Peer Presence and Real-Time Assessment: A Symbiotic Relationship

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Abstract: Web-based learning environments often use games and simulations to enrich the learning process. Understanding the response of learners to these non-text-based environments is usually accomplished through laboratory testing or field surveys. The "click to submit" web-form questionnaire is a common method of gathering user feedback, however, these questionnaires are plagued by low response rates and inconsistent results. Research into survey design reveals many potential problems in the construction and administration of questionnaires – problems that are exacerbated by the nature of communication on the web. Intended to promote a sense of community among users and to gather accurate feedback from them, The National Film Board of Canada's NFBkids website fails to obtain useful feedback through its web-based questionnaires. Our study investigates an alternative methodology for gathering user preferences – by exploring solutions for NFBkids. According to preliminary user studies, real-time, peer-to-peer assessment techniques are "fun", they foster a sense of peer presence among a community of web users, and they succeed in gathering valuable user feedback.

Introduction

This project grew out of discussions with two groups within the National Film Board of Canada – the Kids Destination Project and the Animation, Children, Interactive (ACI) Project. In 2001, the National Film Board (NFB) launched the NFBkids website as a "creative space" where children might explore interactive, informative and visually rich resources on auteur animation and point-of-view documentaries (National Film Board, 2001a). In order for the NFBkids website to be successful, the managers of Kids Destination and ACI felt that feedback from those who visit NFBkids should be incorporated into the design of future versions of the site. The goal was to begin a dialogue with the children who use the website, so that NFBkids might "evolve and grow" based on users' comments and suggestions. Initially, the methods of gathering user preferences at NFBkids consisted of web-log data and online questionnaires. These methods did not prove successful in obtaining useful information that could be passed on to the site designers. Furthermore, Kids Destination and ACI felt that NFBkids failed to create a sense of "community" for the children who visited the site.

Our project began with two goals: (1) to promote a sense of "community presence" among users of NFBkids and (2) to implement a system that would succeed in gathering valuable user feedback. By applying cognitive theory and psycholinguistics to the problem of obtaining user preferences on the World Wide Web, the project explores an alternative methodology for gathering user preferences – one that seeks to attenuate the problems known to affect online surveys and to promote a sense of presence in an active, virtual "space" populated by web users. The result is a system that incorporates real-time assessment into an online game-playing environment so that users no longer see "rating a game" as separate from the game activities.

Our hypothesis is that as feedback is integrated with gameplay, users become more inclined to provide comments and ratings. Moreover, if it is possible to shift game ratings and comments so that they are intended for users (and made clearly visible to all users) instead of "for the designers", this both contributes to the sense of community and improves the overall quality of feedback.

User studies suggest that our system succeeds in promoting a sense of community among users and that it provides an effective alternative to web questionnaires. Children who have used the software find the real-time, peer-to-peer assessment features to be "fun" and their comments indicate that real-time assessment represents an alternative, perhaps complementary, methodology for gathering preferences from users.

Cognitive Theory, Psycholinguistics and the Process of Gathering User Feedback

The process of soliciting information through a survey or questionnaire might seem straightforward. Participants receive a series of questions from an interviewer or from a written questionnaire and the participants' answers to these questions are recorded. If the authors of the survey feel they have designed the questionnaire "properly", the information gathered is assumed to reflect the opinions and concerns of the participants. However, in the words of Herbert Clark and Michael Schober,

> How a question is worded makes a difference, but so do many other factors – how the question is introduced, what questions come before and after, what answers are allowed, and much, much, more. The factors are so diverse that they may seem impossible to account for. Even wording is mystifying. (Clark & Schober, 1992, p. 15)

Research into the cognitive processes that underlie the procedure of asking and answering questions reveals many pitfalls in questionnaire design and administration. Psycholinguistics, the study of the mental faculties involved in the perception, production and acquisition of language, may be applied to survey design to show that survey responses are linked to the intentions of the interviewers and participants (Peterson, 2000; Sudman, Bradburn & Schwarz, 1996; Clark & Schober, 1992). Therefore, understanding "what goes wrong" in a survey or interview requires an investigation into the intentions of the speaker (or author) and how the participants interpret the speaker's intentions. According to Clark and Schober, "once we understand the role of speakers' intentions in language use, we will find many of the problems of survey design more tractable" (Clark & Schober, 1992, p. 15).

The research of Tourangeau, Rips and Rasinski (2000) and others (Wentland & Smith, 1993; Clark & Schober, 1992) examines how the structure and language of a survey may influence the participants' responses. These results may be applied to questionnaire design in order to put together more honest and accurate surveys. In an attempt to understand the "role of speakers' intentions in language use," these authors outline several problems that hamper the effectiveness of surveys as a method of gathering feedback. These problems include: (1) recognizing common ground between the author of the questionnaire and the respondent, (2) perspective, (3) common purpose, (4) grounding, (5) pressure to respond and (6) consistency. Although there may be no precise method of survey design, the research mentioned above offers several guidelines for the construction of honest and accurate surveys – guidelines that aim to minimize the problems traditionally associated with surveys and questionnaires.

Bringing the Theory of Survey Design to the World Wide Web

This research into survey design may be applied to the process of soliciting user feedback on the World Wide Web. The web is an interactive system that allows for efficient communication – however, as outlined by Sproull and Kiesler, communication on the World Wide Web is hampered because the social and contextual cues associated with most forms of human communication often are missing or attenuated (Sproull & Kiesler, 1995). For example, an online questionnaire seems particularly vulnerable to the problems of intention described by Clark and Schober. In soliciting user feedback on the WWW, the challenge is to overcome problems like grounding, perspective, pressure to respond, etc., and to do so with a medium that is much more limited than traditional methods of communication.

The Goals of the NFBkids Site

The National Film Board created the NFBkids website as a place where children might "see things in a whole new way, get creative, play games and test their skills" (National Film Board, 2001b). In several press releases from 2001, the Film Board explains that "creativity" is a key component of the NFB's vision for its children's site (National Film Board, 2001a). Coinciding with the "creative" nature of the website is the Film Board's desire to give users the ability to shape the future direction of NFBkids. According to the project manager, the first phase of NFBkids was designed "for the kids," but future versions of the site will be developed, in part, "by the kids" who visit the website (National Film Board, 2001c). By providing a "safe place on the web where young people will be able to explore and develop their creativity" (National Film Board, 2001a), NFBkids is designed to emphasize the interactive nature of the web. It is hoped that visitors to the site may see themselves as "belonging" to a community of NFBkids users. With a sense of entitlement, the children of NFBkids might be prepared to take an active role in the site's evolution.

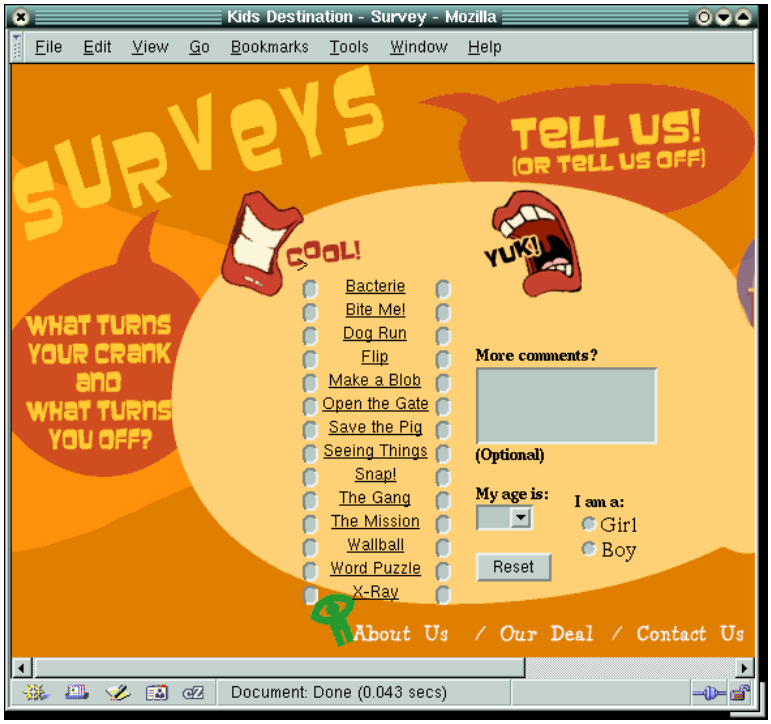

Figure 1: The SURVEYS page at the NFBkids website.

Version 1.0 of NFBkids

NFBkids consists of several single-player games and activities – including word games, puzzles, math and science games, and short video clips. The site also contains a SURVEYS page (known affectionately as "Tell Us or Tell Us Off") that allows players to rate the games and to submit comments to the web designers (Fig. 1). The SURVEYS page presents a palette of NFBkids games and allows users to select "COOL" or "YUK" for each game activity. Also, players may add their own (open-ended) comments in a text box and supply information on their gender and age. Along with web-log data provided by the web server, the feedback from "Tell Us or Tell Us Off" is expected to shape the design and implementation of future versions of the website.

Soliciting Information on the WWW

According to the managers of ACI and the Kids Destination Project, the original version of NFBkids has not succeeded in fostering a sense of community among its users, or in gathering meaningful user feedback. Frequently, users who have not played the games proceed to rate all of them. Often, players who spend more than 20 minutes playing games submit blank SURVEYS pages. Many users who do write comments provide the NFB with short responses like "This sucks," "Pretty Good" or "Too slow". According to the Film Board "this is not the sort of feedback we were hoping for" (National Film Board 2001c).

Reasons for the site's failure to gather useful feedback may be found in the cognitive theory and psycholinguistics literature. However, understanding why the web-from questionnaire fails is only part of the problem. "Tell Us or Tell Us Off" suffers from many of the "traditional" questionnaire problems discussed by Clark and Schober. Some of these difficulties are exacerbated by the deficiencies of communication on the WWW. Yet, the project goal is to design a system that might overcome pressure to respond, common purpose, perspective, etc., and function as a component of the NFBkids website.

Peer Presence and Real-Time Assessment

As an alternative to "Tell Us or Tell Us Off", the project focuses on comments and ratings intended for other players. Instead of asking users (the NFB hopes these will be children) to provide feedback to "Us" (adult web developers), the new system allows users to rate games for other users. Comments are shared among the community of gameplayers – all players have the chance to rate and comment on the activities, and all players see each other's ratings and comments.

As NFBkids is targeted to an audience of children, there is already the potential for a strong us-and-them mental model for kids who visit the site. For a website that aims to be "by the kids" as much as "for the kids", it seems inappropriate to make the adults' role even larger ("Tell Us!") and to potentially reinforce the dichotomy between those who create the site and those who use the site – at least in terms of gathering feedback. Questions surrounding pressure to respond, common purpose and perspective form the basis of the decision to change the focus from "comments to designers" to "comments to other players".

In order to promote a sense of community presence for those who visit the website, ratings are sent to all users in real-time. As soon as one player rates an activity, all players see this event on their screens. A "Popcorn Meter" was designed for this purpose (Fig. 2). In a sense, this lets players know that other users are "out there" – that other players are exploring the site along with them. Also, it builds excitement for the rating scheme. After players are finished with a game activity, they have the chance to rate the game and to supply comments "to other players". All ratings and comments are archived by the web server and, after players have submitted their comments, they are presented with a list of recent ratings (indexed by user ID; users log in before gaining access to the site) and comments (also indexed by user name).

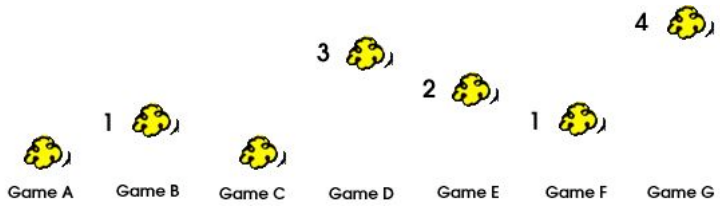

Figure 2: The Popcorn Meter. As players rate games, they cause the kernels to "pop".

User Studies / Findings

Two user studies were conducted. In the pilot study, a website with ten game activities was presented to 28 Grade Six students (ages 10-12). In this study, there were no interactive, real-time assessment features. After exploring a game, players had the option of sending ratings and comments "to the web designers".

After 45 minutes with the system, a post-session (paper) questionnaire asked the children their thoughts on sending ratings and comments to the designers. A second study presented seven game activities to 27 Grade Six students. The system for this study included the Popcorn Meter and the "comments to other players" chat feature. A paper questionnaire also followed this 45-minute session.

University Hill Elementary School (Pilot Study)

The pilot study was an attempt to normalize the data for future experiments. The goal was to determine whether or not the poor results seen at the NFBkids site would be duplicated in the environment of a single-classroom experiment. Generally, the results at University Hill correspond to the NFB's findings: the system collected "poor" feedback – not the type of data the NFB had hoped to gather from users. The 28 students at University Hill had a slightly higher response rate on comments and ratings that the NFB kids, however, unlike the users at the NFB website, these Grade Six students knew they were part of a study.

Did you like sending comments and ratings to designers? (N=28)		Will the designers pay attention to your comments? (N=28)	
Only Positive Comments:	18	Yes:	15
Positive and Negative Comments:	6	Maybe / Yes & No / Not Much:	3
Only Negative Comments:	4	No:	6
		Don't Know:	4

Table 1: Pilot study results. Students' reactions to sending comments and ratings "to designers".

The results from the post-session questionnaire reveal evidence of the Clark-Schober effects. For example, even though students sent comments and claimed they "like sending comments", only 15 of 28 students clearly stated that they thought the designers would actually pay attention to their comments (Tab. 1). Children in the pilot study clearly preferred rating games to sending comments (47% of students rated every game they played and 79% of students rated at least 50% of games played. 27% of students submitted comments on every game played and 33% sent comments on at least 50% of games played).

Maple Grove Elementary School

The 27 Maple Grove students saw a very different version of the website. They were the first students to see the Popcorn Meter and the "comments to other players" chat feature. The Maple Grove students seemed to accept the Popcorn Meter and liked sending comments to other players (Tab. 2). Certainly, they did not have an adverse reaction to "chatting" and "popping".

At Maple Grove, students rated and commented more freely and more frequently than at University Hill. 71% of students rated every game they played and 94% of students rated at least 50% of games played. 41% of Maple Grove students submitted comments on every game they played and 71% sent comments on at least 50% of games played. These data, along with the post-session questionnaire results, suggest that the peer-to-peer, real-time, game assessment afforded by the Popcorn Meter and the chat feature may be addressing some of the Clark-Schober effects. This fascinating conjecture deserves further study.

Reaction to the Popcorn Meter (N=27)		Did you like sending comments to other players? (N=27)	
I like it / I choose games based on it:	11	I really like it / I can express my feelings:	8
Great idea / fun / cute / funny / cool:	9	I like it:	11
I do not like it:	5		
I did not see it:	1	I do not like it / It is annoying:	8
No comment:	1		

Table 2: Students react to the Popcorn Meter and sending comments "to other players".

Conclusion / Future Work

The results of the preliminary studies are promising. They suggest that the system has successfully incorporated real-time assessment into the game-paying environment and that users see real-time, peer-to-peer assessment of game activities as "fun". 70% of the Maple Grove students "liked" or "really liked" sending comments to other players and 74% had good things to say about the Popcorn Meter. The questions regarding the Popcorn Meter and chat feature were open-ended in order to avoid biasing the responses. The fact that students wrote in their own words that they "choose games" based on the Popcorn Meter, and that the chat feature allows them to "express feelings" to other players, further suggests that these features may be promoting a sense of community among users. The next step is to explore the hypothesis that comments to players or friends are more honest than comments "to designers" – the psycholinguistics theory claims that the intentions are different between these sorts of comments.

Do these real-time, peer-to-peer methods promote a sense of place for the users? Do they provide cleaner feedback for the web developers? Do they address some of the effects described by Clark and Schober? Early indications suggest that this may be the case – future studies will examine these questions and work to tailor the peer-to-peer features to the audience of users. Among the interesting results at Maple Grove: when asked for their thoughts on the Popcorn Meter, 24% of students had suggestions for the Popcorn Meter's appearance (for example, "Instead of popcorn use Happy Faces" and "Make them Bunnies"). By allowing users to personalize their assessment tool, they might further enjoy the process of rating the game activities.

Based on the early data, real-time assessment and peer presence seem to represent a promising alternative for gathering feedback on the World Wide Web – for example, the Popcorn Meter gathers "different" data and seems to motivate "different" user behaviour. These "differences" were expected, to some extent, as they were suggested by the psycholinguistics theory that forms the basis of the design of the Popcorn Meter. Future work will examine these differences more closely and explore the hypotheses that have emerged as a result of this research.

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