Using Social Influence for Motivating Customers to Generate and Share Feedback

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Abstract. A combination of high tech environments and social influence concepts holds great potential to positively effect behaviors and attitudes of individuals. Drawing upon socio-psychological theories, this study explores how social influence design principles change customer engagement in sharing feedback. For that purpose, an information system consisting of social influence design principles was implemented on situated displays and examined with 77 Twitter users. The results reveal interplay between the design principles and their capacity to explain 52% of the variance in perceived persuasiveness of the system, which can further predict 40% of the variance in behavioral intention of participants to provide feedback through the system in the future. The findings could be instrumental in progress towards a richer understanding of how to further harness social influence for customer engagement through socio-technical environments and how it effects the development of novel persuasive systems.

Keywords: Customer engagement, social influence, persuasive systems design.

1 Introduction

Customers experience greater engagement with organizations when they are able to exchange feedback. It creates a sense of community that encourages open communications [17]. In turn, emerging technologies empower businesses to approach customers in innovative ways [24]. The social web provides the necessary infrastructure for such interaction, and mobile devices enable organizations to gather customer feedback [23]. For example, situated displays nowadays are increasingly entering public places and are being used to draw peoples' attention [12], while individuals evidently use their social media accounts on smart computing devices to interact with them. Such environments create opportunities for ongoing interaction at almost any location [2]. The integral parts of these technology-enhanced environments are information systems that are linked with social media and designed for large displays to support the aforementioned interactivity. Now, the real challenge would be to design operational software features that encourage customer engagement in this kind of setting.

According to Oinas-Kukkonen and Harjumaa [22], information systems can facilitate social influence when augmented with relevant persuasive principles. This

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implies that people in public places could experience social influence not only from others around them, but equally through information systems that are equipped with persuasive design principles. Furthermore, persuasive systems could be classified as social actors [10], and would therefore be capable of retaining their social influence potential even in the absence of other people. Such persuasive systems are helpful in facilitating behavioral and attitudinal change within the novel social context described earlier. For example, publicly displayed systems (screens) could harness social influence design principles to engage people in generating and sharing feedback.

Earlier research about similar environments merely concentrates either on interaction through public screens [21] or on behavior changes urged by interactive environments [18]. There is a need to gain deeper knowledge about how social influence could be further harnessed to engage people through publically displayed systems. Accordingly, the present study attempts to answer the following research question:

RQ: How can social influence design principles persuade people to engage with publically displayed systems that are integrated with social media?

According to Chatterjee and Price [4], studying the ability of persuasive technologies to engage users is a pivotal future research direction. The objective of the present study is to examine how social influence design principles affect the perceived persuasiveness of a publicly displayed system and the behavioral intention of users to engage with it in the future. For that purpose, an information system composed of social influence design principles was developed and empirically examined with 77 Twitter users. The results reveal that the design principles are intricately interconnected and altogether they can explain more than half of the variance in the persuasiveness of the system, which can further predict forty percent of the variance in the behavioral intention of participants to provide feedback through the system in the future.

2 Background

Social influence has a long history in the field of psychology research, where it encompasses several forms of potential influences on human behaviors by way of the actual, imagined, or implied presence of others [26]. Historically, social influence has often been associated with compliance, identification, internalization, obedience, and persuasion, although it is considered distinct from conformity, power, and authority. Current research on social influence falls mainly under areas of minority influence in group settings, dynamic social impact theory, social influence in expectation states theory, and persuasion [5, 6]. The latter is broadly defined as changes in behaviors or attitudes due to information received from others. It focuses on the interaction between source and recipient, thus underpins the theoretical background for this study.

In line with the socio-technical context of this study, Fogg [10] suggests that computers are effective persuaders because of their capacity to maintain a high level of interactivity and adjust influence strategies as situations develop. In addition, they can be more persistent and be accessed ubiquitously. Technologies typically do not seek to influence users on their own, but, through services that can be designed on top of them, they facilitate and simplify the behavior change process.

3 Social Influence Design Principles

As an extension of Fogg's [10] work on persuasive technologies, Oinas-Kukkonen and Harjumaa [22] proposed the Persuasive Systems Design model, which describes the key issues, the process model, and the design principles for developing and evaluating persuasive information systems. The model has previously been examined in various contexts. However, there is limited knowledge about the relations between the model's seven design principles, listed under the social support category [14]. For this research, all seven principles were considered, based on the study context.

Social science theories related to persuasion suggest multiple sources of reference for every social influence design principle that is proposed by the model. When people use information about others to evaluate themselves, they engage in social comparison [9]. More precisely, social comparison is defined as the process of thinking about others in relation to the self [33]. This process influences motivation, as people look for self-enhancement when comparing themselves with others who are worse off, or they look for self-improvement when seeking a positive example for comparison [32].

The influence of others also leads people to conform in order to be liked and accepted [7]. This specific human behavior is guided by perceptions of the popularity of certain behaviors, that is, by social norms. Studies emphasize that both injunctive and descriptive norms are particularly effective in altering peoples' behaviors and attitudes. Injunctive norms inform people about what ought to be done, whereas descriptive norms refer to what most people actually do [5].

Interpersonal factors of cooperation, competition, and recognition provide important intrinsic motivations that would not be present in the absence of other people [16]. Competition and cooperation are directed toward the same social end by at least two individuals [19]. On a social level, people cooperate when they are striving to achieve the same goals or are working together, but compete when they are trying to achieve the same goal that is scarce or are seeking to gain what others are endeavoring to gain at the same time [20]. With independent tasks, combining the scores of different people can encourage cooperation, but providing some salient metric for people to compare their performances could promote competition [16]. Next, recognition could be experienced after competing or cooperating with others [28] or can simply be enjoyed when gaining acceptance and approval from others.

Within a social context, people learn from others by observing their behaviors [3]. This implies that the transmission of information from one individual to another happens through imitation, teaching, and spoken or written language. According to Bandura [3], social learning is ubiquitous and potent because it allows people to avoid the costs of individual learning.

Finally, the mere or imagined presence of people in social situations creates an atmosphere of evaluation, which enhances the performance, speed, and accuracy of well-practiced tasks, but reduces the performance of less familiar tasks. These social facilitation effects occur in the presence of both passive onlookers and people who are actively engaged in the same activity [34].

4 Research Hypotheses and Methodology

The review of related theoretical foundations demonstrates that all seven social influence design principles embrace, in one form or the other, an effect on human attitude and behavior. Attitude, according to Ajzen [1], is defined as peoples' positive or negative feelings about performing a target behavior, and it is the central perspective that must be considered when reflecting on persuasion, as it represents an evaluative integration of cognitions and affects [6]. This implies that peoples' attitudes towards generating and sharing feedback, that is, towards the perceived persuasiveness [15] of the system in this study, are altered by social influence design principles. Thus, hypothesis H1 is formulated for this study as follows: *Social influence design principles positively affect perceived persuasiveness*.

Furthermore, Ajzen [1] suggests that peoples' attitudes towards behaviors are primary determinants of their behavioral intentions and are immediate and important predictors of their actual behavior. This means that people are likely to also share feedback in the future if they retain or develop a positive attitude towards such contribution behavior through persuasive experiences. Thus, hypothesis H2 is formulated as follows: *Perceived persuasiveness positively affects behavioral intention*.

To explore the hypothesized effects of social influence on human attitude and behavior, a persuasive system (hereinafter, the system) was developed with all seven social influence design principles (hereinafter, features) at its core. The system was integrated with Twitter, a popular micro-blogging social media platform that has been found to influence actions outside the virtual world [29].

According to the specified context of the present study, the system was designed for projection on large public screen displays, with an aim to engage users in generating and sharing feedback. Its interface attracted peoples' attention by posing questions at the top of the display (Fig. 1), and users were able to provide feedback using Twitter messages, that is, tweets. As people started using the system, it automatically showed all updates on the screen display, so everyone could follow their own actions and what others were tweeting.

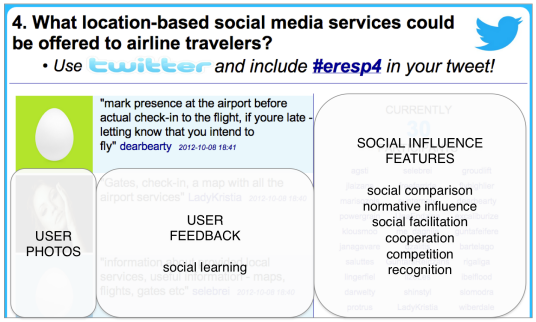

Fig. 1. System display

Feedback provided by users was displayed in the form of a newsfeed on the left side of the display. This feature provided a means for social learning, as it allowed users to observe how others generated tweets and to continuously learn from that [3]. On the right side of the display, the remaining six social influence features were implemented (Fig. 2), rotating in 15-second intervals when the system was used.

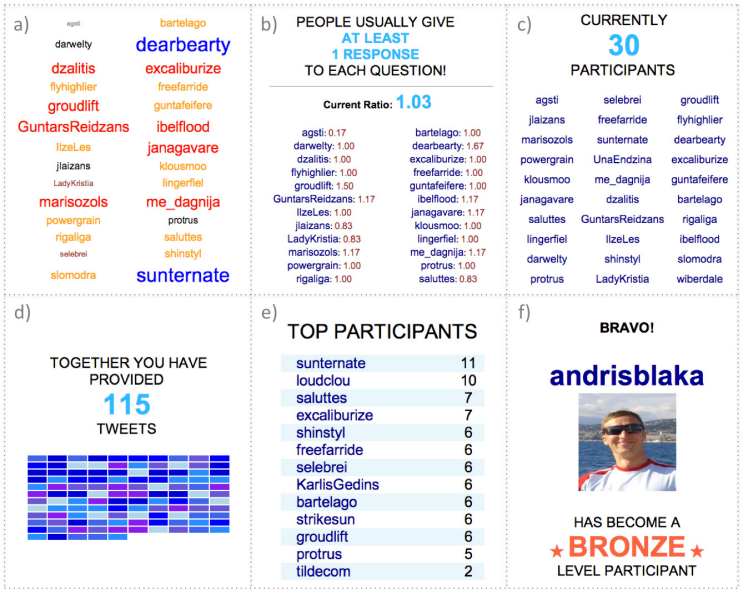

Fig. 2. Social influence features: a) social comparison, b) normative influence, c) social facilitation, d) cooperation, e) competition, and f) recognition

Initially, all features were blank, and, after the first successful tweet, they began to operate and form patterns. Based on the number of tweets provided by each individual, their usernames a) grew in size and changed color to enable social comparison; e) were arranged hierarchically to facilitate competition; and f) were accompanied with their pictures and special titles to express recognition. The total number of provided tweets, that is, of generated and shared feedback messages, was displayed as the result of d) cooperative efforts; and the total number of contributors with their usernames were listed to support c) social facilitation. Finally, b) injunctive norm was provided in the form of a statement (above) and complemented by calculations representing a descriptive norm (below). The implemented features were pretested by three groups of people to assure that they emphasized the intended meaning.

5 Data Collection and Analysis Results

The system was demonstrated in several seminars both in Latvia and Finland. The demonstrations were performed to empirically test the effect of the designed social

influence features. Prior to the demonstrations, the participants were provided a brief description of the system and advised that participation was not obligatory. In all, 77 participants volunteered and used the system. After each demonstration, users filled out an online questionnaire about their experiences using seven-point Likert-type scale indicators (Appendix A). The gender distribution of the participants was 57% female and 43% male. The majority of participants were 25–34 years old (53%), with the next largest group being 35–44 years old (29%).

The collected data was analyzed with partial least squares structural equation modeling (PLS-SEM) using WarpPLS 4.0 software. This method was selected because it is well suited to exploratory research and is appropriate when the purpose of the research is to predict rather than to test established theory [11]. Data analysis with PLS-SEM includes both assessment of the reliability and validity of the measurement model and assessment of the structural model. The measurement model includes the relationships between the constructs (Table 1) and the indicators used to measure them (Appendix A). The measurement instrument for this study was developed based on the theory-driven items, which were pretested with four scholars from the same field of research before the study. Further, the properties of the scales were assessed in terms of item loadings, discriminant validity, and internal consistency, where item loadings and internal consistencies greater than .70 are considered acceptable.

Table 1. Latent variable coefficients and correlations

	COR	CR	AV	VIF	SL	SC	NI	SF	C	CT	RE	PP	BI
SL	.84	.73	.64	1.3	**.80**								
SC	.84	.72	.64	1.5	.05	**.80**							
NI	.89	.82	.73	1.8	.31	.18	**.86**						
SF	.84	.71	.63	1.2	.17	.39	.20	**.79**					
CR	.85	.74	.66	1.6	.33	.19	.54	.16	**.81**				
CT	.87	.78	.69	1.8	.19	.46	.23	.25	.29	**.83**			
RE	.87	.77	.69	1.5	.16	.32	.31	.17	.30	.47	**.83**		
PP	.86	.76	.68	2.5	.42	.12	.58	.17	.50	.45	.31	**.82**	
BI	.96	.94	.90	1.9	.37	.07	.49	.20	.38	.30	.42	.62	**.95**

COR = Composite Reliability; CRA = Cronbach's Alpha; VIF = variance inflation factor (full collinearity); Bolded diagonal = square root of Average Variance Extracted (AVE)

The constructs in the model display good internal consistency, as evidenced by their composite reliability scores, which range from .84 to .96. Inspection of the latent variable correlations and square root of the average variance extracted (AVE) in Table 1 demonstrate that all constructs share more variance with their own indicators than with other constructs, demonstrating adequate internal consistency.

To explore how the designed social influence features affect the perceived persuasiveness of the system, the structural model for this study (Fig. 3) originated from and was shaped upon the strongest correlations between constructs that were observable from the measurement model (Table 1). In the analysis of the model, a PLS mode M

regression algorithm was used, in which the measurement model weights are calculated through a least squares regression, where the latent variable score is the predictor and the indicators are the criteria [13]. In addition, the jackknifing resampling procedure was applied to test the significance of the path coefficients.

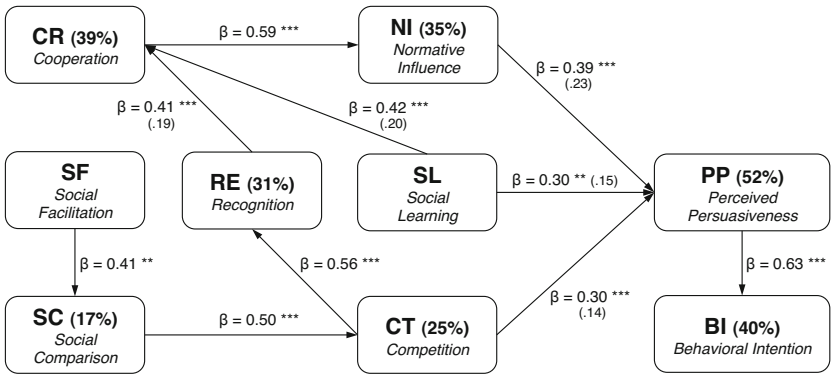

Fig. 3. The structural model with results of PLS-SEM analysis

As can be observed from Figure 3, the results of the PLS-SEM analysis provide substantial support for the structural model. They reveal that the social influence features are intricately interconnected and that altogether they can explain 52% of the variance in perceived persuasiveness of the system, which can further predict 40% of the variance in the behavioral intention of participants to provide feedback through the system in the future. The main direct contributors to explain the variance in perceived persuasiveness were found to be normative influence (23%), social learning (15%), and competition (14%). Social learning and recognition together can explain 39% of the variance in cooperation, which in turn can explain 35 % of the variance in normative influence. Social facilitation can explain 17% of the variance in social comparison, which can further explain 25% of the variance in competition, while it can explain 31% of the variance in recognition. Finally, the β values demonstrate the strength of relationships between the constructs and the asterisks mark their statistical significance, while the R-squared contributions are presented in brackets.

For a more elaborate view of the structural model, total effects and effect sizes for total effects are presented in Table 2. Effect sizes (f^2) determine whether the effects indicated by the path coefficients are small (.02), medium (.15), or large (.35). Additionally, the results of PLS-SEM analysis provide fit and quality indices that support the structural model [13]. Besides reporting the values of average path coefficient (APC = .450, $p < .001$) and average adjusted R-squared (AARS = .329, $p < .001$), the model demonstrates a large explanatory power (GoF = .486). Moreover, both Sympson's paradox ratio (SPR = 1.000) and the nonlinear bivariate causality direction ratio (NLBCDR = 1.000) provide evidence that the model is free from Sympson's paradox instances, and the direction of causality is supported.

Table 2. Total effects and effect sizes

	SF	SC	CT	RE	SL	CR	NI	PP
SC	.41** (.17)							
CT	.21** (.05)	.50*** (.25)						
RE	.11* (.02)	.28*** (.09)	.56*** (.31)					
CR	.05* (.01)	.11** (.02)	.23*** (.07)	.41*** (.19)	.42*** (.20)			
NI	.03* (.01)	.07** (.01)	.13** (.03)	.24*** (.07)	.25*** (.08)	.59*** (.35)		
PP	.07* (.01)	.18*** (.02)	.35*** (.16)	.09** (.03)	.40*** (.20)	.23*** (.12)	.39*** (.23)	
BI	.05* (.01)	.11*** (.01)	.22*** (.07)	.06** (.03)	.25*** (.09)	.15** (.06)	.25*** (.12)	.63*** (.40)

***p < .001; **p < .01; *p < .05; (f^2) = Cohen's f-squared

SF has no inbound arrows (row is empty) and BI has no outbound arrows (column is empty)

6 Discussion

The results of this study reveal the strength and prominence of social influence features in designing persuasive systems for user engagement in sharing feedback through situated displays. The findings provide empirical evidence for the pertinence of the research model, and therefore contribute to the existing body of knowledge.

It is remarkable to discover that the seven social influence design principles can explain more than half of the variance in the perceived persuasiveness of the system (supporting H1), which further can predict forty percent of the variance in the behavioral intention of participants to provide feedback through the system in the future (supporting H2). This implies that social influence design principles affect peoples' behaviors not only when they are using the system, but also affects their attitudes about their future behaviors, indicating that there is a long lasting effect. These findings demonstrate several advances compared to previous research in which, for example, only three features were explored and less variance was explained [30].

The main direct contributors to explain the variance in perceived persuasiveness were found to be normative influence, social learning, and competition. The effects of the first two design principles have been discovered and verified previously [30], while the latter adds another significant contribution that better explains the persuasiveness of the system. According to the relevant theories described earlier, all three design principles, namely social learning [3], normative influence [5, 7], and competition [16, 19, 20, 28], should promote favorable impressions of the given system; that is, they should influence how much people felt persuaded to engage in feedback generation and sharing, and this study confirms that.

The remaining four social influence design principles also indicate substantial effects on perceived persuasiveness, as can be observed from their total effects and effect sizes (Table 2). However, in contrast to the three aforementioned design

principles, they correlated more with other design principles than with perceived persuasiveness (Table 1). Accordingly, it was found that cooperation [16, 19, 20, 28] correlates with and positively affects normative influence [5, 7]. This implies that people in novel contexts tend to acquire and shape social norms through ongoing cooperation [8], that is, through collective feedback generation and sharing, in this study. At the same time, people learn new behaviors by observing others [3]. So, if people can monitor how others contribute, they can learn new ways of collaborating in a certain social context. This explanation provides support for the direct positive effect of social learning on cooperation in the model. Concurrently, cooperation is also positively affected by recognition [16], as indicated in the model. This implies that people appreciate being recognized, which fosters their participation and contribution [25]. As such, recognition motivates individuals to produce more content, and therefore facilitates cooperative efforts.

In competition [16, 19, 20, 28], people strive to achieve more than others and, if successful, they can reach a level where their accomplishments are appreciated and recognized by others [16, 31]. People have a preference for general social recognition, which is scarce by nature, and intensified competition unsurprisingly drives people towards achieving it [27]. This explains the direct positive effect of competition on recognition in the model. Further, humans have a fundamental need to compare their behaviors with those of other people in order to evaluate their abilities and opinions [9, 32, 33]. Additionally, Festinger [9] suggested that social comparison leads to competition and not to matching when abilities and behaviors are evaluated. Consequently, this underpins the finding of a direct positive effect of social comparison on competition in previous studies [31] as well as in the present study. Additionally, the three theoretical concepts, namely, social comparison, competition, and recognition, are already intertwined on the conceptual level, as each of them enables people to determine their individual performance [27, 31], which is not explicitly inherent in the other constructs in the model (Fig. 3).

Finally, social facilitation was found to be in correlation with and to have a direct positive impact on social comparison, which could be explained by social facilitation theory [34], suggesting that people are influenced when surrounded by others. So, the larger the number of users interacting with the system, the more opportunities there are for people to compare their own behaviors with those of others. In summary, the present study revealed the strongest correlations between the seven social influence design principles and their predictive powers to account for the persuasiveness of the system. However, the obtained research model needs to be further investigated and tested in other settings and with various combinations of the design principles.

7 Conclusions

Studies presented in this paper are highly relevant, as they advance the design of future information systems. Along these lines, this study provides both researchers and practitioners with richer insights on how social influence principles could be designed as persuasive software features in information systems aimed at facilitating behavior change. Drawing upon socio-psychological theories and interconnecting them through

the Persuasive Systems Design model [22], the paper explores the effects of social influence design principles on users of the system with respect to their engagement in feedback sharing through social media integrated with situated displays.

The main contributions of this study include the designed social influence features, and the developed measurement instrument and constituted research model, as they supplement the existing body of knowledge and could be instrumental for scholars focusing on research related to social influence effects on user behavior mediated by information systems. Limitations of the study include the setting, where users were able to watch others sharing feedback, and a relatively narrow sample size of respondents. Nevertheless, the obtained research model, the reviewed theoretical concepts, and the design of particular social influence features could be applied and tested in multiple contexts.

This study provides valuable input for further research related to social influence on user behavior and highlights several useful features for designers of persuasive systems. At the same time, organizations could gain direct benefits by designing and launching similar systems on their premises in order to collect feedback from their customers. For example, a screen in a coffee room could potentially engage employees to share feedback about concerns and ideas related to their work.

In the future, where countless screens are increasingly entering public places, including supermarkets, museums, hospitals, schools, restaurants, transportation spots, and even vehicles, such socio-technical systems could gradually become an integral part of these environments, providing a seamless and natural channel for businesses to engage with their customers. These channels could play a significant role in advancing customer relationships on the one hand, while increasing the amount of relevant feedback for organizations on the other, because they enable immediate interaction at the place where customers acquire new experiences about a certain service or product.

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Appendix A: Measurement Items and Combined Loadings

Constructs	Indicators	Load
Social Learning	The system helped me learn from others.	.810
	Observing tweets by others in the system helped me to learn from them.	.808
	I was able to learn from tweets sent by others.	.789
Social Comparison	I was able to compare others' performances in the system.	.869
	In the system, I noticed users with similar behaviors.	.720
	In the system, I was able to compare others based on their activity.	.798
Normative Influence	The system informed me about how most people behave.	.846
	The system displayed common patterns that people generally follow.	.844
	The system explained how people generally respond.	.879
Social Facilitation	I noticed others who were using the system.	.833
	In the system, I was able to observe others participating.	.739
	In the system, I could notice the number of others participants.	.806
Cooperation	The system allowed the users to cooperate.	.850
	The system showed me the results of cooperative efforts among users.	.748
	I noticed that the system enabled cooperation among users.	.834
Competition	The system allowed competition between the users.	.854
	The system stimulated its users to compete.	.859
	I noticed the results of competition among users in the system.	.776
Recognition	Users of the system were publicly recognized for their participation.	.894
	The system recognized its active participants publically.	.701
	I noticed public recognition of active users of the system.	.875
Perceived Persuasiveness	I felt motivated to engage with the system.	.806
	The system motivated me to participate.	.916
	The system influenced my thoughts while I was using/observing it.	.737
Behavioral Intention	I would be willing to try such a system in the future.	.967
	I would like to use the system in the future.	.942
	I would consider using the system in the future.	.932