A System's Self-referential Persuasion: Understanding the Role of Persuasive User Experiences in Committing Social Web Users

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Abstract. This paper discusses how social web platforms try to influence user interactions. We explain this influence from the perspective of persuasion context analysis and provision of persuasive user experiences. Additionally, the paper introduces and expounds on the concept of self-referential persuasion and illustrates its application through discussion and analysis of preliminary results of a survey (N=57) on the use of the social web. The persuasive systems design (PSD) model is utilized to analyze the social influence aspects through analysis of the persuasion context and the subsequent persuasive user experiences.

Keywords: Social web · platform · Social influence · Persuasive systems design · Self-referential persuasion · Persuasive user experience · Humanized web.

1 Introduction

Our contemporary web can be described as the era of the social web, and the future web is becoming even more humanized [16]. The social web platforms provide ecosystems of related elements comprising of both digital and traditional media that leverage the personal relationships embodied in social networks [22, 27]. Thus re-transforming the World Wide Web (WWW) to what it was initially created for "a platform to facilitate information exchange between users" [24]. In the social web user participation and user-generated content in a collaborative and open environment plays an essential role [20].

There are many kinds of information technologies available that have been developed for online collaboration and sharing of user-generated content, and many of these technologies share similar features such as creation of user profiles that disclose whom the user is in contact with, access to others contacts lists, customization of user profiles, private messaging, discussion forums, media uploading, integration with other applications [3, 12] amongst others. In this type of activity, one of the major challenges is how to motivate and encourage different stakeholders and particularly end-users to keep contributing to the operational environment [16]. Especially as users are no longer passive recipients of information and they are increasingly taking

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part in all aspects of value creation [21]. We refer to this as an *information system's self-referential persuasion* where users can not only participate in the co-creation of value, but also leave their own identity into the system [22] and are persuaded to keep using it more.

In overall**,** this paper examines how users interact via social web channels and it sheds light on the inherent features of social networking technologies that purposefully aim at influencing user behaviors. The background stems from a persuasive technology domain, which describes how interactive computing systems have an impact on users' thoughts and consequently lead to a change in their behavior [9, 17]. Persuasive systems design is a growing research area, which has attracted a lot of interest recently. Illustrative examples of research include using persuasive system design models for analyzing carbon management systems [6] or systems for weight management [29] and avoidance of alcohol abuse [15] as well as for studying adherence in the use of health behavior change support systems [14] amongst many others.

The specific focus of this paper, a system's self-referential persuasion, is illustrated through analysis of preliminary results of an Internet survey (N=57) on the use of the social web. The survey covered topics such as reasons for joining a particular platform, the types of platforms used, use history and the kind of information primarily shared in the social web sites. Our analysis also explored the differences between certain categories and demographics of the respondents. An inherent feature in all social web platforms is their appeal to human need for interaction as the basic reason for doing activities online–even though these activities may be different for different people–remains the same [23]. Understanding social influence requires one to understand fundamental aspects of human behavior and these social web platforms with their focus on supporting social interaction–through social design–[7, 16, 23] seem to embody this and should be examined from a social-technical perspective [7].

The rest of the paper discusses other related work and the conceptual underpinning in persuasive systems design (section 2). Section 3 describes the survey methodology, followed by the analysis and results in section 4, which presents data on the importance (from the end-users' viewpoint) of the various features. We conclude by discussing the implications of the findings for persuasive systems design of social web platforms.

2 Related Work

To place our research in context, the current section will be based on two interlinked perspectives related to the social web. These perspectives are persuasive systems design, in particular for understanding the persuasion context, and provision of persuasive user experiences, in particular for committing users.

2.1 The Persuasion Context

Although not related to the social web only, such underlying features as simplicity of use, wide reach and easy accessibility provide social web platforms with an ideal context for influence; also many of the persuasive techniques applied in other computing systems are

equally applicable in these platforms [9]. Additionally, many persuasive strategies and software features can be applied in them. Technological influence depends on whether one is interacting through–computer-mediated communication– or with–human-computer interaction [9]. For example, instant message for people in different locations is interaction through and where a technological product, such as an activity band, is a participant in the interaction and can proactively seek to motivate and influence is interaction with technology.

Oinas-Kukkonen and Harjumaa's [17] persuasive systems design (PSD) model for designing and evaluating persuasive systems suggests that before one is able to implement any of the desired persuasive software features, seven essential postulates behind persuasive systems must be understood. These postulates relate to accessibility and reach, ease of use, making and enforcing of commitments, attitudes and persuasion strategies, sequential nature of persuasion, the ideal moments for initiating persuasive features and openness [17].[1]

Inherent in the above postulates and the PSD model are social psychological theories on attitude change, influence, learning and so forth that help to explain human behavior in different circumstances. Therefore, when developing persuasive systems it is relevant to consider the applicable theories such as the elaboration likelihood model (ELM) [19] which is a theory on attitude change that describes two distinct routes to information processing and persuasion; Bandura's [1, 2] social learning and social cognitive theories which provide a framework for understanding, predicting and changing human behavior and state that people learn new behaviors by studying (the consequences), observing and then replicating the actions of others; and Cialdini's [4, 5] studies on influence which show how formulating requests in certain ways can trigger automatic compliance response from individuals.

After acknowledging the persuasion postulates, the context for persuasion is analysed. *Persuasion context* analysis comprises of recognizing the intent of persuasion, the persuasion event, and the strategies in use [17]. Acknowledging the intent includes determining, who the actual persuader is. Since computers don't have any intentions of their own, the source of persuasion in a system is always one of those who create, distribute, or adopt the persuasive technology [8]. Analyzing the intent also covers defining the change type [18]. The outcome/change design matrix [18] defines the three potential, successful voluntary outcomes of behavior change support systems as formation, alteration, or reinforcement of attitudes, behaviors, or compliance.

As for understanding the persuasion event, the contexts of use, the user, and the technology should be recognized [17]. The use context covers the characteristics of the problem domain in question, the user context includes the differences between the individuals, and the technology context addresses the technical specifications of a system. Finally, identifying the persuasion strategies includes attempting to analyze the persuasive message that is being conveyed and the route, whether direct or indirect, that is used

[1] After this step, the development can commence into designing actual software features, which are categorized by the PSD model as primary task, computer-human dialogue, credibility and social support features. [19]

to reach the persuadee–the end-user [17]. It is important to realize that the persuasion context can be fleshed out as software architecture [cf. 28].

2.2 Persuasive User Experiences

The social web platforms as spheres of influence focus on the consumers' user experience and expand media choices so as to capture reach, intimacy, and engagement [21]. The social web has conjured radical new ways of interacting and presented an unparalleled opportunity for people to network [13]. This is mainly because of it being a platform that provides tools and documentation to enable creation of applications that can be embedded within the respective environments [3, 7, 13, 20, 24].

Interaction online also depends on the medium used, which defines and helps to frame the message. Communication media as explained by the social presence theory differ according to the degree of "social presence". That is, the state of being present between two communicators using a social medium [25]. Some communication media have a higher degree of social presence, for example, characters in virtual environments, whereas others have a lower degree of social presence, for example, e-mail, and audio. The higher the degree of social presence the more a communication medium is viewed as sociable, warm and personal and the larger the social influence that communicators-people interacting with the media-have on one another [24, 25].

One of the most important directions for the future web is providing persuasive user experiences for the masses of users, particularly when people who are not on an organization's payroll still contribute to its success; these users must be motivated, encouraged and persuaded [16]. From persuasive system's point of view, we call this a system's self-referential persuasion. The phases of the behavior chain related to this and referred to in [10] are discovery, superficial involvement and (true) commitment. Discovery and superficial involvement are concerned with becoming aware of a web service by learning about it from friends, for example, and deciding to try it by setting up an account. When trying to understand the platforms, which are already very well known by a large audience, analyzing persuasive strategies for commitment is needed. The success witnessed by the growth of the platforms has hinged on persuading users to perform certain inherently social behaviors. These include, creating value and content that others can consume, staying active and loyal through repeated visits to the site and involving others to use the service by inviting them to be friends and sharing information and links–both social and formal [10].

Fogg [11] explains that the software components and particularly their design can explain how technology creates a persuasive experience (designed to change attitudes and/or behaviors) making the creation and delivery of target behaviors and persuasive goals easier and much faster. Although there are many uses and goals for social web platforms, the main persuasion goals can be broken down to: (1) encourage users to create a personal profile (cf. creating value and content); (2) invite and connect with friends (cf. involving others); (3) respond to others' contributions (cf. creating value and content); and (4) regularly access the site (cf. staying active and loyal) [12].

The stages of the behavior chain and corresponding persuasion goals above have been further elaborated on in [23] where various methods for developing social websites have been discussed. These include the importance of considering the users pri-

mary goal–the intent, the social objects that enable interaction and features, which are possible actions that can be done as derived from the goals and social objects [23]. More recently, Sleeper et al. [26] explore users' behavior-change goals for using the social web platforms. This provides insights to their perceptions of how their lives are affected and informs on tools that can be used to help users achieve the desired behavior change goals [26].

3 Survey Methodology

There have been numerous studies on how social web platforms are used and some such as [3, 13, 21, 24] that discuss the various categories of these platforms and the reasons for joining them[2] were used to generate the list of those included (for user selection) in the survey. As Morris et al. [12] have noted, other than catching up on personal information and current activities (of social ties), many users are utilizing their social web sites as sources of information and productivity. Thus we conducted a survey to explore users' platform preferences, their interactions, the information they primarily share and the features they found most useful. The survey was primarily based on PSD model principles [17] and persuasion goals [10, 12] as these studies discussed features and their target behaviors, which was an important consideration for our study.

3.1 Data Collection

The online survey of social web users in Finland was conducted between December 2 and December 23, 2014. The data was collected using an online survey and analysis tool called Webropol. According to the statistics given by the tool, the total number of visitors was 110 of which 57 responded; thus, the effective survey response rate was 52% (57/110) – albeit a small sample size. All these were valid for further analysis. Prior to publishing the survey online, a pilot test was conducted with 8 (2 senior scholars and 6 doctoral students) participants. Based on the results of the pilot test some questions and Likert scale options were modified.

3.2 Survey Content

In addition to collecting basic demographic and background information about participants' use of social web platforms, the survey asked a number of questions related to reasons for joining a particular platform, satisfaction with the use of the various platforms and the features present in them. Additionally, we requested users to self-report on what they primarily use social websites for and after selecting a particular platform(s), what they share in these platforms. Participants were also asked to rank a set of features found in most social web platforms in order of importance and these were

[2] This was based on the idea of object-centered sociality - http://bit.ly/1oL6JfM - where there are social objects (also discussed in [23]) (work, hobby, friendship etc.) that connect people.

compared to the satisfaction ratings on the same. As with most self-reported data, there is potential for inherent mistakes that the reader should bear in mind.

3.3 Respondent Characteristics and Usage Statistics

There were more male (61.4%) than female respondents, a majority (86%) of the respondents also had a university degree and were mostly (56.1%) in the 25-34 year age range. Detailed characteristics are presented in Table 1. The survey also asked users which social web platforms they mostly used (Table 2) from a given list with an open text option to add extra if not given.

Table 1. Respondent characteristics

Demographics		Frequency	Percentage
Gender	Male	35	61.4%
	Female	22	38.6%
Age	Less than 24	13	22.8%
	25 - 34	32	56.1%
	35 or older	12	21.1%
Marital status	Married	11	19.3%
	In a relationship	20	35.1%
	Single	26	45.6%
Education	High school	6	10.5%
	Vocational training	2	3.5%
	Bachelor's degree	21	36.8%
	Master's degree	23	40.4%
	Other advanced	2	3.5%
	Doctoral degree	3	5.3%

Table 2. Percent of respondents who reported the frequency of access (of 52 Facebook, 47 Youtube, 38 Wikipedia, 37 Linkedin and 31 Twitter users)

Service	Few times a day	Once a day	A few times a week	Once a week or less
Facebook	59.6%	19.2 %	9.6%	5.8%
YouTube	40.4%	25.5 %	25.5%	8.5%
Wikipedia	18.4%	26.3%	31.6%	25.7%
Twitter	12.9%	16.1%	35.5%	34.7%
Linkedin	5.4%	8.1%	18.9%	67.5%

4 Data Analysis and Results

Opinions, level of satisfaction and agreement and the frequencies were reported on 5-point Likert scale, where 5 = the most positive (e.g. strongly agree) and 1 = negative value (e.g., strongly disagree). Participants' responses to what they primarily use the platforms for were coded after first reviewing all the responses and then reading them again to assign them to the respective categories (reason for joining).

4.1 Information Sharing and Use of the Social Platforms

The reasons people had for joining or using the various social platforms were investigated. These reasons (for joining) were divided into five main categories with a sixth option–Other–given for user input. Table 3 shows the categories, their prevalence and examples by categorization of the usage of the social websites.

Table 3. Reason for joining and platform use

Reason	N (%)	Percent	Social platform use
For networking	35 (61.4)	30.4 %	To connect with people, share online resume
For entertainment	31 (54.4)	27.0 %	Music, chat, share photos
Suggestion (friend/family)	28 (49.1)	24.3%	Social updates
Interest in a topic	15 (26.3)	13.0%	Seeking information, news updates
To support a particular cause	3 (5.3)	2.6%	Share information on organizations, local events, news etc.
Other	3 (5.3)	2.6%	Mainly for work-related purposes

The most popular reasons for joining, *networking, entertainment* and *suggestion* all involve a social aspect where users are mainly interested in sharing information with those they already know [11, 12] and consequently to also meet others. This also corresponds with most responses given to the question "*What do you primarily use social web sites for?*" which consisted of communication and connecting with old friends. Additionally, most of the information shared on the various platforms (mainly social networking sites) is of a personal nature or links related to ones' interests. With continuous technological development extending the functionality of the various platforms, both social and professional boundaries have recently become blurred [13] and all or most of the forms of use above could be simultaneous and within one environment.

4.2 Feature Satisfaction Ratings

In the survey there was a question measuring 'user satisfaction' (from 1 very dissatisfied to 5 very satisfied) which consisted of 12 features found in the social platforms. Initially they were 13, but one was removed (open-text input) after testing because it

resulted in the greatest increase in alpha. The scale had a high level of internal consistency as determined by a Cronbach's alpha of 0.865. A summary of the satisfaction ratings is presented in Table 4.

The features with the highest satisfaction ratings included: *inviting and connecting with friends* (M=3.89, SD=0.92), *responding to posts and updates* (M=3.89, SD=1.064), *uploading content* (M=3.74, SD=0.955), *private communication* (within the platforms) (M=3.7, SD=1.085), *creating* (M=3.67, SD=1.075), and *editing profile* (M=3.35, SD=1.142), and *forming groups* (M=3.56, SD=0.866). An independent samples t-test was conducted to compare satisfaction with the features in males and females. There was no significant difference in the scores for male (M=3.49, SD=0.64) and female (M=3.42, SD=0.68) conditions; t (55)=0.36, p = 0.721. A one-way between subjects ANOVA was also conducted to compare the effect of age and level of education on satisfaction. There was no significant effect of age and level of education on satisfaction remembered at the p<.0.05 for the three conditions [F (2, 54) = 4.94 p=0.26] and [F (7, 49) = 1.61 p=0.16]. These results suggest that gender, age and education do not have an effect on satisfaction with the features and the difference in means is likely a result of chance.

Table 4. Summary of feature satisfaction ratings

	Mean	Min	Max	Range	Max / Min	Variance	N of Items
Means	3.463	2.930	3.895	.965	1.329	.109	12

4.3 Feature Rankings

In addition to satisfaction ratings, users were also asked to rank (1=least, 13=most) the features in order of importance. Thus, a higher score corresponded to a higher importance ranking. The features ranked most important were (apart from newsfeed) similar to those users were most satisfied with though the ranking order differed slightly. These were (in descending order): *private communication* (M=9.23, SD=3.89), *editing profile* (M=8.89, SD=3.26), *inviting and connecting with friends* (M=8.74, SD=3.44), *creating profile* (M=8.32, SD=3.51), *responding to posts and updates* (M=8.02, SD=3), *newsfeed* (M=7.91, SD=3.25) and *uploading content* (M=6.18, SD=3.19). Again an independent samples t-test was conducted to compare ranking of the highest ranked feature (private messaging) in males and females. As before, there was no significant difference in the scores for male (M=9.5, SD=3.91) and female (M=8.82, SD=3.9) conditions; t (55)=0.63, p = 0.533. A one-way between subjects ANOVA was also conducted to compare the effect of use history on ranking (of private communication). Consistent with other findings above, there was no significant effect for the three conditions [F (2, 54) = 1.1 p=0.34]. These results suggest that gender and use history do not have an effect on the feature rankings and the difference in means is likely a result of chance and not due to the manipulation of the

grouping variables. It is possible though that a larger sample size might reveal different results with greater variance in the rankings between groups.

5 Self-referential Persuasion in Social Web Platforms

This paper is about a system's self-referential persuasion, i.e. the system's persuasive intent being to refer to itself so that users stay as part of its ecosystem–and are persuaded to frequently use it, even though the system may not necessarily be persuasive in itself. We have presented data from a survey of 57 social web users on the social platforms used, the information shared and the platforms features' usefulness. The data provides valuable insights on the features users consider important and the information they primarily share, which can somewhat be linked to their reason(s) for registering to or frequently using any particular platform.

However, when interpreting the findings, it is important to bear in mind the limitations of our mostly highly educated survey demographic and the sample size that could have had an effect on the significance of some results. It is possible that a larger sample could have led to different findings. Additionally, the survey mainly focused on the features in general without considering the specifics of platform. Although, we did ask users to rank the features based on the one they used most frequently. This information could be used to compare the differences in rankings and satisfaction level (if any) between users of different platforms, which we have not done in this study. We also did not collect respondents' contact details denying us an opportunity for follow up questions that could provide additional insights. Furthermore, in creating persuasive user experiences via technology, user actions determine whether the systems meet their intended purpose [28]. Therefore, supplementing the study with a more extensive survey/multiple surveys to compare differences in user responses over time, use of system logging data and/or interviews to explore certain findings in greater detail are potential avenues for further research. Another avenue for further research that is especially important for persuasive systems design is exploring of unintended consequences from the developers point of view and the gap between their intentions and users' behavior.

The results provide support for the claim put forward by [10] that users creating value and content as well as involving others lead to their staying active and loyal. The features that enable this include: *creating and editing profiles, inviting and connecting with friends, responding to posts and updates, uploading content, newsfeed, and* a result not previously considered is that users value the possibility to *privately communicate* within these social platforms. As most of previous research [7, 11, 13, 20, 21, 23, 24] emphasize the collective, interactive, and interconnected nature of the social web, person-person push communication akin to email is also considered important by users (especially in social networks like Facebook). These features can more precisely be categorized as self-presentation, connecting, communication and regular access.

Creating and editing the profile is a form of self-presentation and enables users to portray a favorable image of themselves and leave their own identity into the system [22]. The other features are of a social nature and they reflect the need for interaction; the extent to which is dependent on the purpose and medium used [7]. The social web

is at the core of people's and businesses' online presence today because it typifies and has a subsequent influence on the current culture of fast information sharing, synchronous communication and interconnectedness [cf. 16]. The possibility to connect with friends or other like-minded individuals is what makes interactions in the social web intriguing. As people primarily utilize the platforms to share their thoughts, views, successes and/or failures, interaction over user-generated content and their responses form the core of such services.

People are more satisfied especially when they see others responding positively to their posts or updates [12]. This pattern of user behavior makes the service more valuable by creating content that others can consume (e.g., videos, polls, breaking news, photos, and links) and form discussions around and adds value to the service [10]. This is also reflected by some of the user responses on what they primarily share. For example, "*my mood, funny pictures, interesting news articles, commenting different events, professional information, links to music videos or inspirational content, status updates concerning my own personal life and photographs*" and so forth. The varying forms and degrees of system use can be explained by the persuasion context, particularly the use context which classifies users according to their usage patterns and familiarity with the respective systems [17]. Users are also frequently reminded of on-going activities through emails (which were ranked lowly compared to the other features) and the newsfeed that provides a snapshot of other users' posts and messages encouraging regular access. Nowadays, the growth of mobile devices has also facilitated regular use as these services can be accessed while on the move and at any moment.

6 Conclusions

This paper has shed light through a survey (N=57) of social web users on the features, which aim at committing social web users into their platforms so that they keep regularly accessing these systems. The key in this system's self-referential persuasion is that these services provide persuasive user experiences, which are able to capture and maintain users' interest on the content provided, thus enhancing frequent visits. Inherent in the persuasive elements are social psychological approaches, which form the basis for crafting the user experiences. That is, even though technology is not the centermost factor it enables and helps in realization of the persuasion intent. Moreover, even if the features in the investigated social web platforms were still relatively limited in terms of persuasive potential, this study suggests that social web platforms are prone to persuasion–they have been built for behavior change in mind.

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