

Web site sociability and UGC: The mediating role of emotions

ABSTRACT

Standing at the conceptual intersection between various fields (i.e., Communication, Human-Computer Interaction, Consumer Behavior, Social Psychology, and Usability), this research investigates the influence of social functionalities on consumers' online attitude toward contributing content to the website. Relying on social psychology theories such as group influence and similarity-attraction, one of our central predictions is that when online consumers are exposed to Web sites containing features supporting the site sociability, their intention to contribute will be greater than when not exposed. Furthermore, galvanic skin response was used to assess emotions during the task, to complement more traditional data collection methods. Our results show that online consumers' attitude toward participation is positively influenced by social functionalities, and that emotional reactions mediate this influence.

Categories and Subject Descriptors

H.5.2 [User interfaces] Theory and Methods – *Designing social Web sites.*

General Terms

Design. Performance.

Keywords

Web site design, Online participation, Physiological measures, E-commerce, UGC, Social Web.

1. INTRODUCTION

This research project focuses on online consumer behavior in the context of Web 2.0, also called the social Web. Described as a second-stage evolution of the Web, this

emerging context is characterized by increasing consumer participation which can rely on more sophisticated bi-directional communication tools and technologies, enabling «customers to share their opinions on, and experiences with, goods and services with a multitude of other consumers» [44]. Contradicting the Web 2.0 hype discourse, participative technologies do not equate participation though, and Web site managers struggle to find new Web 2.0 business models that would lead to profitability [37], which depends on a community of active contributors. Such community of active users is necessary for commerce applications, but also in many other areas such as politics and health related websites. Any instance of Web site contribution from consumers (user-generated content or UGC) such as blogging for instance [28], has shown to be primarily motivated by the desire for social interaction [44]. In other words, online consumer participation is more social than it is technological [36], and requires more than a platform to happen [37]. This study examines further how functionalities supporting social interaction, like evaluation of contributions and profile of the contributors, can influence consumers on a participative Web site [39]. Furthermore, it investigates the moderating role of emotions in this relationship.

2. RESEARCH CONTEXT

Encouraging people to contribute to online communities is very important in various areas, as so well proven in the case of the Amazon Web site, as the first and foremost leader in applying this principle to online ecommerce. It is the reason why we chose this Web site to conduct this study, as participation has nowhere else been so long established as it is on Amazon. So far, studies on consumers' participative behavior online have mainly focused on the why and how of participation, identifying:

- Drivers of contribution such as motivations to create and maintain a blog [28], or to articulate themselves on consumer-opinion platforms [36], as well as
- Factors encouraging participation in virtual communities, such as offline interaction and perceived usefulness [22], or

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- The modes of inter-personal influence which can take place in these online communities for the adoption and use of products and services usefulness [42].

In the marketing literature, usability has been recognized as a key factor to Web site performance turning users into customers [1]. Surprisingly enough, researchers seem to have ignored consumers' participation to Web sites from the perspective of the user's experience. Yet, consumers' participation can be linked to Web site performance in identifying sites' characteristics supporting participation, such as social functionalities (e.g.; Amazon's ratings and contributors' profiles). The user's experience relies on interactivity with the Web site itself and increasingly with others through computer-mediated social interaction [19]. Defined as a community's purpose expressed through the online behavior of its users, sociability focuses on social interaction while usability's classic focus is on human-computer interaction [31]. As both keep interplaying to influence Web site participants' communication and interaction, this study posits the hypothesis of a relation between sociability-related design characteristics of Amazon's online consumers' community and online participation, in order to evaluate their impact in encouraging consumers' participation.

3. FEATURES SUPPORTING ONLINE SOCIALITY

We tested our main hypotheses on Amazon's Web site, for which sociality is mainly supported by two social functionalities, namely **books' ratings** and **users' profiles**. Ratings can be associated to a specific book comment written by a consumer, or can be summarized in frequency tables indicating the number of 1 to 5-stars evaluation totalized for one book. Ratings fulfill people's need for social validation, modeling their behavior on what they observe from others or judging « a behavior as correct in a given situation to the degree that we see others performing it» [7]. Relying on the frequency ratings for evaluating books is important in order to assess other users' reviews and comments, and it helps the user make up his own opinion [47]. Although the effect of consumer reviews on sales has been investigated in relation to various products, [11] [12], such as movies [24], craft beer [8], and more specifically online books [6], the main focus of the studies usually relies on three metrics for online word-of-mouth: valence, variance and volume [10]. In this study, we are interested in ratings as a social feature, regardless of its positive-negative valence, or its statistical variance measures, to examine how it influences consumers' attitude toward participation.

Along with ratings, user profiles also support sociality in a Web site. The information provided about contributing

consumers, help others assess the evaluations shared on the Web. Through the similarity-liking principle, attribution theory stresses the source credibility importance to assess message and to influence attitude toward contributing. These profile cues allow consumers to identify people similar to them either in opinions, personality traits, background or lifestyle, as they are more inclined to believe what they say. People trust others who they believe to be like themselves [11]. Amazon's Web site can provide various pieces of information about contributors: username, 'real name', country of residence, number of contributions so far, year when they signed up for their first review. The power of the similarity principle through social conformity, usually translates into mimicry behaviors, where individuals are influenced by others' preferences or actions [12]. If someone similar to them has provided feedback, the online consumer might demonstrate a more positive attitude toward contributing to the Web site. Both unintentional (automatic) and intentional mimicry facilitates and expresses social affiliation and that process is bi-directional – mimicry facilitates affiliation and prosocial behavior and affiliation goals increase mimicry" [35].

4. METHOD AND PROCEDURES

In order to measure the relative importance of the different social functionalities, we tried to assess the user reactions to them in context. It appears important to study emotional reactions in order to adapt computer systems to improve the user experience [6].

In a previous study we had observed a correlation between the ratings scores given by other readers, the user GSR reaction and his intention to buy a book [13]. In this study we are interested in measuring further the importance of the different functionalities of the interface to support the social dimensions of the contribution process.

To address this study's objective, we used a combination of user research methods going beyond traditional opinion and attitude-targeted questionnaires, and usability testing qualitative classical approach based on think-aloud protocols [37]. We complemented these classical sources of data with physiological measures, so as to triangulate the data and obtain a richer perspective on the phenomenon. Twenty-seven (27) participants aged over 18, were recruited via Social Media platforms, extending from various professional groups on LinkedIn to graduate students' networks.

They were invited to complete a navigating task on the famous online retailing community-based Amazon's Web site. The task involved shopping for a book as a gift, choosing between a selection of six books all related to well-being and general health. Participants were also asked to complete a pre-task questionnaire and a post-task one. A twenty-dollar compensation was allocated to participants to the experiment.

4.1. Eye-tracking measures

Eye-tracking was used to determine the various zones that the online users are looking during the test. Based on Amazon's classic elements related to each book presentation in their online catalogue, four zones were defined: Comments (UGC), Description of the book from Amazon, Contributions (number of comments), Ratings (UGC). The different areas of interest (AOI) or the various parts of a Web page which are important for the completion of the task, were determined by looking at the fixations. A fixation is a "relatively stable eye-in-head position within some threshold of dispersion over some minimum duration and with a velocity below some threshold" [2]. The AOI allowed us to see what were the users' emotional reactions in specific points in the Web pages. Using data collected with eye-trackers, design evaluations can be done and recommendations can be provided regarding visual displays [30] [41], Web search tools [17]), advertising content and positioning [25] or brand display [30]. Furthermore, it allows to gain "insight into human performance" [21] [33] or mental effort [16] and it helps to understand "user's decision making while searching and navigating interfaces" [18].

4.2. Physiological measures

Hence, to enhance the understanding of the emotional effect of social functionalities on online users, physiological measurements are required. In many research, researchers can analyze the users' physiological activities in order to inform themselves about the user's experience and their interactions with the computer [46]. More precisely there are many uses in information technology and in relation to affective states [29]. First, there is the biofeedback which has been studied in research for treating paraplegic victims [4] and attention deficit [26] and many more [5]. Second, it is also used when systems need to be adapted to the physiological state of the user as in the case of stress, fatigue or inattention as GSR was found to be linked with stress related to frustration or fear [14]. For our data collection, the galvanic system response (GSR) was used to capture users' emotions. It provides information about the user's interest, mental effort and stress using data from the electric resistance caused by perspiration. The advantages of this method is being able to look at what the user's emotion are during the experiment at a precise point [20]. Also, it is possible to detect emotions that the user is not even aware of [46]. There are disadvantages to this method which regards the "normalization", the signal treatment, and the size of the data collected [40]. Furthermore, as in the case of eye-tracking, during the capture of data, there could be some "noise" which is due to the user's movements or stress related to a task [32].

We were interested in measuring the reactions to the different social functionalities of the interface (Ratings and User profiles) to support the contribution process and the

mediation role of GSR in relation to those functionalities and the resulting attitudes toward contribution (Figure 2 available on the next page). To measure GSR, physiological sensors were placed on two fingers to record skin conductance and the intensity of the user emotional reaction.

4.3. Testing environment

User testing with a shopping task was conducted in the CITÉ/Bell laboratory. We used the MS Internet Explorer® Web browser (version 6.0) on a TOBII T120 unit (eye tracking system). We also used a 17" flat panel control monitor to observe the gaze movement. The processor was Intel® Core™2 CPU 6600@2.40Ghz 2GB of RAM, and the operating system was Windows® XP Pro2002 SP2. The software Tobii Studio 1.0 from Tobii was used to conduct the test and Biograph Infiniti from Thought Technology was used to capture the physiological measures. The testing room set-up conformed to the classic usability testing lab design with separate testing and observation rooms, with the control monitor connected to a computer through a VGA2USB adapter. We recorded comments from the user and the output of the control monitor, with an overlay of the gaze movement. All measures were gathered in a system [9] where it was possible to visualize eye fixations and reactions of users.

5. RESULTS

Focusing on Amazon Web site, we were interested in validating how social features such as ratings and profiles, as part of the online bookstore functional dimensions, have an impact on the consumers navigating this e-commerce site with a goal purchase in mind. Our hypotheses were that Web site features supporting sociality positively influence attitude toward online content contribution.

Table 1. Ratings Effect (presence or absence) (ANOVA)

	SS	df	MS	F	Sig.
Attitude toward contribution	691,764	1;1115	691,764	620,391	0,000

In this study we compared four versions of the Amazon interface: the actual complete interface, and other mock-up instances where the profile of contributors or the ratings, or both were removed. In a classic experimental design, the impact of removing social functionalities were measured on different dependent variables such as 'Intention to contribute', 'Book's interest', 'Buying intention', 'Perceived ease of use', 'Perceived usefulness' and 'Attitude towards Amazon', revealing that ratings significantly influence all of them and most interestingly

'Attitude toward contribution' which is the one we focus upon in the context of this study (See Tables 1 and 2) .

Table2. User profiles effect (presence or absence) (ANOVA)

	SS	df	MS	F	Sig.
Attitude toward contribution	536,822	1;1,191	536,822	450,719	0,000

Mediator variables are «conceptual variables which may account for differences in peoples' behavior. The mediator function of third variable, which represents the generative mechanism through which the focal independent variable is able to influence the dependent variable of interest.» [3]

Figure 1. The mediation variable concept

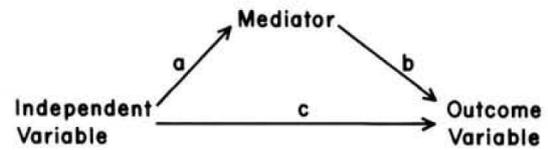
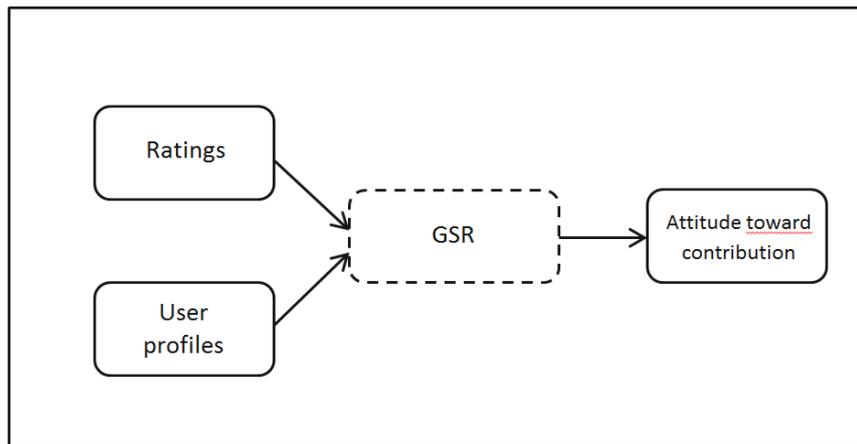


Figure 1 illustrates the role of a mediator variable upon which mediation analysis relies based on various comparative regressions between the two variables of a relation, and the third variable hypothesized as a mediator variable in the relation between the two initial ones.

Figure 2. Research model



5.1 GSR mediation for ratings

Cross-validating various data sources through further analysis, we found that the physiological response of skin conductance (i.e.;GSR) were respectively mediating some of the relationships between the social functionalities and the various consumers' attitudes measured. The attitude toward contribution was the only dependent variable for which the mediation held true both for ratings and user profiles. In order to better understand the effect of rating's presence on a Web site, it is important to acknowledge psycho-physiological reactions which can be collected using the physiological measure of Galvanic System Response (GSR). Relying on mediation hypotheses (illustrated in Figure2) and the corresponding analysis [34], this study observed that the relationships between ratings and books' interest as well as intention to buy a book are mediated by the GSR as shown in Table 3.

Table 3. GSR Mediations (Ratings)

Variable	Relation with ratings	GSR mediation
Attitude toward contribution	$\beta = 0,350$ $p = 0,000$	No specific zone: No Comments: $\beta = 0,122$ $p = 0,001$ Description: No
Intention to contribute	$\beta = 0,399$ $p = 0,000$	No specific zone: No Comments: No Description: No
Book's interest	$\beta = 0,229$ $p = 0,000$	No specific zone: $\beta = 0,086$ $p = 0,000$ Comments: $\beta = 0,098$ $p = 0,009$ Description: $\beta = 0,206$ $p = 0,000$
Buying intention	$\beta = 0,212$ $p = 0,000$	No specific zone: $\beta = 0,170$ $p = 0,000$ Comments: No Description: $\beta = 0,272$ $p = 0,000$
Perceived ease of use	No	N/A
Perceived usefulness	$\beta = 0,268$ $p = 0,000$	No specific zone: No Comments: $\beta = 0,261$ $p = 0,000$ Description: No
Attitude toward Amazon	$\beta = 0,051$ $p = 0,047$	No specific zone: No Comments: No Description: No

To test the mediating relations, we rely on a multi-step procedure illustrated in Figure 1, and in which regression results are compared. Regression results corresponding to the initial relation between the independent and the outcome variables (path c in the «Relationship with ratings» column) are compared to the parallel regression when the mediator variable is introduced between the independent variable (path a) and the outcome variable (path b). The GSR mediations tested for each of these initial relations show significant and complete mediation results as the direct path is still significant when the mediator is introduced. For these results, it is interesting to note that the case was observed when considering the area of interest defined for comments.

A plausible explanation for this result could be that reading comments is not solely processed at the cognitive level. In fact, it has long been established that cognitive activity and emotions have repercussions on the physiological system [23]. Therefore, when the user relies on ratings for the book evaluations, this social functionality increases positively the interest toward the book. This emotional response is mediated by the GSR measure, and shows that it is not only cognitive. When looking at the reviews' comments, as a specific area of interest on the Web page, it was found that ratings are linked to attitude toward contribution, as well as interest toward the books and perceived. The results which are also interesting to mention regarding the usefulness of UGC [34] especially beyond the obvious cognitive dimension related to the processing of the ratings [27], to support their importance at the social level as well in the context of this study. In other words, the emotional dimension of the attitude toward contribution can be explained by the fact that when online consumers have access to features supporting sociability on a Web site - in this case the number of reviews posted by other consumers, and the books' overall rating - it shows active social participation as the site's norm and it influences their attitude toward contribution [46].

In social cognition theory, this phenomenon of influence is referred to as the principle of social proof, stating that "we determine what is correct by finding out what other people think is correct and then we conform.

As mentioned, the principle applies especially to the way we decide what constitutes correct behavior. The situation described can also be reinforced by the reciprocation rule, where one feels they should comply with the group's contributing behavior to reciprocally return the specific favor from which they benefited - and not behave in a way that could make them feel as a social outcast in any way [7]. Also, the participants' interest toward the book increases when comments are provided by other users. Based on consumer decision research [15], and attribution theory to understand online consumer behaviors and choices we can explain this observation via the similarity rule which definitely applies here as consumers will tend to trust other

consumers' opinions more than merchants'. Whether they agree (conform) or disagree (anti-conform) with the reviews content, shaped by the way humans process information and the task environment, consumers infer that as 'buyers vs sellers', they share a common side's interest, whereas the official editors' discourse is interpreted as necessarily biased by the sales profit objective which is opposite to their interest [13]. Finally, the perceived usefulness is more favorable when ratings are present on a page. In short, the ratings are seen as useful in this online context.

5.2 GSR mediation for user profiles

Complementary to the social functionality of ratings, users' profile information can also be considered as a social functionality since it supports the sociability of the Web site as well, providing information about the individuals who rated the books. As shown in Table 4, it was found that user profiles have a global impact on attitude toward contribution which is mediated by GSR as well, regardless of any specific area of interest (i.e.; no specific zone in the page). Attitude toward contribution increases when the profile of other online consumers is shown. In fact, it helps to demonstrate the correlation that exists between the social functionality of user profile, a stimulus, and the improvement of the attitude toward the action of contributing.

Table 4 shows the positive GSR mediation observed between the second social functionality (i.e.; the user profiles), and the variable 'attitude toward contribution'.

Table 4. GSR Mediations (User Profiles)

Variable	Relation with profiles	GSR mediation
Attitude toward contribution	$\beta= 0,190$ $p=0,000$	No specific zone $\beta=0,077$ $p=0,000$

When online consumers acknowledge peers and their respective consumers profile, a psychological reaction takes place. In this case, the cognitive activity is processing profile information such as login names, their correspondence to real names, membership status and duration, regional information, etc. Processing these information leads to a change in attitude toward the contribution via what can be derived from the contributor, and this change of attitude can be emotionally translated and captured by the GSR mediation (Figure 2).

6. CONCLUSION

In this research, we were able to empirically test our hypotheses regarding the influence of social functionalities on the attitude of online consumers toward participation,

when available on an online bookstore Web page in comparison to the case when it is not available.

Furthermore, GSR physiological measures, which is a physiological method of measuring emotions, was used as original and innovative complementary methods for data collection. Our results show that GSR mediates the relationship between social functionalities and attitude of online consumers. The fact that the GSR mediations hold true for both social functionalities, ratings and user profiles, increase the validity and strength of our results.

Because of their social nature, functionalities such as ratings and user profiles give rise to emotional reactions which in turn determine attitude toward online contribution, showing that attitude is not solely resulting from a cognitive process.

Finally, it is possible to conclude that beyond the informative pertinence of UGC content, managers should implement social functionalities in their Web sites and ratings and user profiles in particular, so as to encourage participation, as well as more systematically pay close attention not to overlook the effect of social functionalities design on the attitude and behavior of their online consumers.

7. LIMITATIONS AND FUTURE WORK

This is an exploratory research with limitations in the number of subjects and the length of the experiment, but the main objective was to try and develop the concurrent use of a series of methodological tools to combine the different viewpoints from which to assess the quality of the user experience. One of our next goals would seek to test and verify the same hypotheses with a larger sample, as well as in the context of the evaluation of a non-commercial Web site, where the community's social capital is higher.

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