be confused with notions of loss of self, timelessness, etc. It is important because flow can only occur in a situation in which people do not feel anxiety or depression. Our data show that the most frequently reported source of the sense of control is from the Web environment itself since most Web users perceived that they had control over the Web environment without specifying any reasons (38.1%; Table 6). Another source of control was from successful navigation or successful information retrieval (29.5%). It seems that sources of control on the Web originate from both the familiarity with the Web activity and the capacity to dominate the whole Web environment. One can sense control only when s/he knows where to go next and what s/he can achieve or get as s/he proceeds. However, it is important to note here that if combined with both samples, about 20% in total of those respondents who tried to answer this question reported that they did not understand what the sense of control meant to them. Similar to the feeling of challenge, this question was included to try to elicit respondent descriptions of the concept of sense of control that could be used in future research.

4.5. Enjoyment

Our fourth research question focused on the users’ enjoyment while on the Web reflecting the positive emotions associated with the flow state. Conceptually, when in the flow state, people feel enjoyment from the activity itself. Because the flow state is so enjoyable, people will attempt to replicate it whenever possible. Is the Web enjoyable? Do people want to replicate their Web uses? A very high percentage (81%) of respondents reported that they have had enjoyable experiences on the Web. Information retrieval on the Web and activity associated with newsgroups are the two major activities generating feeling of enjoyment (Table 7). These two activities involve a very high degree of interactivity and communication among Web users as well as interaction with the Web environment itself. In the activity of information retrieval on the Web, causes of enjoyment (Table 8) were reported to have come from “information found”, “tracking information”, “discovering new things”. In the activity related with newsgroups, reading/posting on the newsgroups becomes the source of the enjoyment. It seems that interactivity and communication are two major impetuses for the feeling of enjoyment in the Web environment. Additionally, a large portion of respondents confirmed the characteristic dimension of flow—autotelic, when 9.8% of respondents identified the source of enjoyment as, “the activity itself of utilizing the Web or browsing the Web”.
4.6. Antecedents of flow Web activities

From our analysis, major activities on the Web related with flow experience can be separated into five major categories: the Web environment itself, newsgroup discussion, chatting through the Net, e-mail communication, and playing games. Among these, generic Web activities (including research on the Web, information retrieval on the Web, and creating Web pages) describe 66.1% (60.6 + 5.5%; Table 3) of all flow-related activities on the Web, while the activity of reading, posting and debating in newsgroups accounts for 9.2%, and the activity of reading/replying e-mail accounts for 8.3% of reported flow-related activities (Table 3). Together, they account for 83.6% of all reported activities associated with flow. How do these three major clusters of activities ‘fit’ in with the conceptual antecedents to the flow state as set forth in Table 9 (also see Section 1.2)?

These three activity clusters all provide clear goals and relatively strict rules. However, how do those asynchronous communications, such as debating on newsgroups and writing e-mail, provide immediate feedback? How do they provoke challenges to Web users in order to reach the flow state? Previous flow research focusing on reading and writing may provide us with some explanations.

The activity of reading e-mail and articles fits into flow models because, according to previous studies (e.g. McQuillan & Conde, 1996), skills required in the reading process refer to “some prior knowledge of the topic of the text or sufficient interest before or while reading it”, and challenges refer to “the texts usually contain some new or relatively unfamiliar aspects, providing the challenges to sustain flow, which in turn usually caused growth and perceived benefits form increased knowledge and/or personal development”.

On the other hand, the activity of composing e-mail or articles for newsgroups fits into flow models because according to Larson (1988, p. 171), “when creative thinking is necessary ... (t)he quality of performance will depend, to a large extent, on how well the thinker is able to arrange his or her thought processes so as to make them enjoyable.” We know that writing/debating in newsgroups and reading/replying to e-mail are a kind of asynchronous communication, where people do not receive ‘immediate feedback’ after sending out their articles or e-mail. Nevertheless, during the process of composing their articles or e-mail, in some sense, people do get immediate feedback from what they write on the computer screen.

Table 9
Analysis of antecedents of flow activities on the Web

<table>
<thead>
<tr>
<th>Antecedents</th>
<th>Researching on the Web</th>
<th>Discussing/debating on newsgroups</th>
<th>Reading/writing e-mail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clear goals</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Immediate feedback</td>
<td>*</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>Matched skills and challenges</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
</tbody>
</table>

Note: * = fit; ? = unknown.
We would like to emphasize here that our data suggest that perceived challenges and skills are dependent on the situational conditions of flow experience in the Web environment (i.e. the internal goals, etc., of the user). The situational conditions are dynamic, changing in response to what the user encounters and creates in the Web environment. Therefore, the challenges and skills must also be dynamic.

Flow seems to be an engine of evolution propelling human beings to a higher level of complexity (Csikszentmihalyi, 1993, p. 197). In order to duplicate the experience of exhilaration, an individual must slightly increase the challenge level and also develop his/her skill level to meet the increased challenge. The evolution of this process continually leads us into a world of increasing complexity and increasing uncertainty, which in turn forces human beings to grow and evolve. An effect of flow seems to be to induce human beings to grow in the sense of fulfilling the potentialities of the organism and going beyond those limits (Csikszentmihalyi, 1988b, p. 367). Therefore, if researchers who are interested in flow phenomena in the Web environment operationalize perceived challenge too generally (e.g. as the feelings of challenge felt by Web users) or orient their definition to the technology (e.g. as feelings of challenges in operating computer hardware or software), they will misrepresent the phenomenon and its necessary role in human self-improvement.

5. Conclusion

In this study we conceptualized the Web as a multi-activity medium and attempted to collect some baseline data in order to build more reliable and valid measurements of the factors and conditions associated with flow activities in the Web environment. Empirically, through an open-ended questionnaire and standard content analysis techniques, we explored Web users’ descriptions of flow experiences. We believe that our data support other studies’ conceptualizations of the flow state and helps in the development of a coherent conceptualization of flow for Web-related activities. We looked for those sources or activities related to Web users’ perceived challenges in the Web environment, which should be helpful in building a situational measuring instrument to identify Web users’ flow experience.

This study also provides some insight that should be useful to Web designers, i.e. that design criteria should focus on what it is that users are trying to do, where they are trying to go rather than on how the technology works. If designers focus more on internal concerns of users and less on the external nature of the environment, more useful and usable activities will emerge on the Web. According to Csikszentmihalyi (1996), a Web site must be challenging, competitive, and provide feedback to its users in order to encourage the occurrence of flow. He described this on-line experience as “tracking the footprints of some animal you haven’t seen.” He further suggested that a Web site which facilitates flow could be described as “a gourmet meal”, starting with appetizers, followed by the salads and entrées, and choosing dessert at the end.

Although there is much future research that needs to be done in order to understand Web-related phenomena, one clear thrust must be in the operationalization of
some of the key concepts associated with flow conceptualizations, i.e. ‘challenges’ and ‘skills’. Although our data provides some direction, some extensive methodological work needs to be done before researchers can provide clearer insight into Web activities that enhance or facilitate the emergence of flow experiences. We are in the design stages of a follow-up study that will look at users’ descriptions of flow experiences in a real-time, natural context with repeated-measures. We expect that our next study would capture Web users’ on-line flow experiences situationally in real time, and does not rely on subjects’ retrospective recollection of their flow experiences.

Appendix A

Questionnaire

1. How many years have you used the World Wide Web?
   a. less than 1 year;
   b. between 1 and 2 years;
   c. between 2 and 3 years;
   d. between 3 and 4 years;
   e. between 4 and 5 years;
   f. more than 5 years.

2. How many hours in average do you spend in surfing the Web in one week?
   a. less than 1 hour;
   b. between 1 and 3 hours;
   c. between 3 and 5 hours;
   d. between 5 and 8 hours;
   e. between 8 and 12 hours;
   f. between 12 and 16 hours;
   g. between 16 and 20 hours;
   h. more than 20 hours.

3. Please read the following paragraphs carefully:

   My mind isn’t wandering. I am not thinking of something else. I am totally involved in what I am doing. My body feels good. I don’t seem to hear anything. The world seems to be cut off from me. I am less aware of myself and my problems.

   My concentration is like breathing. I never think of it. I am really quite oblivious to my surroundings after I really get going. When I start, I really do shut out the whole world. Once I stop, I can let it back in again.

   I am so involved in what I am doing. I don’t see myself as separate from what I am doing.
Have you ever encountered the situation indicated by any one of above paragraphs in your Web navigation and use?

Yes
No
If your answer “Yes”, could you briefly describe what you were doing on the Web when the last time these experiences occurred?
If you answer “Yes”, could you briefly tell us more about how you felt the last time these experiences occurred?

4. In your Web navigation, have you ever experienced the feeling of ‘time going too fast’?

Yes
No
If you answer “Yes”, could you briefly describe what were you doing the last time on the Web when these experiences occurred?

5. Have you ever experienced the feeling of enjoyment during your Web navigation?

Yes
No
If you answer “Yes”, could you briefly describe what you were doing the last time on the Web when these experiences occurred?

6. Have you ever experienced the feeling of ‘positive challenge’ during your Web navigation?

Yes
No
If you answer “Yes”, could you briefly describe what you were doing the last time on the Web when these experiences occurred?

7. Have you ever experienced the feeling of ‘being in control’ during your Web navigation?

Yes
No
If you answer ‘Yes’, could you briefly describe what you were doing the last time on the Web when these experiences occurred?

8. Please tell us more about yourself:

My age is:
a. below 20;
b. 21–30;
c. 31–40;
d. 41–50;
e. over 50.
My gender is:
a. Male;
b. Female.

The highest level of education I have is:
a. less than high school;
b. diploma high school degree;
c. some college;
d. bachelor’s degree;
e. master’s degree;
f. doctoral degree or more.

References


