THE SELF-CONFRONTATION INTERVIEW: TOWARDS AN ENHANCED UNDERSTANDING OF HUMAN FACTORS IN WEB-BASED INTERACTION FOR IMPROVED WEBSITE USABILITY

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ABSTRACT

An in-depth understanding of human factors in web-based interaction requires a methodology which enables researchers to chart online actions, understand the cognitive processes guiding these actions and the mental dispositions governing them. In this regard, the self-confrontation interview is an extremely effective method. In this article, the self-confrontation interview method, its history, design and execution are explained. This method was utilized in a study on online shopping behavior. Selected findings from this study are presented and design principles which will enhance the usability of online store interfaces are proposed. These design principles are: (i) follow a sequential progression, (ii) mimic real-life scripts, (iii) provide visual indicators, (iv) place functionality above aesthetics and (v) avoid conditioning automatic actions. The article concludes with an assessment of the strengths and limitations of the self-confrontation interview method and its efficacy *vis a vis* other methods of studying web-based interaction.

Keywords: online shopping behavior, action psychology, qualitative research, interface design principles

1. Introduction

The starting point for any systematic analysis of human-computer interaction is a concrete understanding of how and why users perform their activities (Smith 1997). However, the human factors which influence web-based interaction can be difficult to comprehend given the complexity of the human mind and the dynamism of the World Wide Web. These human factors cannot be fully understood through the use of quantitative methods such as data mining where the time difference between different online actions is calculated, or the progression of movements from one hyperlink to another is charted and so on.

With regard to e-commerce, a research method which provides a deeper perspective on the human factors influencing web-based interaction will enhance our understanding of online shopping behavior and contribute to improved website usability. This research method should enable researchers to study online shopping actions *qualitatively*, understand the cognitive processes guiding these actions and the mental dispositions governing them. In this regard, the self-confrontation interview is an extremely effective method.

Prior research has helped to establish the situational factors which influence online shopping behavior. For example, the effects of animated, media-rich online shopping environments (Richmond 1996; Griffith, Krampf et al. 2001), Web advertisements (Raman and Leckenby 1998) and product characteristics (Lal and Sarvary 1998) on online shopping behavior have been studied. The demographic and lifestyle characteristics which influence online shopping behavior have also been investigated (Bellman, Lohse et al. 1999; Bhatnagar, Misra et al. 2000). Extensive quantitative research has also been conducted on the human factors which impinge on online shopping behavior. These include flow experience (Novak, Hoffman et al. 2000), trust propensity (Lee and Turban 2001) and perceived control (Koufaris, Kambil et al. 2001-2002). This study complements earlier research findings by undertaking a *qualitative* analysis of online shopping behavior using an action psychology framework and a novel research method.

2. The Self-Confrontation Interview Method

The fact that the interview method is still widely used for research despite the introduction of more cost-efficient quantitative methods is a testimony to its usefulness. Interviews are very effective for understanding a phenomenon in-depth. The self-confrontation interview is no exception. It was traditionally used in action psychology and was applied to situations such as the interaction between children in a playroom (Cranach 1982) and

activities involving group work and cooperation (Cranach, Ochsenbein et al. 1986; Cranach 1996) etc. Prior to this study, the self-confrontation interview method had *not* been applied to the study of online behavior.

The self-confrontation interview comprises the following steps (Cranach 1982; Cranach and Kalbermatten 1982; Cranach, Kalbermatten et al. 1982; Kalbermatten 1982-83):

- Asking subjects to perform the behavior being analyzed;
- Making a video-recording of the subjects' actions;
- Asking the subjects to view the video recordings of their own actions;
- Pausing the video recordings at certain junctures and asking the subjects to recount any thoughts and emotions they had when they performed those actions;
- Transcribing the interviews and correlating the actors' thoughts and emotions with their respective actions.

Therefore, the self-confrontation interview method involves within-method triangulation of the interview and systematic observation methods (Webb, Donald et al. 1966; Creswell 1994; Creswell 1998; Flick 1998). It facilitates the "integration of cognitive with manifest phenomena, of verbal with non-verbal activities" (Kalbermatten 1982-83, p. 3). It taps into the short-term memory of the individual which is more likely to be reported in full than long-term memory (Ericsson and Simon 1984). It also facilitates a good analysis of actors' intentions as these can be understood from the actors' own claims, given that it is unlikely for actors to be systematically false about their intentions (Harre and Secord 1972; Harré 1982). Interviews are also more effective in investigating experiences and feelings when compared to more static methods such as questionnaires (Judd, Smith et al. 1991; May 1997; Denscombe 1998). They have been used in the study of human-computer interaction to find out how activities are performed and to uncover issues affecting the performance of different tasks (Smith 1997).

The action steps constituting different actions can be identified through systematic observation. Systematic observation is defined as "a particular approach to quantifying behavior…The aim is to define beforehand various forms of behavior – behavioral codes – and then ask observers to record whenever behavior corresponding to the predefined codes occurs" (Bakeman and Gottman 1986, p. 4). Systematic observation also enables the researcher to record behavior as it occurred and not as reported by the actor (Selltiz, Jahoda et al. 1959; Chadwick, Bahr et al. 1984). Systematic observation of behavior which is too fast or complex to analyze in real time can be enhanced by the use of video recordings which can subsequently be slowed down for analysis (Martin and Bateson 1993).Observational methods have been adopted by anthropologists to study human-computer interaction in detail, charting how users navigate websites and noting the points at which they encounter problems (Abrams 2000). Through the triangulation of the interview and systematic observation methods, the self-confrontation interview enables researchers to thoroughly analyze actions and the cognitions and dispositions which guide them.

3. Applying the Self-Confrontation Interview to Web-Based Interaction

This study utilized the self-confrontation interview method for a deeper understanding of online shopping behavior and for uncovering the nature of online shoppers' interactions with online store interfaces.

3.1 Interviewee recruitment

In order to understand actions and behavior, Clarke suggests that an "intensive" method to understand large numbers of factors in small numbers of instances is preferable to an "extensive" method of understanding small numbers of factors in large numbers of instances (Clarke 1982, pp. 201-202). The objective is to carefully analyze small numbers of examples for any recurring events, patterns, processes and relations.

Since this study was geared towards understanding online shopping behavior in-depth, the aim was to study a select number of online shoppers' actions thoroughly. Hence a corpus construction approach was adopted for recruiting interviewees, where subject selection proceeds stepwise and the diversity of the subjects' social strata and functions is striven for (Bauer and Aarts 2000). The first group of interviewees was recruited through a campus newspaper advertisement and through emails to targeted communities in New Haven, Connecticut. These communities were selected on the basis that the residents in these neighborhoods were seen disposing of delivery boxes from online stores in their recycling bins. This was a good indicator that many of these communities' residents had purchased products from online stores and had experience with online shopping.

From these initial contacts, six interviewees were obtained. From there, snowball sampling was adopted where the initial six interviewees were asked to help recruit friends and acquaintances whom the interviewees knew had experience in online shopping and who fit certain specific socio-economic profiles stipulated by the researcher. This resulted in the recruitment of another five interviewees. The remaining three interviewees were then specially selected through personal contacts to fit socio-economic profiles which differed from those online shoppers who had already been interviewed. Equal numbers of male and female interviewees were recruited to account for any gender differences in online shopping behavior. Fourteen interviewees were studied in total – seven male and seven female.

This method of purposive selection helped to counter the problem of interviewee self-selection, and ensured that the interviewees spanned a wider socio-economic range. The self-confrontation interviews were conducted between April and June 2001. Interviews were conducted at mutually-agreed venues and interviewees shopped online using the researcher's laptop computer as it had the screen capture software installed on it.[1] Each interviewee was given a US$10 shopping voucher for participating in the study.

3.2 Interview procedure

Interviewees were first asked whether they needed to shop online for anything and if so, to shop online in as natural a manner as they usually did while their actions were video recorded. (The website navigation software used was Internet Explorer Version 5.0.) To make the interview situation even more natural, the interviewees were told that they could take as much time as they needed. They were also told that they did not have to confine themselves to the items which they said they needed but to shop for any products which occurred to them and to surf any websites which came to mind. It was especially important to highlight this point as that would make the interview more closely approximate regular online shopping where shoppers do not necessarily shop only for what they need. The interviewees were left to shop online independently, without interference by the researcher, to eradicate any effects which observation may have had on their actions (Martin and Bateson 1993, p. 31).

Since this study focused on online shopping actions, the video recordings did not focus on the interviewees physically but on the interviewees' interactions with the computer interface. All of the interviewees' online actions were video recorded using screen capture software Camtasia™. Camtasia™ is able to record all of the activities that take place on a computer screen – cursor movements, text inputs, screen changes, banner advertisements, video output etc. It can therefore capture how an interviewee arrives at a particular website, which parts of the website he clicks on, the products he views, the information he keys in and so on. The on-screen activity is then saved as a video-recording in an AVI file format. AVI stands for Audio Video Interleave and is the most common format for recording audio and video data on the personal computer (McGowan 2000).

When the interviewees had completed their online shopping, the video recordings were played back to them. The recordings were then stopped at critical junctures to elicit comments from the interviewees about their actions at the time. The interviewees were asked to recount any thoughts and feelings which may have guided their online shopping actions. They were also asked to point out exactly what they were looking at on each website when such information could not be gleaned from the recordings. (The self-confrontation interview question guide is at Appendix 1.) The interviews were audio-recorded using a portable mini-cassette recorder. Full transcripts of these interviews were prepared and the action-related cognitions were identified and correlated with their respective actions in a separate table.

3.3 Analysis of video recordings

Recordings of the interviewees' interactions with e-commerce interfaces were observed to discern the interviewees' action steps and action strategy. Before commencing the analysis of observational data, it is useful to construct a coding scheme to classify the component actions of the behavior being studied (Bakeman and Gottman 1986). The codes should be "mutually exclusive" so that only one code is associated with a particular event and they should also be "exhaustive" wherein there are codes for every event (Bakeman and Gottman 1986, p. 33). Given that the goal of this study was to identify the sequence of action steps in online shopping acts, it was more meaningful to code the events themselves rather than to code time intervals between events (Bakeman and Gottman 1986).

Therefore, a coding scheme was first constructed to identify the different actions performed by the interviewees while they shopped online, e.g. type in URL, click on product hyperlink, etc. Care was taken to create appropriate terminology for describing different online shopping actions and the different features which appear on online shopping websites. When the hyperlink appeared in the form of underlined text, it was coded as a hyperlink. When the link was in the form of a graphic representation such as a button or icon, it was coded as a "button". The coding frame for the video recordings is at Appendix 2.

3.4 Analysis of interview data

On average, a self-confrontation interview on a fifteen minute online shopping act lasts about one hour and generates ten pages of interview transcript. The analysis of the interview data was carried out in two stages. In the first stage, the action-related cognitions were identified and correlated with their respective actions in a separate table in order to understand the cognitive processes guiding and accompanying online shopping actions. To ensure that the cognitions and actions were accurately correlated, all transcripts were made within 24 hours of the

[1] Budgetary constraints foreclosed the possibility of all the interviewees having the screen capture software installed on their own computers. That would have been ideal as it would have captured the interviewees' typical online shopping actions using their own computers with their own browsers, 'favourites' lists and other personalised features.

interviews being conducted. In the second stage of analysis, the full transcripts including action-related cognitions, post-interview reflections and interviewees' commentaries on their own actions and the interfaces were then content analyzed using a method known as "meaning condensation". This method abridges the interviewees' views into briefer statements or labels (Kvale 1996).

Two sets of labels were generated, one set relating to action structure and the other pertaining to general social psychological aspects of online shopping. The qualitative analysis software NUDiST was initially employed but found to be unsuitable for the multi-faceted nature of the data which dealt with both online shopping action structures and other qualitative aspects of online shopping. A customized data analysis method had to be applied instead. The analysis was performed manually on print-outs of the transcripts where labels relating to action structure were listed in the left margin and labels pertaining to general social psychological aspects in the right margin. This made it possible for some views to have two sets of labels concurrently if the views pertained to both action structures and social psychological aspects of online shopping. When any ideas or phenomena reappeared, the labels were re-attached. New ideas were given their own labels. This method enabled the researcher to organize the data under a few salient issues and to study any inter-relations between the different ideas and phenomena. The coding frame used for analyzing the interview findings is at Appendix 3.

3.5 Validity

Gaskell and Bauer (2000) assert that in qualitative research, transparency is functionally analogous to internal and external validity in quantitative research. In this regard, this article has described in detail the design and administration of the self-confrontation interview method. Details on the administration and analysis of the interviews and observations have been provided. The interview questions and the coding frames for the analyses of the interview transcripts and video recordings have also been appended. Technical information on the functioning of the recording software Camtasia was also furnished. The interviewee recruitment process was also reported. In the next section, another important criterion for assessing the validity of qualitative research is also fulfilled, i.e. "thick description" through the reproduction of verbatim text (Gaskell and Bauer 2000, p. 347).

4. Design Principles and Selected Findings

The interview findings and video recordings generated a wealth of valuable data on how online shoppers interact with web-based interfaces and the factors which impinge on website usability. Based on these findings, design principles which online stores should adopt for enhanced website usability are proposed. Quotations from the self-confrontation interviews have also been included to illustrate why these design principles should be closely adhered to.

4.1 Follow a sequential progression

The hierarchical-sequential organization of human actions in everyday life is a well-proven proposition (Hacker 1985). The planning of activities takes place from the larger activity units down towards its smaller component units (Clarke 1982). Similarly, online shopping actions involve a funneling process where consumers first use a search engine to identify relevant online stores, narrow down a range of online stores to surf, select a range of products within each online store and so on. So online shoppers progressively narrow down their consideration set in a sequential manner. Similarly, information on websites unfold in a sequential manner where one hyperlink is an elaboration of a previous inter-connected hyperlink and so on. Most online shoppers are now accustomed to this sequential progression and when websites fail to adhere to it, online shoppers get frustrated:

> *"Actually the site is kind of confusing. When you clicked on digital cameras on the left side, it brought you up to that window that again had a list of products so I thought that would give you more of a selection of what type of digital cameras but it didn't. It just gave the product list again." Jim*
>
> *"It basically came up with a screen with just the album name and I had to click on that to get more. It would have been more efficient if they had just had all the information come up like Amazon does cos I'd already clicked once on the item name. And I would expect that to bring up the information. Instead it brings me to a screen with nothing on it but the item name. And to me that's poor design. So at that point I became annoyed with CDNow." Stephanie*

It is therefore imperative for online stores to be designed so that they follow a logical sequential progression, where each click by the online shopper produces tangible results. When that progression does not occur, frustration and confusion will be experienced by the online shopper as seen in the two quotations above. Ultimately, these negative feelings will lead to website abandonment.

4.2. Mimic real-life scripts

As human beings, we understand our environment and remember discernable trends. We then utilize this knowledge to make assumptions about what will happen next. Given an action, it is reasonable and logical to expect that a particular action will follow – this the essence of a script (Schank 1982). Scripts enable actors to interpret actions according to a pre-determined, stereotyped sequence of actions which characterize familiar situations (Schank and Abelson 1977).

Consumers of today have two sets of scripts to deal with – scripts for online shopping and scripts for shopping in brick-and-mortar stores. Since online shoppers move between the online shopping environment and the brick-and-mortar store environment, they are likely to use their brick-and-mortar store shopping scripts in the online environment and vice versa. However, brick-and-mortar stores have been in existence longer than online stores and most consumers have more experience shopping in brick-and-mortar stores than on the Internet. Therefore, the tendency for online shoppers to use their real-life shopping scripts in their online shopping is greater than the reverse tendency. In this regard, when online shopping is still a relatively new shopping option, online stores have no choice but to design their interfaces to mimic real-life shopping scripts rather than expect consumers to adopt online shopping scripts right away.

Take the example of Geraldine. She tried to purchase a multiple-stops plane ticket and this was what she said during the self-confrontation interview:

> *"…they [the interface] always ask you to write 'morning, evening, afternoon' and their results never have anything to do with whether you write 'evening, morning' as I can tell. They just give you results according to the cheapest price but for me I always wonder if it's worthwhile filling in those spaces.……that's one of the things about online shopping that sometimes, you often have to go down these paths just to see where it's gonna end up whereas when you're speaking with the operator, you can say, 'Look it's in the same area. Could you tell me whether it'll cost completely more or not?'…So I had a feeling this wasn't going to work but I tried it anyway."*

In Geraldine's case, there was clear tension between what the interface required her to do and what she had become accustomed to from her conversations with travel agents. With the travel agent, she merely has to state the different destinations she requires and ask the travel agent to find her the best possible combination of price and convenience. But online, the rigidity of the online shopping script frustrated her. She had to go through the interface step by step. She also had to input information which she found irrelevant and having done that, she was still not confident that she would get the required information. She did not see the sense in the online shopping script because it did not resemble her real-life experience of dealing with travel agents.

The hybrid shopper is set to be the shopper of the future, where his shopping habits and shopping scripts will be an uneven combination of online and brick-and-mortar store experiences. In the meantime, when online stores are still newcomers to the retail scene, it is perhaps safer for them to ease consumers into online shopping by mimicking real-life shopping experiences. Other activities which similarly traverse the online and real-life environments, such as Internet banking and online medical consultations, will also encounter similar problems where consumers will use their scripts for these activities in real life to guide their actions in the online environment. For such activities, website designers should strive to ensure that online scripts do not detract too much from the regular, real-life scripts or users will be confused and feel insecure about whether their online actions will achieve the desired results. It is important for website designers to remember that people who use online interfaces do not merely live online but bring their experiences from the real, offline world into their online actions. It is only with this knowledge that usability and consumer satisfaction can be enhanced.

4.3 Provide visual indicators

In brick-and-mortar stores, consumers rely on visual indicators to aid their shopping (Alba, Hutchinson et al. 1991). They observe the layout of the store to identify the likeliest location for the product they need. In addition, while consumers may be unable to recall the names of products, they can often recognize them by their packaging, shape and size, e.g. the familiar green and black design of a can of Heinz baked beans. In online shopping, consumers do not have the aid of such visual indicators. This was Keith's thought when he was shopping for a video game online: *"I was looking for a box cover and so I didn't even see that so I got frustrated"* .

The online store is a collection of hyperlinks which the consumer has to "leaf through" to locate a product. This is of course unnecessary since many retail sites offer search engines for locating products, or offer product category listings under which consumers can make a more direct search. However, it is important to note that the World Wide Web is fundamentally a text-based medium and users navigate their way within websites through text-based search engines. To successfully search for a product using a search engine, online shoppers need to know the exact terms for describing the products which they want, the nomenclature which stores adopt and their systems of classifying

products. This was demonstrated in the case of Thomas who was unsure about the specific terms for describing office chairs. To circumvent this problem, he had to first surf various websites to educate himself on the appropriate terminology to use:

> *"It was a little frustrating, I will say that…I think it's got to do with my search techniques, that's what needs help cos I felt like I was less in control. I was going into sites that I knew had chairs but they weren't telling me about chairs that I wanted in a way that I find useful. I had to follow their logic for a while before deciding that this isn't the right site for me… I think if I had known the right lingo and if I had the time, I might have put that into my search string."*

If the websites had provided simple visual indicators representing different types of chairs, Thomas would not have had to take such a convoluted route to locating an office chair online. Most online shoppers will be similar to Thomas in that they know what they want when they see it, but do not know how to describe it using the "correct" terms. Given that the World Wide Web is able to transmit graphics, the provision of simple visual indicators is not a technological impossibility and online stores should strive to provide these in order to make online shopping more intuitive for consumers.

4.4 Place functionality above aesthetics

It is important for online store designers to give greater priority to functionality than to aesthetics as online shoppers tend to be focused and purpose-driven. They zoom in on what they want rather than browse aimlessly. In this regard, it is important to make the functions of links and buttons clear rather than to make them attractive and appealing. Take the example of Keith. He was merely trying to obtain information on the price of a new video game for the Playstation. Instead of obtaining that information easily, he had to scan through irrelevant information and a marketing gimmick as well:

> *"…I'm amazed that when I click on something, what I anticipate coming up is just a box cover and some writing and you know, 'This is how much it costs'. But instead I get this, which is very interesting. But I'm like 'Great' (expresses disdain). This isn't what I need cos I'm wondering how much it costs, first off. Then it's like 'for shipping time and available product format see product detail pages' and so I scroll back up and on the Playstation 2 page, it said 'product detail' and so I was looking for that. I thought I must have missed it and it's just not there. So I'm thinking 'Ok, what do I do?' And I almost read there until I read, 'We want you to download this gorilla.' And I'm like, 'No!' (expresses incredulity). And so I'm trying to figure out what to click on to find the information that I want and eventually I realize that sometimes on what I consider really badly designed web pages, they hide the buttons under visual elements. I eventually think that."*

Evidently, the website designer had invested effort in making the button visually pleasing but not in making it clear and functional. In this case, Keith was a technically savvy customer who had knowledge of website design. So he knew that the functions could be hidden under graphical elements. If it had been a less technically competent shopper visiting this online store, it is likely that he would have given up much sooner and proceeded to another online store which provided basic information such as product prices up front.

4.5 Avoid conditioning automatic actions

Online shopping often involves repetitive actions in predetermined sequences, e.g. scan through list of products, click on item, return to list of products, click on another item and so on. At the same time, online shoppers are able to make repeat visits to online stores at very little time or financial costs. This repetition tends to result in the development of automatic actions in the actor such that in response to certain environmental stimuli, the actors perform certain actions. Automatic links then exist between a set of situational features and behavioral goals and this results in predictability of actions (Bargh and Chartrand 1999). Indeed, it has been argued that an acknowledgement of situational variables can contribute to an enhanced understanding of consumer behavior (Belk 1975).

Take the example of Ellen who is planning her wedding and has been making repeat visits to the online wedding gift registry TheKnot.com. This was what she said when she logged onto the website:

> *"Well as the new window pops out, The Knot always has a little added window and runs the bigger one and so I know to wait for it so that I can just shut it as soon as it opens out. So I mean this is what I was doing right then, I was waiting to shut that."*

Ellen automatically shut the pop-up window as she knew that it would appear every time she logged onto that website. She did not even bother to see what was in the pop-up window. The pop-up window probably contained information on a special promotion which the website was having but she did not even read the information because she had shut the window automatically.

Online stores need to guard against the conditioning of such automatic actions in their shoppers who will become cursory rather than thorough in processing information. As a result, these shoppers are likely to overlook special promotions, new product lines and advertisements. Instead online stores have to constantly reinvent themselves and update their online storefronts regularly. Promotions and advertisements will also have to break away from the mould of the pop-up window as online shoppers are likely to close these windows without bothering to look at them. Their instinct is to remove whatever obstructs their line of vision.

5. Discussion

Overall, this study shows that a qualitative analysis of online shopping actions using an action psychology approach can shed more light on human factors in web-based interaction. It also introduces a novel research method, the self-confrontation interview, to the study of online shopping behavior and online behavior in general. However, this study had several limitations which should be noted and these limitations can be addressed in future research. It adopted a corpus construction approach to assess a variety of online shoppers and online shopping experiences. Therefore, it is difficult to generalize the findings across users of varying experience levels or across different store genres. The relatively small number of interviewees studied also limits the extent to which its findings can be generalized. Future research can be conducted into how online shopping actions differ for specific product or service categories. The study can also be replicated with groups of shoppers of varying experience levels.

Since the self-confrontation interview had not hitherto been applied to the study of online behavior, it is incumbent upon this researcher to assess the method's efficacy with regard to the study of web-based, human-computer interaction.

5.1 Strengths of the self-confrontation interview method

The self-confrontation interview method was found to be particularly effective in discovering the mental activity surrounding online shopping actions. The interviews yielded descriptive findings from the interviewees including cognitions relating to decision-making and action-planning, as well as the difficulties faced in using online interfaces. Findings such as those presented in the previous section could not have been obtained with the use of quantitative, mechanistic research methods such as data mining. Asking the interviewees to reveal what they were thinking during their actions also had the effect of self-introspection. The act of shopping online just prior to the interview served to remind the interviewees of their usual actions and thus stimulated more considered and more accurate answers. The self-confrontation interview method also allowed for the immediate retrieval of emotions which are usually not accessible after a considerable period of time has lapsed between action and recall.

In addition, the interviewees found it interesting to observe their own online shopping actions in the video recordings. This made them extremely enthusiastic and as a result, more communicative. As the interviews progressed, the interviewees became more comfortable with voicing their cognitions and grew increasingly vocal and descriptive. Camtasia™ proved to be a very useful recording device. The fact that the interviewees could view virtually every step they had made, from moving the cursor to keying in text to clicking on hyperlinks, was very useful in stimulating the recall of action-related cognitions. Another key advantage of Camtasia is that it captures on-screen activity in an unobtrusive manner. The only thing that may remind the interviewees that their actions are being recorded is a little icon on the bottom of the screen. Since the interviewees did not actually have a video camera trained on them physically, they became less self-conscious and more relaxed as a result.

Web-based interactions are extremely rapid and compressed in time. Online shoppers are able to view a large number of products, process vast amounts of information and perceive a wide range of stimuli from websites in comparatively short durations. In this regard, the video recordings were very useful for analyzing online actions because they could be slowed down and studied frame by frame if necessary.

An added advantage of the self-confrontation interview method is that researchers require relatively little training. They merely need to play and pause the video recordings and to ask the interviewees a pre-determined set of questions. In addition, the Camtasia software is extremely easy to use as its interface resembles that of the standard video recorder. Recording, replaying and pausing the video were simple commands to execute. The questions asked during the self-confrontation interview are also simple, straightforward and factual questions rather than probing ones. Therefore, researchers can use the self-confrontation interview method with minimal instruction and supervision.

5.2 Limitations of the self-confrontation interview method

One limitation of the self-confrontation interview method is that the process of transcribing the interviews, identifying the action-related cognitions and correlating them with their respective actions can be time-consuming. One way of circumventing this is to produce a second video recording using the original video recording as footage and the self-confrontation interview as commentary on the footage through a process of dubbing. This method ensures correspondence of the commentary with the action. However, it requires investment in hardware such as a digital microphone and was not used in this researcher's study due to budgetary constraints. For market research companies which require efficient evaluations of website usability, this method of dubbing the original video recording is highly recommended.

Another limitation is that no records were made of the facial expressions and body movements of the interviewees since recordings were made only of the interviewees' on-screen activity. However, observation of the interviewees revealed that online shoppers do not display many facial expressions or variations in body movements when they focus on the computer screen. Furthermore, the interviewees recounted their thoughts and feelings verbally without the researcher having to infer such information by observing their physical movements and expressions. Finally, one other limitation is that the video recordings take up a considerable amount of data storage space on the computer and making back-ups of the recordings involves the use of compact discs rather than floppy disks.

5.3 Comparison to other methods

Other qualitative methods have in fact been applied to the study of online behavior. How does the self-confrontation interview method measure up to these other methods? The 'thinking aloud' method involves the subject vocalizing his thoughts while he performs an action. But this method is less useful than the self-confrontation interview method because the subject feels that he has to give a running commentary on his own actions and this distracts him from his actions. He is also pressured into giving comments on his actions even when there may be no necessity to comment at all. The possibility of capturing self-regulated behavior and automatic actions would be greatly diminished when using the 'thinking aloud' method.

The interruption method involves interrupting the subject during his actions to ask him what he is looking at, why he is performing a particular action and so on. This method is also inferior to the self-confrontation interview because it interferes with the flow of actions and the interviewees' train of thought. In contrast, the self-confrontation interview allows the interviewee to perform the action independently and without interruption. As a consequence, his actions can be executed in a more natural manner.

6. Conclusion

The self-confrontation interview method can greatly enhance our understanding of human factors in web-based interaction. It is a simple and cost-effective method of studying human-computer interaction and has been successfully applied to the study of online shopping behavior. It yields findings that cannot be obtained with quantitative methods and it can better capture natural behavior than other qualitative methods. In conclusion, the self-confrontation interview method can make a valuable contribution to improving the usability of e-commerce interfaces.

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APPENDIX 1. SELF-CONFRONTATION INTERVIEW GUIDE

Before the interviewees are asked to shop online (warm up questions):
Let's chat a little about your online shopping.
Which products or services do you shop online for?
Have you ever bought anything online?
Are there any purchases that you make regularly online, e.g. do you buy your weekly groceries online?
How much of your total shopping needs would you say are met by online shopping?
Interviewees are asked to shop online while their on-screen actions are recorded:
Is there something which you have been planning to shop online for? Try to shop online for that product/service in the manner that you usually shop. Take as much time as you need

After the interviewees have shopped online (self-confrontation interview)
I'm now going to play back the recording of your online shopping to you. I will pause the tape now and then to ask you what thoughts you had at that point. If there were no thoughts at any moment, that is perfectly fine. If you need me to stop the tape so that you can explain something to me or to show me something, let me know.
Could you also point out what you would do differently on your own computer, e.g. would you access this website from a favorites list instead of keying in the URL etc.?
The recording will be stopped at certain junctures to elicit comments from the interviewee using the following prompts:
Did any thoughts occur to you at this point?
Why did you choose to click on this link?
Why did you leave this site?
Which part of the website were you looking at at this point?
This appears to be the first thing you looked at. Why?
Concluding questions
Now that you have observed your own actions when you shop online, can you tell me how your online shopping style differs from your regular shopping style?
And do the two shopping styles have anything in common?

APPENDIX 2. CODING FRAME FOR VIDEO RECORDINGS

Keys website URL directly into browser address box
Keys search string into search engine box
Amends search string in search engine box
Studies information on search engine search results page
Clicks on hyperlink/button in search engine results page
Studies information on retail site
Keys search string into retail site search engine
Clicks on hyperlink/button in retail site
Clicks on image in retail site
Clicks on hyperlink/button in non-retail, third-party site (e.g. news portal site)
Clicks on online advertisement
Studies information in pop-up window
Closes pop-up window
Leaves website
Opens additional Internet browser window

APPENDIX 3. CODING FRAME FOR INTERVIEW TRANSCRIPTS

Action-related cognitions
Goal generation
Goal protection
Goal enactment
- Action steering

▪ Action monitoring ▪ Action accompanying ▪ Action justifying ▪ Emotion (to be specified) Bidirectional adaptation Mental representation ▪ Knowledge ▪ Memory Motivation states ▪ State-orientation Action-orientation
Structural dimensions Hierarchical-sequential structure (presence/absence) Multi-tasking online (presence/absence) Multi-tasking offline (presence/absence) Nature of online shopping (intentional/incidental)
Cognitive processes Automatic actions (presence/absence) Interactive actions (presence/absence) Goal (fixed/varying)
Dispositions Mental Representations ▪ Knowledge (general/specific) ▪ Memory processes ▪ Scripts Values ▪ Attitude to shopping in general (positive/neutral/negative) ▪ Attitude to online shopping (positive/neutral/negative) ▪ Attitude to conventional shopping (positive/neutral/negative) ▪ Social norms (positive/neutral/negative) Motivation states ▪ State-orientation ▪ Action-orientation ▪ Flow (positive/neutral/negative) ▪ Emotions (positive/neutral/negative)
Situational variables Structure of World Wide Web Interface design Interactivity
Social psychological dimensions Online shopping (advantages/disadvantages) Conventional shopping (advantages/disadvantages) Effect of offline shopping on online shopping Effect of online shopping on offline shopping Online communities (positive/neutral/negative) Store loyalty (positive/neutral/negative) Price thresholds (increased/no change/decreased) Impulse purchases (absence/presence) Social perceptions (positive/neutral/negative) Information sources on online shopping (online/offline) Online shopping environment (pleasant/unpleasant)