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Supporting sustained willingness to share knowledge with visual feedback

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ABSTRACT

The goal of this study is to investigate the impact of simple, system-generated visual feedback on motivations to contribute knowledge to community-based crowdsourcing. Various kinds of visual feedback (status, rank contrast, average assimilation, and top assimilation) were created based on social comparison theory and cognitive evaluation theory. In addition, motivation to contribute knowledge over time was investigated. A total of 280 individuals participated in the experiment. The study found that 1) the rank contrast group completed less tasks than the control group, 2) the rank contrast and status group exhibited lower willingness to contribute than the control group, 3) participants who completed all tasks showed increased willingness to contribute over time, and 4) among participants who completed all tasks, social comparisons focused on achievable target goals resulted in greater willingness to further contribute knowledge over time. These findings provide theory-based, empirical support for the potential of external interventions such as visual feedback to influence willingness to contribute and sustain knowledge sharing.

1. Introduction

The emergence of the Internet and Web-based social applications has increasingly allowed individuals to share knowledge and engage in public exchange (Benkler, 2007; Gilbert & Karahalios, 2009; Vassileva, 2012a). Knowledge sharing takes advantage of the voluntary participation of crowds (human collectives) in order to cooperatively create networks, accomplish tasks, or create repositories of knowledge (Grasso & Convertino, 2012; Lévy, 2010; Malone, Laubacher, & Dellarocas, 2009). In addition to public participation (who), successful knowledge sharing also requires a clearly defined goal (what), motivation or incentive (why), and a structure or system to facilitate knowledge sharing (how) (Malone et al., 2009). These four required elements exist to varying degrees in different knowledge sharing systems.

Crowdsourcing is a form of knowledge sharing, which solicits the collective intelligence of the undefined crowd (who) in the form of an open call to address a specific task (what) set forth by a crowdsourcer (organizing individual or institution). Crowds are managed via information technology (how) and motivated by some form of incentive (why). Incentives may be tangible (e.g., prizes or money) (Brabham, 2008; Leimeister, Huber, Bretschneider, & Krcmar, 2009), or intangible (prestige or personal enjoyment). Taken together, the collective intelligence of crowds are then synthesized to meet the goals and objectives of the crowdsourcers (Brabham, 2013; Malone et al., 2009; Prpic, Shukla, Kietzmann, & McCarthy, 2015).

Community-based crowdsourcing is another form of knowledge sharing where the target participant pool is finite, limited to targeted communities (Puah, Bakar, & Ching, 2011). As in crowdsourcing, participants are recruited in the form of an open call, yet rewards for contribution are more often intangibles such as a sense of enjoyment or satisfaction in having given something to the community.

While the success of knowledge sharing relies on individual interests and willingness to voluntarily participate and sustain their contribution (Malone et al., 2009), persuading individuals to share and sustain participation is challenging as inherent interests differ and are difficult to change (Xiong & King, 2015). In an effort to solicit and sustain participation in community-based crowdsourcing, some studies have explored the potential of simple system-generated visual feedback of individuals' contributions and its impact on motivation (e.g., Gilbert & Karahalios, 2009; Kimmerle & Cress, 2009). This study aims to further investigate the impact of simple system-generated visual feedback on participant motivation and sustained contribution.

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2. Theoretical framework

2.1. Information visualization in knowledge sharing

Information visualization allows people to communicate and analyse data through graphical representations. When underlying data is successfully transformed into visual representation, it can provide individuals with an immediate understanding of data without need for further explanation (Chen, 2006; Ware, 2013). Visualizations may be further presented to help individuals identify personally relevant information from a set of data.

In a knowledge sharing environment where underlying data such as social cues or group behavioural patterns are not explicitly available, transforming these data into salient visual formats may provide information which form individuals' perceptions of the group. Visualizations can represent individual contributions while additionally comparing these contributions with those of others, thus providing greater awareness of one's standing or performance within an online community (Falakmasir, Hsiao, Mazzola, Grant, & Brusilovsky, 2012). This group awareness then guides individuals' behaviour to conform to the group norm (Cress & Kimmerle, 2007). The degree to which individuals conform to the group norm, however, can be influenced by identifiability or anonymity; individuals have been shown to have greater knowledge sharing tendencies when identity is made explicit (Cress & Kimmerle, 2008). Individuals who perceive themselves as having more knowledge than others, however, are less influenced by identifiability and tend to share their information regardless (Cress & Kimmerle, 2008).

Many knowledge sharing communities and projects have adopted visualizations to facilitate group and self awareness to promote contribution (Arazy et al., 2010; Gilbert & Karahalios, 2009; Vassileva, 2012b). The insight facilitated by these visualizations has been shown to help encourage individuals to share their knowledge and to sustain their motivation to participate. Enhanced individual motivation (Kimmerle & Cress, 2009) and self and group awareness have been further shown to encourage reflection based on personal performance (Gilbert & Karahalios, 2009).

2.2. Social comparison theory

Social comparison theory seeks to explain the innate tendency of individuals to compare themselves, their actions, and their characteristics with those of others (Goethals, 1986). Individuals engage in these comparison behaviours in order to self-evaluate or assess comparative personal standing, raise self-esteem, and/or improve their own abilities (Buunk & Gibbons, 2007; Festinger, 1954; Suls, Martin, & Wheeler, 2002). Social comparisons thus can influence how individuals view themselves relative to others; and the results of these comparisons can influence goals, sense of well-being, and the concept of self (Suls et al., 2002). In order to engage in a meaningful comparison, however, individuals need to be provided with an explicit target (Collins, 1996).

Social comparisons are fundamentally the identification of similarities and dissimilarities between one's own characteristics and those of others. In the process of such evaluations, a decision of similarity of self with others (assimilation) results in a conclusion that one's own characteristics and abilities are therefore similar. A decision of dissimilarity (contrast) conversely results in a conclusion that one's own characteristics and abilities do not match those of others (Mussweiler, Rütter, & Epstude, 2004; Suls et al., 2002; Vassileva, 2012a). Self-evaluations of abilities and behaviours have been shown to correspond with the adoption of either an assimilation or contrast position.

The direction of comparisons individuals make, upward or downward, has further implications in social comparison theory (e.g., Buunk, Collins, Taylor, VanYperen, & Dakof, 1990; Suls et al., 2002). Upward comparisons with slightly higher performers are associated with self-improvement (achievement) motivations. Downward comparisons with lower performers, on the other hand, are associated with self-enhancement (self-esteem) motivations (Buunk & Gibbons, 2007; Festinger, 1954). It has been further noted that feelings of autonomy in a given situation will increase the probability of assimilating with an upward reference point (seeking improvement) and conversely with the probability of contrast with a downward reference point (avoiding failure) (Buunk & Gibbons, 2007).

2.3. Cognitive evaluation theory

Cognitive evaluation theory is a sub-theory of self-determination theory. In line with self-determination theory, cognitive evaluation theory is based on understanding the intrinsic and extrinsic motivations of individuals (Deci & Ryan, 1985). Individuals internally self-motivated to engage in an activity for personal enjoyment, enrichment, and satisfaction are described as intrinsically motivated. Individuals who are persuaded to engage in an activity by external interventions such as monetary rewards, point systems, and rating systems are described as extrinsically motivated (Hau & Kim, 2011).

The main focus of cognitive evaluation theory is on how internal feelings of autonomy and competence can influence intrinsic motivation. External interventions that accommodate individuals' needs for competence and autonomy are also indicated as supportive of intrinsic motivation. For example, competence-enhancing external intervention (i.e. positive feedback) was found to increase intrinsic motivation (Hagger, Koch, & Chatzisarantis, 2015; Vallerand & Reid, 1984; Zheng, Li, & Hou, 2011). Autonomy-enhancing external intervention (e.g., choice) has also been found to support intrinsic motivation (Patall, Cooper, & Robinson, 2008; Shoemaker, 2014; Vandereycken & Vansteenkiste, 2009). When individuals perceive their level of competence and autonomy to be higher, they exhibit more self-determined motivation (Shoemaker, 2014; Zheng et al., 2011).

3. Material and research methodology

3.1. Hypotheses and study design

According to the social comparison theory, individuals' views of themselves in comparison to others have an impact on goals, well-being, and concept of self, leading to different behaviours. In an effort to investigate the impact of simple system-generated visual feedback on participant motivation and sustained contribution, this study hypothesized that visual feedback focused on social comparison would have differing impacts on completion ratio and willingness to further contribute.

- H1. The mean completion ratio for the visual feedback groups in a series of knowledge sharing tasks will not be the same as the completion ratio for the control group.
- H2. Among the participants who do not complete all knowledge sharing tasks, the visual feedback groups' mean willingness to further contribute as indicated in the last completed task will not be the same as the mean of the control group.
- H3. Among the participants who complete all knowledge sharing tasks, the visual feedback groups' mean willingness to further contribute will not be the same as the mean of the control group.

Cognitive evaluation theory suggests that intrinsic motivation is either supported or diminished by internalized feelings of