SOCIAL CO-BROWSING IN ONLINE SHOPPING: THE IMPACT OF REAL-TIME COLLABORATION ON USER ENGAGEMENT

Stefan Seedorf
University of Mannheim, Mannheim, BW, Germany, seedorf@uni-mannheim.de

Christian Thum
University of Mannheim, Mannheim, Germany, thum@uni-mannheim.de

Thimo Schulze
University of Mannheim, Mannheim, Germany, schulze@wifo.uni-mannheim.de

Lea Pfrogner
University of Mannheim, Mannheim, Baden-Württemberg, Germany, lea.pfrogner@gmail.com

Follow this and additional works at: http://aisel.aisnet.org/ecis2014
SOCIAL CO-BROWSING IN ONLINE SHOPPING: 
THE IMPACT OF REAL-TIME COLLABORATION 
ON USER ENGAGEMENT

Research Paper

Seedorf, Stefan, Business School, University of Mannheim, Germany, 
seedorf@wifo.uni-mannheim.de

Thum, Christian, Business School, University of Mannheim, Germany, 
thum@wifo.uni-mannheim.de

Schulze, Thimo, Business School, University of Mannheim, Germany, 
schulze@wifo.uni-mannheim.de

Pfrogner, Lea, Germany, lea.pfrogner@gmail.com

Abstract

For many years, online shopping has been a solitary activity. Social co-browsing is an emerging technology which enables two or more users to share the same view in the browser in real-time. Co-browsing enhances online shopping sites with a multi-player mode and enables new forms of communication between online shoppers. In this paper, we study the impact of social presence in social co-browsing on key attributes of user engagement. We extend a measurement model for user engagement with social presence and conduct an online experiment on Amazon’s Mechanical Turk. Two subjects are either paired in text chat session or social co-browsing session. Additionally, a control group is engaged in solitary online shopping experience. User engagement attributes, social presence, and perceived usefulness are measured using a survey. Our data analysis suggests that users who perceive a higher psychological presence are significantly more engaged in the online shopping activity. In particular, social presence in co-browsing leads to a more rewarding experience than in the case of a chat-only approach.

Keywords: Collaborative Systems, User Engagement, Social Presence, E-Commerce.

1 Introduction

In recent years, e-commerce and online shopping have developed new and profitable business models. Communication services connect both people and places remotely. People interact with each other via the internet and are continuously connected (Attfield et al. 2011). They actively use new possibilities open up by collaboration, e.g. to give feedback on services, to propose ideas on products, and even participate in value creation (Mangold and Faulds 2009).

Participation in value creation can only happen if users are willing to interact with the system and become interested in sharing ideas. Online services strive to master the continuous improvement of their online applications by making them more attractive (Di Gangi 2010). They explore new methods in order to increase user engagement. The adaptation of elements such as the user interface design, organization and set up of information, social features, or instant feedback are traditional levers in
setting one’s online service apart (Atkinson and Kydd 1997). However, in order to be able to improve engagement it is necessary to understand and measure the reasons, intentions, and determinants of users that actually engage in those services (Attfield et al. 2011; O’Brien 2006).

A lately conceived method of creating new online experiences is “social co-browsing”. Social co-browsing is a collaborative web service which puts real-time communication in the front seat of the online experience. It enables several users to share the same activity in their own browsers in real-time (Aneiros and Estivill-Castro 2005). Social co-browsing is perceived as a convenient approach to collaborate and effectively carry out activities together (Sidler et al. 1997). Some companies use co-browsing to support collaborative online shopping and therefore increase companies e-commerce success (Zhu et al. 2010). Due to the novelty of this web service, the question of how to diffuse co-browsing to new users and persistently engage them is of high interest.

Social co-browsing is an emerging concept, which is now increasingly being deployed due to advances in Web technologies. In other cases, shopping web sites deploy text chat for social shopping without co-browsing. Because of the novelty of both social co-browsing and social text chat little is known how it influences the users’ online experiences shopping behaviour. In this paper, we therefore aim to answer the following research question:

**What is the influence of social co-browsing and social text chat on user engagement attributes in the context of online shopping?**

To answer this research question, we use a positivist approach. Since user engagement is a multi-stage concept that consists of different attributes and theories (Kappelman 1995; Omar and Ali 2011), it is necessary to develop a model for measuring the core attributes of engaging experiences by online users. O’Brien and Toms (2008) analyse existing theories and develop a user engagement scale which is measured using surveys. This research draws on the measurement model developed by O’Brien and Toms (2010) and includes the concept of social presence. We test our research model in an online experiment. In the experiment, subjects solve online shopping tasks with social co-browsing, social text chat, or without collaboration. User engagement, social presence, and perceived usefulness are measured by a survey. It is hypothesized that social engagement during the online shopping increases the endurability of the online experience.

Online companies are continuously seeking new insights and methods to increase user engagement. However, the notion of user engagement often remains blurred and is measured using metrics such as “average time spent on site” or “number of conversions”. This research contributes to practice by investigating how user engagement using both social co-browsing and text chat. It goes beyond understanding user engagement as key measures and adds a real-time social layer to the “single user” web experience. From a theoretical perspective, this body of work extends user engagement by a social dimension. Social interaction on the web has become a pervasive entity; therefore the impact on user engagement has to be better understood.

## 2 Foundations

### 2.1 Social Co-Browsing

The World Wide Web consists out of a large collection of information connected by hypertext links (Hoyos-Rivera et al. 2006). That information can be accessed and displayed by web browsers. Users usually browse individually. Thus, web browsers are single-user instead of multi-user tools.

In the past, web browsers have been extended by text chat applications. Text chat enables easy and fast communication from within any web browser (Gerosa et al. 2004). Although text chat is
Co-browsing takes real-time engagement one step further because it extends web browsing into the multi-user sphere. It supports users to browse simultaneously, to share the same view, or to edit the same document (Crandall et al. 2002). Co-browsing creates a collaborative interaction process in which remote participants access web-based applications and are able to visually follow other users’ online activities in real-time (Chua et al. 2006). Users are supported by software that synchronizes browsers and supports users to co-navigate the web using devices like desktop computers, mobile phones, or tablets (Lowet and Goergen 2009). Traditional applications of co-browsing in a business setting (B2B or B2C) include online live support and guided sales.

We define social co-browsing as co-browsing with a focus on end user or consumer (C2C) activities. Social co-browsing can enable users to shop together online, to share experiences, or to make recommendations for purchasing a certain product (Kamis and Frank 2012). Watching online video clips, editing pictures, planning a route, choosing a movie together, or playing the same game are some other examples to demonstrate the possibilities of using social co-browsing (Lowet et al. 2007).

A crucial requirement towards co-browsing tools is the ease of use. For this matter, co-browsing is to be designed self-explanatory to non-experts that do not have to pre-register for or pre-install the application before engaging in its utilization (Esenther 2002). Furthermore, a feature of co-browsing should be its accessibility from any device, system, or locality to simplify a spontaneous collaboration of its users. Scalability of the system is required to secure its stability and guarantee low response time in case a great number of users access a co-browsing system simultaneously (Hoyos-Rivera et al. 2006).

Co-browsing systems may categorized as internet-based, web-based, browser-based, or browser-native (Thum and Schwind 2010). The degree of support for real-time collaboration ranges from limited to adequate. For example, the synchronization speed of a virtual mouse pointer differs depending on how much bandwidth is used by a co-browsing system. A web-based screen sharing tool that transmits graphical or video streams consumes more bandwidth than a browser-native co-browsing system that relies on event synchronization only. Traditionally, a master-slave model limits collaboration in one direction. User involved can only share information on screens but not engage in collaboration on the information content (Tee et al. 2006). In contrast, new generation co-browsing tools enables collaborative work through simultaneous interactions on the shared web page.

2.2 User Engagement

User engagement can be defined in different ways, depending on the perspective. User engagement consists of different attributes and theories (Kappelman 1995; Omar and Ali 2011). Flow theory, aesthetic theory, play, and information interaction refer to possible aspects of how to make systems more engaging. User engagement is often described as being influenced by user involvement and user participation. User involvement and engagement are two distinct concepts (Barki and Hartwick 1994). User involvement is a psychological and user participation a behavioural construct (Lin and Shao 2000). When users provide input and feedback to systems design they actively participate. The participation leads to higher quality and results in frequent use, and user satisfaction (Hwang and Thorn 1999). When users are satisfied, their involvement is higher and they are more engaged into the system and aim to fulfil their psychological desires (Hwang and Thorn 1999). The higher user satisfaction and user engagement, the higher the system success (DeLone and McLean 1992; Hartwick and Barki 1994). Through a meta-analysis Hwang and Thorn (1999) confirmed that a positive correlation exists between user participation, user involvement, and system success.

O’Brien and Toms (2008) review and analyse flow theory, aesthetic theory, play, and information interaction in order to deduct user engagement attributes from them. Flow theory is defined as the
motivation of users to deeply focus on a challenging activity (Csikszentmihalyi 1990). Users are completely absorbed by an activity and forget about their surroundings. It can almost be described as a loss of self-consciousness and as self-reinforcing. In contrast, the aesthetic theory describes the importance of visual appearance, design, harmony, and symmetry of the interface design (Beardsley 1982). The needs of users are easier matched, if the design is appealing. It has been identified that a higher motivation, satisfaction, and frequency of using the system occurred when users were playing (Atkinson and Kydd 1997). Playing is defined as an activity in which people are being active, creative, and able to learn. They try to satisfy their psychological and social needs and are confronted with aspects like competition and collaboration (Rieber 1996). Information interaction describes the communication between users and the computer interface. The interface can have positive effects on the user and can emphasize, e.g., enjoyment in using the system or desire to explore more aspects of it (Shneiderman 1997). From this theoretical background, O’Brien and Toms (2008) hypothesise that the sensory appeal of a system, the level of feedback, and the challenge users receive from this system are attributes that are intrinsic to engagement. For engaged users the experience has to be enjoyable in order to motivate users and get them affectively involved.

O’Brien and Toms (2010) later develop a measurement scale of six distinct factors of user engagement: Aesthetics, novelty, focused attention, perceived usability, endurability, and felt involvement. Aesthetics is the visual appearance of the interface (Beardsley 1982) and has been associated with engagement (Chapman 1997). Novelty refers to seeking out elements that are new or unusual (Huang 2003), e.g., checking out related product items on a shopping website. Focused attention is defined as a psychological state of mind with the concentration of mental activity that leads to forgetting of the surroundings (Matlin 2009). Novelty and focused attention are different since “checking out new elements or functionality” may not include a concentrated mental activity. Perceived usability describes to which extent users perceive the system to be difficult or easy to interact with. Endurability describes to which extent users of a system remember enjoyable situations and intend to perform them again (O’Brien and Toms 2010). Felt Involvement is defined as a state of psychological identification with some object that leads to being drawn into a task or the experience of enjoyment (Kappelmann 1995). Felt involvement is about the emotional response of interaction with the system (O’Brien and Toms 2010), i.e., if the interaction is perceived as “fun” or “enjoyment”. In the remainder of the paper, the interpretation of O’Brien and Toms (2010) is adopted. In contrast to felt involvement, focused attention describes a different psychological state in which users become so involved that forget about their surroundings. However, users with high focussed attention may not perceive the system interaction as enjoyable, e.g., they interact with the system to satisfy psychological or social needs (O’Brien and Toms 2008). Endurability differs from involvement in that the users perceive the interaction as successful and thus more are likely to repeat it.

The user engagement factors isolated by O’Brien and Toms (2010) may coincide during a single interaction, however, they are describe distinct attributes of engagement. O’Brien and Toms derived these six measurement items from several theories (flow theory, aesthetics theory, play theory, and information interaction) and tested the constructs in two large-scale studies with online shoppers. In the first study it was found that the factors were distinct without significant overlap. In the second study the internal consistency of the factors was also shown and no additional factors were present. O’Brien and Toms (2008) understand user engagement as a holistic framework, which helps to understand how user experiences of a system are pushed from being “perfunctory” to being “pleasurable and memorable”.

Another approach by Jacques (1995) defines factors that influence engagement, especially in the education environment. Engagement can differ depending on the chosen media, the content or the method of presentation, and the specific task setting e.g., research, browse, or game. The chosen media again relies upon presentation, type, and control. The type is the choice and combination of the media e.g. of texts, videos, graphics. The presentation depends on the style e.g. colour, typeface or sound
effects, and the control is the navigational flexibility and support for the user e.g. the index, menu, or hyperlinks.

Based on this theoretical background, user engagement is defined as follows: User engagement is a multi-stage concept that describes how users become interested to interact with a system (e.g., a website) and spend time or pay attention to a product, prospect, or brand. User engagement is a broader concept which comprises both behavioural (user participation) and psychological (user involvement) characteristics. User engagement is supported by attributes such as challenge, motivation, pleasure, or aesthetic appeal. For this reason, user engagement is not measured directly. Instead we develop and test a research model based on four of the six attributes defined by O’Brien and Toms (2010). The research model further comprises social presence, which is introduced in the following part.

2.3 Social Presence

The collaborative shopping experience is largely dependent by the communication medium. Whereas media richness theory explains the fit between media richness and information exchange, social presence theory contributes to studying the qualities inherent to different communication media. Social presence is defined as the “degree of salience” (Short et al. 1976) between users that are connected by a telecommunication medium. In other words, it is the degree to which “a person is perceived as a real person” (Gunawardena and Zittle 1997). The choice of communication medium influences the ability to transmit personal cues that establish a “feeling of presence”. Depending on the presence felt during the communication, the interaction may be judged as “being warm, personal, sensitive, and sociable” (Yoo and Alavi 2001). Hence, the choice of medium influences psychological presence. For example, a video chat conveys a higher social presence compared to voice chat and text chat. The choice of video chat as a medium, however, may lead to a lower group task performance (Yoo and Alavi 2001). In this study, we are interested in the influence of choice of communication medium on user engagement and not task performance. Therefore, social presence in collaborative online shopping is measured and compared to user engagement.

2.4 Related Work

Zhu et al. (2010) investigate the impact of collaborative online shopping support tools on coordination performance and social presence. They use two design components, namely communication support (text chat, voice chat) and shared navigation, which is a simple form of co-browsing. The model is based on media richness and common ground theory that helps users to coordinate their behaviour effectively. Zhu et al. (2010) conduct a laboratory experiment with 128 subjects. They find out that shared navigation reduces communication exchanges and leads to a higher coordination performance. Shared navigation and voice chat enhance the subjects’ perception of social presence compared to separate navigation. The benefit of shared navigation is higher when using text chat compared to using video chat.

Kamis and Frank (2012) study the use of screen sharing technology, which is similar to co-browsing, in online travel planning. They adapt the technology acceptance model to include collaboration and trust. In an experiment with 150 millennials the impact of collaboration on intention to purchase is studied. Collaboration has a positive direct influence on ease of use, perceived effectiveness, and trust. Trust is an important contributor to the intent to purchase, which is in line with previous research on similar topics (cf. Gefen et al. 2003).

Kim et al. (2006) study which design components contribute to one’s intention to collaboratively shop online with others. They examine how two components, embodiment and media richness, can enhance the shoppers’ experiences. The first component is implemented as a personalized avatar, the second
component is implemented by a text chat or video chat embedded on the shopping web site. In an experiment Kim et al. investigate if these components increase co-presence, flow, enjoyment, and intention to shop online. They find that the presence of an avatar significantly increases co-presence. They further confirm that media richness plays an important part in establishing co-presence and establishing hedonic values, motivating shoppers to continue the collaborative shopping experience.

3 Research Model and Hypotheses

Our final research model is shown in Figure 1 and all our model construct and items used are listed in Table 1. In the following paragraphs, we explain the model, construct selection, and hypothesis development in detail. The model builds on a multi-attribute perspective on user engagement and extends it with the concept of social presence and perceived collaboration usefulness.

O’Brien and Toms (2010) developed and tested a measurement model for user engagement comprising felt involvement, focused attention, novelty, perceived usability, aesthetics, and endurability. Both usability and aesthetics are mainly related to the user interface of the shopping web site. The two attributes are omitted in the model because the collaborative user experience cannot be separated from the user interface. The novelty attribute refers to the overall experience of the system, thus it includes the social co-browsing and chat experiences. Collaboration usefulness is added to the model to measure if users perceive that their performance during the collaborative shopping experience has increased (Davis 1989; Venkatesh and Davis 2000).

Since two users are sharing the shopping experience in real-time, we measure the impact of social presence on user engagement attributes. Due to the user setup time for video chat and voice chat as well as technical limitations of modern web browsers, these mediums are omitted. It is studied how social presence in social co-browsing with text chat impacts the main attributes of user engagement.

Figure 1. Research model and hypotheses
<table>
<thead>
<tr>
<th>Construct Definition and Items</th>
<th>Source</th>
<th>Cronbach’s Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Focused Attention</strong> is related to flow and defined as a psychological state of mind with the concentration of mental activity that leads to forgetting of the surroundings.</td>
<td>Matlin (2009) O’Brien and Toms (2010)</td>
<td>0.86</td>
</tr>
<tr>
<td>FA1 I forgot about my immediate surroundings while shopping on this website.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FA2 I was so involved in my shopping task that I lost track of time.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FA3 When I was shopping, I lost track of this world around me.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FA4 The time I spent shopping just slipped away.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Endurability</strong> measures to which extent online shoppers remember enjoyable situations and the intention to perform them again.</td>
<td>O’Brien and Toms (2010)</td>
<td>0.87</td>
</tr>
<tr>
<td>EN1 Shopping on this website was worthwhile.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EN2 I consider my shopping experience a success.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EN3 My shopping experience was rewarding.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EN4 I would recommend shopping on this website to my friends and family.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Novelty</strong> refers to unexpected or surprising elements or features that arouse interest and curiosity.</td>
<td>O’Brien and Toms (2010)</td>
<td>0.78</td>
</tr>
<tr>
<td>NO1 I continued to shop on this website out of curiosity.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NO2 The content of the shopping website incited my curiosity.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NO3 I felt interested in my shopping task.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Felt Involvement</strong> is defined as a state of psychological identification with some object that leads to being drawn into a task or the experience of enjoyment.</td>
<td>Kappelmann (1995), O’Brien and Toms (2010)</td>
<td>0.85</td>
</tr>
<tr>
<td>IN1 I was really drawn into my shopping task.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IN2 I felt involved in this shopping task.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IN3 This shopping experience was fun.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Social Presence</strong> is defined as the extent to which a medium or technology allows users to experience others as being psychologically present.</td>
<td>adapted from Gunawardena and Zittle (1997), Short et al. (1976)</td>
<td>0.87</td>
</tr>
<tr>
<td>SP1 The interaction with my shopping partner was personal.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SP2 I felt comfortable interacting with the other participant in the shopping experience.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SP3 I felt that the interaction with the other participant was close.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SP4 I felt comfortable conversing through the live chat.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Collaboration usefulness</strong> is a measure to which extent user performance during the collaborative shopping experience has increased due to the availability of collaboration technology.</td>
<td>adapted from Venkatesh and Davis (2000)</td>
<td>0.93</td>
</tr>
<tr>
<td>US1 I found the collaboration useful in achieving the tasks.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>US2 Using the collaboration increased the chances of achieving the task solutions.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>US3 Using the collaboration helped me accomplish the tasks more quickly.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>US4 Using the collaboration increased my productivity.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1. Model Construct Definitions and Items used. Reliability is measured according to the data from chat & co-browsing.
Online shoppers who perceive a high social presence may be more likely to forget their surroundings and focus on the task at hand. This psychological state of mind is conceptualized as focused attention and related to flow. Focused attention is defined as the concentration of mental activity (Matlin 2009; O’Brien and Toms 2010). A second attribute of user engagement is felt involvement, which is a “need-based cognitive (or belief) state psychological identification with some object” (Kappelman 1995). In other words, felt involvement describes how users emotionally respond to the system.

If a user feels a closer psychological presence of another user, they are more likely to perceive it to be fun and are more engaged in the experience. Hassanein and Head (2007) showed that social presence induced by personal user interface elements significantly increases enjoyment by online shoppers. Thus, social presence in the form of conversing with other shoppers on the same shopping web site is likely to increase felt involvement. Endurability is depicted as a main outcome of user engagement (O’Brien and Toms 2008). It describes to which extent online shoppers remember enjoyable situations and the intention to perform them again. We predict that a higher social presence will not only have positive impact on involvement and focused attention but also the outcome variable.

Hypothesis 1a: Social presence increases endurability.
Hypothesis 1b: Social presence increases felt involvement.
Hypothesis 1c: Social presence increases focused attention.

Felt involvement is a subjective psychological state of being drawn into the task and their experience as enjoyment. It is defined as “need-based cognitive (or belief) state psychological identification with some object” (Kappelman 1995). If users have more fun during the collaborative activities, they are predicted to remember this experience and feel the desire to perform it again. In studying behavioural intentions to use a system, Jackson et al. (1997) find that psychological involvement plays a significant role in shaping the user perception. Because the felt involvement describes an emotional response by interacting with the system, we predict that higher felt involvement increases overall endurability of the experience.

Hypothesis 2: User involvement increases endurability.

If users become immersed in the shopping experience they exclude their environment and are less easily distracted. Distortions in the users’ perception of time (time flies by in the eye of the user) are commonly used to measure attention (O’Brien and Toms 2008; Webster and Ho 1997). In the context of collaborative online shopping becoming absorbed in the experience may mean that the users are also enjoying it. We predict that focused attention increases felt involvement.

Hypothesis 3: Focused attention increases felt involvement.

Novelty drives the user’s curiosity to explore a system and to repeatedly engage with it (Webster and Ho 1997). For example, new online content may sustain the attention of users over longer periods of time (O’Brien and Toms 2010; Pace 2004). Hence, we predict that novelty positively increases focused attention.

Moreover, we predict that novelty leads to increased felt involvement in the online shopping experience. Since novelty is defined as arousing interest and curiosity, future research has to study if these effects remain once a user gets accustomed to a new system.

Hypothesis 4a: Novelty increases focused attention.
Hypothesis 4b: Novelty increases felt involvement.

It is postulated that the perceived usefulness of collaboration positively predicts social presence and novelty. Due to the low adoption of social co-browsing and chat in online shopping, which are still emerging technologies, it is likely that users who find it useful are positively surprised by this new
experience. Similarly, users who find this way of online collaboration useful will also perceive a higher presence through this communication medium.

Hypothesis 5a: Collaboration usefulness increases novelty.

Hypothesis 5b: Collaboration usefulness increases social presence

4 Experiment on User Engagement

4.1 Experimental Design

To test the model, we design a survey based experiment. We recruit participants via the online labor marketplace Amazon Mechanical Turk (http://www.mturk.com). Mechanical Turk is a marketplace for work where requesters can post so called Human Intelligence Task that are self-selected and solved by human workers all over the world (Schulze et al. 2012). Studies in different research areas have shown that experimental results from participants recruited on Mechanical Turk are comparable to lab experiments or online experiments with student participants (Horton et al. 2011; Mason and Suri 2012; Paolacci et al. 2010); but are comparatively fast and inexpensive. These studies also show that the demographics of MTurk participants are more diverse than traditional study participants such as student subjects.

For the experiment we use a demo installation of PrestaShop (http://www.prestashop.com) with a default theme and containing a selection of Apple products. The participants are randomly allocated to one of three groups: (1.) Participants in the first group are directed to the shop alone. (2.) For the second and third group, we use synchronite (http://www.synchronite.net) as a backend and create a queue where the workers are paired together in groups of two and automatically redirected join a session. Group two visits the same shop but can communicate with each other via a text chat in the bottom right corner. (3.) The third group is connected via co-browsing and text chat powered by synchronite. With co-browsing, both participants can browse on the website together and see the mouse pointer of the other worker. If one user clicks on a link, this page will be opened in the browser of the other worker as well. The participants also have access to chat to communicate with each other. The three groups are summarized in Table 2. A screenshot of the co-browsing environment is depicted in Figure 2.

Figure 2. Screenshot of our demo online shop with synchronite header and co-browsing and chat enabled. User actions are synchronized from one worker (Chrome, left) to other worker (Firefox, right) and vice versa.
In order to get the workers to experience the shop, we give them three simple tasks of finding products, product properties, and product prices. For the two social groups two and three, we also instruct them to use the chat to ask the shopping partner for the preferred Christmas present. These tasks are not directly related to the research questions but are rather designed to encourage the users to engage with the website in detail and also use the social elements in a meaningful way.

After the shopping experiment, the survey starts on the following page. The questions are based on the constructs of our model, mostly adapted from related work, and checked by experts prior to the experiment. The questions are listed in Table 1. The items regarding social presence and collaboration usefulness are hidden for the first group. After capturing some basic demographic information, the workers are presented with a unique response code that they can enter on MTurk in order to get paid.

<table>
<thead>
<tr>
<th>Group</th>
<th>Treatment</th>
<th>Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Shop only</td>
<td>120</td>
</tr>
<tr>
<td>2</td>
<td>Two workers connected with Live Chat</td>
<td>59</td>
</tr>
<tr>
<td>3</td>
<td>Two workers connected with Live Chat and Co-Browsing</td>
<td>55</td>
</tr>
</tbody>
</table>

Table 2. Experiment groups and Participants.

4.2 Data Collection and General Results

The survey was started on a Friday evening in the fall of 2013. After about four hours we had collected the desired 300 survey responses. Mechanical Turk shows an average Time per assignment of 11 minutes which leads to an average hourly rate of just over 4 USD.

We filtered out 14 spam answers (where the test questions was not answered correctly or the answers for the shopping task were wrong), incomplete responses and 13 responses where the worker stated that there were technical problems or they were not connected to a shopping partner in a timely manner. Another 31 responses had to be excluded from the chat and co-browsing samples because the workers stated that they did not receive a chat response from their assigned shopping partner.

This leaves us with a total of 235 valid responses. Despite being assigned randomly, the control group with no social interaction is more prominent with 120 responses that chat (59) and co-browsing (55). In addition to the excluded responses with chat problems, this can be explained by the fact that many workers did drop out of the task when they were not matched with a shopping partner. User might also have dropped out because of the unexpected introduction of the social elements. Despite being lower than initially intended, the sample size of the groups is still large according to the sample size recommendations of (Cohen 1992). 134 survey participants were male and 100 female with an average age of 34. Most participants are experienced and use online shopping site very frequently (N=96) or frequently (78). 57 participants report using these sites only occasionally, three rarely.

4.3 Data Analysis

We use PLS-SEM for our data analysis because of the more exploratory nature of the research, the focus on theory development, and since different subgroups are compared. For tool support, we rely on SmartPLS (Ringle et al. 2005). All constructs are measured using a reflective measurement model. We analyze the whole sample as well as different subgroups and the three samples separately. Due to space limitations and since the results are similar for the two social samples of chat and co-browsing, we focus the reporting of the results on this sample of 114 responses. Finally, we use the PLS-MGA approach to find specific differences between the results for chat and co-browsing.
Using the general accepted test, we find that the measures are reliable and valid. The item loadings are all within an acceptable range and Cronbach’s alpha as well as the composite reliability values exceed the recommended threshold of 0.7. The cross-loadings matrix shows that all item loadings for their respective constructs are higher than all other constructs. Bootstrapping with 5000 samples was used to test the significance levels of the path coefficients. Figure 3 shows the model results.

For the data set containing both data from chat & social co-browsing, the obtained path coefficients and their level of significance indicate that H1a, H1b, H1c, H2, H4, H5a, and H5b are supported in our model. Only H3 (focussed attention → felt involvement) is rejected. The model explains the majority of the variance for our dependent variables felt involvement (R² = 0.777) and endurability (R²=0.764). The findings strongly support the proposed research model, and demonstrate that social presence can have a strong influence on user engagement in online shopping.

![Figure 3. Left: PLS results for text chat & social co-browsing combined. N =114. Right: PLS results for control group in reduced model. N = 120* = p <0.05; ** = p<0.01; *** = p<0.001; (ns) = not significant](image)

4.4 Comparison of Different Groups

The results for the three different groups are compared. We present the results for the comparison of the control group (shopping alone without shopping partner) vs. social (chat or co-browsing) as well as chat vs. co-browsing. We use the PLS-MGA method proposed by Keil et al. (2000) using the manual approach outlined and supported by the tools from Hair (2014).

When comparing chat versus co-browsing, two path coefficients are significantly different: The path from social presence to endurability (0.07 for chat, 0.378 for co-browsing, p = 0.037) and the path from felt involvement to endurability (0.85 for chat, 0.53 for co-browsing, p = 0.018). These results show that the social presence induced by co-browsing directly enhances the endurability of the shopping experience. This direct effect cannot be seen for chat only.
Next, we compare the control group versus the combined groups of chat and co-browsing. Since social presence and collaboration usefulness were not measured for the control group, we only use the reduced model for this comparison. As we can see in Figure 3, the explained variance is lower in the control group. However, as far as the path coefficients are concerned, the PLS-MGA method does not show any significant differences. This is expected since the differences can only be captured in the two added social constructs.

4.5 Discussion

The theoretical model is supported by the experiment in most aspects. The data collected in the control group supports the connections between novelty, focussed attention, felt involvement, and endurability; thus reproducing the results from O’Brien and Toms (2010). The data set using the experimental group with chat and co-browsing significantly support the proposed relations between collaboration usefulness and social presence as well as between social presence and the three constructs related to user engagement; all while increasing the overall explained variance of the model. Future research has to show why we do not see a significant relation between focused attention and felt involvement while also testing alternative models. Our analysis of the subjects’ comments suggest that some users were confused by the unexpected social elements; thus being rather drawn to these social connections rather than enjoying the collaborative shopping experience.

The comparison of the different groups does not show many significant differences. This can be explained by both the small sample sizes and the generic shopping tasks. It is important to note that the direct connection between social presence and endurability is only present in the case of social co-browsing but not in the case of text chat only. This suggests that richer collaboration techniques directly contribute to long term endurability of the shopping experience and loyalty towards the shopping site.

5 Conclusion

The purpose of this positivist research is to examine the impact of collaborative online shopping on user engagement attributes. It was predicted that social presence during online shopping leads to a higher perceived user engagement. The theoretical model enhanced the engagement model introduced and tested by O’Brien and Toms (2010) with concepts of social presence and perceived collaboration usefulness.

An experiment with 235 workers on Mechanical Turk tested three modes of the online shopping experience (solitary shopping, text chat, co-browsing & text chat). All hypotheses with the exception of H3 were confirmed. Social presence in co-browsing has a direct impact on the outcome variable endurability, which is significantly less apparent in the case of text chat. This hints towards rich collaborative user experiences as antecedent to long-lasting effects on user engagement. Further research is necessary to gain deeper understanding of the connections between collaboration medium, social presence, and user engagement.

This study has theoretical and practical contributions. User engagement in online shopping is extended by social presence theory. It is shown that the sense of psychological presence and sociability induced by the medium of text chat or co-browsing have positive effects on user engagement. In sense of theory building, we combine two research streams. Previous research has shown that collaborative shopping support increases social presence (Zhu et al. 2010). Other research has investigated the link between collaboration, trust, and intention to shop online together (Kim et al. 2013). This study established a link between collaborative shopping and social presence as well as between social presence and different manifestations of user engagement.
Our data analysis concluded that social presence generated through co-browsing has a significant effect on the felt involvement and durability of the shopping experience. We therefore recommend that e-commerce companies should experiment with social co-browsing on their websites to create a social environment and drive online conversions. As a first step, offering a social text chat to chat with other customers is predicted to have positive effects.

The presented study is not without limitations. First, the study is based on self-reported measures that are inherently subjective. Alternatively, cognitive-based measures (e.g., eye tracking and EEG) or web analytics measures can be used. Although the measures in this experiment are not objective they still provide an efficient way to capture the users’ perspective (Jacques 1995; Webster and Ho 1997). Second, the type of products being evaluated may play an important role in the online shopping experience. Moreover, there has to be a good fit between the online shopping system and products characteristics as well as users (Jahng et al. 2000). As part of ongoing research, we are experimenting with more complex products/services to increase validity. Third, the subjects in our study did not know each other prior to the experiment and are randomly and somewhat unexpectedly grouped together. Results might be different in social shopping settings where the collaboration is in a more trusted group with friends or family.

Also, some tasks benefit from co-browsing more than other that are better performed alone. The nature of the task might also have implications for the effect of the variables social presence and media richness on focused attention. Future research has to show whether users might be distracted from the task at hand by additional website elements which might lead to lower task performance. In the next step, we therefore plan to first conduct experiments where the participants can invite known associates to shop on the website together and perform while also explicitly measuring trust. Then, we will extend or study of co-browsing to other tasks and other domains beyond online shopping.

6 References


Hair, J. F. 2014. A primer on partial least squares structural equations modeling (PLS-SEM), Los Angeles: SAGE.


