Bazaar Motivations:
Exploring Participation in Collectively Sourced Projects

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Abstract

The networked structure of the Internet affords distributed participant contribution to an array of projects, a phenomenon described by Raymond (1998) as a bazaar model of development. Included in, and related to this type of production is human computation, crowdsourcing, social computing, and peer production. A common element in each of these areas is voluntary participation. Given that participation is voluntary, prior research has explored motivation in a variety of contexts including citizen science, social networking sites, skill-based crowdsourcing applications, and public engagement projects. However, as each of these studies use different measurements of motivation it is not possible to accurately compare motivations between different contexts or identify overarching variables that affect motivation. Haythornthwaite (2009) theorizes that motivation is linked not to the project itself, but to the level or weight of participants' contributions to the project. Through surveys and interviews this study will examine motivations across sites and between varying weights of contribution. Results will contribute to an empirically grounded examination of motivation for participation in collectively sourced projects.

Author Keywords:

Motivation; crowdsourcing; human computation; peer production; online communities

Introduction

The networked structure of the Internet provides geographically dispersed users with the opportunity to work collaboratively and cooperatively on shared projects. The success of the Linux operating system, despite its seemingly chaotic development, prompted Raymond (1998) to liken this type of production to a bazaar. Since the late 1990s, a variety of similar models of production have become popular among both users and institutions. These models include human computation, crowd sourcing, social computing, and peer production. A common element of each of these models is that they are sourced by voluntary contributions. Given that contribution is voluntary, research into the motivations of participants has been widely studied. However, while Haythornthwaite (2009) theorized that the weight of production models, based on intensity of contribution, commitment to the project, and engagement with other collaborators, affects motivation, this theory has not been tested across a variety of contexts and model weights. The primary motivation of this study is to ground this theory empirically and explore other explanatory factors of motivation. The secondary motivation of this study is to develop a motivation scale that can be reused in a variety of contexts.

Background

The background section is divided into two subsections. The Crowds and Communities subsection provides details on the research areas included in the current project. The Motivation subsection describes characteristics of participants' motivations and outlines a selection of case studies on motivation in collectively sourced projects.

Crowds and Communities

A spectrum of related and convergent research areas address the ways in which users complete tasks through computer mediation. These research areas include human computation, crowdsourcing, social computing, collective intelligence, and peer production. While related, each research area has defining characteristics.

In *human computation* tasks completed by users fit the paradigm of computation; i.e., it is feasible that the tasks performed by participants may one day be solvable by computers. Additionally, tasks must be performed through

a computational system or process (Quinn and Bederson 2011). Unlike human computation, the tasks performed by *crowdsourcing* participants do not have to fit within an existing paradigm. Rather, the defining feature of crowdsourcing is the source of the task rather than the type of task; crowdsourcing

> is the act of a company or institution taking a function once performed by employees and outsourcing it to an undefined (and generally large) network of people in the form of an open call (Howe 2006, para. 4).

Human computation and crowdsourcing may overlap. For example, an institution may use Amazon's Mechanical Turk to source labour for computational tasks.

The focus of *social computing* and *collective intelligence* is people rather than task. Social computing has a broad scope, and includes the use of technologies such blogs, microblogs, and social networking sites. In social computing, humans use computers to facilitate natural human behaviour. Collective intelligence is the "overarching notion that large groups of loosely organized people can accomplish great things while working together" (Quinn and Bederson 2011, p. 1405). In collective intelligence, task is implicit and humans are emphasized.

In *peer production*, emphasis is placed on both the task and the people completing the task. Benkler (forthcoming) describes three defining characteristics of peer production: first, problems and solutions are decentralized, second, users have diverse motivations for participation, and third, ownership and contract are irrelevant to the organizational structure. The third defining characteristic of peer production is what distinguishes it from other forms of collectively sourced work. In peer production, copyright and ownership of the project is irrelevant to who does what task within a project. Tasks are not preselected or preconceived, as is the case in human computation and crowdsourcing (Benkler forthcoming). For example, Wikipedians choose which articles they edit and may add new articles, whereas Turkers (those who participate in projects sourced through Mechanical Turk) are paid to complete specific tasks such as text identification or search result evaluation.

Human computation, crowdsourcing, social computing, collective intelligence, and peer production are highly related: each research area examines aspects of distributed individuals completing projects mediated by computers. Rather than defining and differentiating collectively sourced projects by task type or source, Haythornthwaite (2009) emphasizes the degree, or weight of participants' contribution, commitment to the project, and engagement with other collaborators. "Lightweight" describes scenarios in which contribution is minimal and often rule-based. Contribution is independent and contributors are not required to make a long-term commitment to the project or the group. Lightweight models are often crowd-based (Haythornthwaite 2009).

"Heavyweight" describes commitment to the community as well as to the project. Heavyweight involvement requires more time and energy; sustained involvement involves understanding and developing norms of interaction. Heavyweight models are often community-based (Haythornthwaite 2009).

Lightweight and heavyweight practices describe overlapping patterns of behaviour and therefore may overlap in a single project. For example, in their study on Old Weather, a citizen science project where participants transcribe scanned shipping logs, participation was both lightweight and heavyweight (Eveleigh et al. 2014).

Motivations

Motivations for participating in collectively sourced projects have been studied in a variety of contexts and with a variety of intents. Prior research has identified motivations for participation in specific contexts (e.g., Brabham 2008, 2010, and 2012; Budhathoki and Haythornthwaite 2009; Huberman, Romero and Wu 2009; Kauffman, Schulze and Veit 2011; Raddick et al. 2013), has aimed to increase motivation (e.g., Eveleigh et al. 2014; Zheng, Li and Hou 2011), and has identified strategies to use motivations to increase performance and quality of output (e.g., Huang and Fu 2013; Sampath, Rajeshuni and Indurkhya 2014). This section first discusses aspects of motivations addressed by the literature then outlines the results of a selection of case studies.

Characteristics of motivation

Motivations for participating in collectively sourced projects are treated by the literature in one of two ways: motivations are either considered individually (Brabham 2008, 2010; Huberman, Romero and Wu 2009; Quinn and Bederson 2011; Raddick et al. 2013) or are grouped into categories, most notably, intrinsic and extrinsic (Brabham 2012; Budhathoki and Haythornthwaite 2013; Eveleigh et al. 2014; Haythornthwaite 2009; Kauffman, Schulz and Veit 2011; Zheng, Li and Hu 2011). Intrinsic motivations stem from the task itself and are personally motivated. Coorientation to project goals or ideals is an example of an intrinsic motivation (Haythornthwaite 2009). Extrinsic motivations are rooted in the outcome of the task.

Interaction with community members is an example of an extrinsic motivation (Eveleigh et al. 2014).

Motivations may change over time. Preece and Shneiderman (2009) describe a model of social media involvement in which users transition from "reader" to "leader." When users first join social networking sites, they begin by reading contributions, and then participate peripherally and eventually add content to the site. Finally, they may take a leadership role. Users who contribute to peer production, crowdsourcing, and human computation projects may follow a similar trajectory, developing extrinsic motivations over time.

On a similar spectrum, Haythornthwaite (2009) theorizes that project weight affects motivation. Lightweight models of collectively sourced projects are associated with intrinsic motivations. Participants are motivated by quantitative recognition mechanisms that are internally relevant to the system. Conversely, heavyweight models are associated with both intrinsic and extrinsic motivations. Participants are rewarded with qualitative recognition that is also permeable to outside fields and contributions are judged for quality and expertise (Haythornthwaite 2009).

Case studies on motivation

The following case studies include examples of human computation and crowdsourcing and include lightweight and heavyweight models.

Galaxy Zoo and Old Weather are part of Zooniverse, a citizen science web portal that offers users the opportunity to participate in a variety of human computation tasks. In Galaxy Zoo, participants look at pictures of galaxies and assist with morphological classification. Raddick et al. (2013) surveyed participants to identify their motivations for participating and found that the desire to contribute to scientific research and identification with the project's goals were the top motivators. Participants were least motivated by the desire to learn about science and community participation. Eveleigh et al. (2014) surveyed users to discover their motivations for participating in Old Weather and compared participants' motives to their contribution logs. Findings indicated that contribution intensity was linked to both intrinsic and extrinsic motivation. Higher intrinsic motivation was associated with more contributions and greater depth of participation while higher extrinsic motivation was only associated with a greater number of contributions. Eveleigh at al. (2014) concluded that extrinsically motivated volunteers are more likely to be causally engaged with the project while intrinsically motivated volunteers are more likely to contribute in depth and form a community. High contribution scored significantly higher for both intrinsic and extrinsic motivators suggesting a relationship between motivation and contribution. In both Galaxy Zoo and Old Weather, the majority of the respondents indicated that they were primarily motivated by task; only a small core group were motivated by social interaction.

Similarly, Kauffman et al. (2011) found that participation among Turkers was primarily intrinsically motivated. Other than pay, which the authors discounted due to social desirability bias, the most frequently selected motivators were fun and enjoyment, task autonomy and skill variety.

Mechanical Turk and the Zooniverse portal support human computation tasks. Case studies have also examined users' motivations for participating in crowdsourced projects. Huberman, Romero and Wu (2009) analyzed YouTube's upload data to explore relationships between how many videos users upload (i.e., how much content they contribute) and how much attention their videos receive from viewers (by number of views). Results indicated that motivation to contribute was correlated with the amount of attention a video received. Further statistical tests indicated that the relationship was also causal; the more attention they got, the more users were motivated to contribute.

Brabham (2008; 2010) examined the motivations of users that engaged in skill-based crowdsourced projects. Users of iStock, a company which crowdsources stock photos for resale and Threadless, a company which crowdsources t-shirt designs, were surveyed and interviewed about their motivations for contributing to each of these two projects. The strongest motivators for each were making money and developing skills. However, while iStock users were uninterested in developing a community, the love of the community was a strong motivator for Threadless participants. Brabham (2010) concluded that the best crowdsourcing applications are the ones in which participants engage with and seek to cultivate community.

Unlike users of iStock and Threadless who receive payment for their contributions, participants in the Next Stop Design Project, a crowdsourced project to encourage public engagement in transit planning, received no monetary reward for contribution (Brabham, 2012). The strongest motivators for participating in the Next Stop Design project were career advancement, peer recognition, contribution to a collaborative effort, self expression, and having fun. Having fun and learning new skills were the strongest motivators. Motivations were intrinsic and extrinsic, as well as rational, affective, and norm-based.

Like the Next Stop Design Project, contributions to OpenStreetMap are also unpaid. OpenStreetMap is a free editable map of the world comprised of geographic data sourced by volunteers. Budhathoki and Haythornthwaite (2012) surveyed OpenStreetMap volunteers to examine both intrinsic and extrinsic motivators; like Eveleigh et al. (2014), Budhathoki and Haythornthwaite (2012) mapped

motivators to contribution. Causal mappers' motivations were associated with the overall goals of the project; because they are less engaged with the project, they have fewer opportunities to develop varied motivations. Serious mappers were more likely to cite career advancement as a motivator and were more involved with the community and community specific goals than were causal mappers.

While the list of case studies reviewed here is far from exhaustive, within this set of examples patterns of motivations begin to emerge: there appears to be a relationship between weight of production and motivation (Haythornthwaite 2009). However, because methodologies and survey instruments are varied, the link between production model weight and motivation has not been empirically tested across a variety of contexts. The following sections review how I intend to explore the relationship between motivation and weighted models of production.

Proposed Research

To examine the impact of weight on motivation, I pose the following high-level research questions:

RQ1: What motivates people to participate in collectively sourced projects?

RQ2: What is the relationship between lightweight and heavyweight models of production and participant motivation?

RQ2a: What is the relationship between weight and motivational construct?

RQ2b: What is the relationship between weight and motivation type?

A factor analysis conducted by Budhathoki and Haythornthwaite (2013) resulted in the identification of seven motivational constructs: monetary reward, learning, self-efficacy regarding local knowledge, personal promotion, altruism, project goal, and personal need. Motivation type refers to intrinsic and extrinsic motivators.

To respond to these research questions, I intend to survey participants in selected collectively sourced projects through online questionnaires and interviews. Initially, each project will be treated as a case study. Case studies will include examples from a variety of types of collectively sourced projects along the spectrum of production weights. Data collection in the case studies will employ a sequential explanatory strategy; I will first distribute a survey to participants and then conduct follow-up interviews with a selection of respondents to explicate survey results (Creswell 2009). After data is collected from each of the cases, I will analyze the data across the case studies to determine if there are patterns within lightweight and heavyweight models of production and convergences between the models. As of writing, the questionnaire is under development and the first case study has been selected.

Questionnaire

The questionnaire is derived from the survey instrument developed by Budhathoki and Haythornthwaite (2013); due to context-specific questions like "When I see information about the places I know missing from OpenStreetMap, I map them" it is not feasible to reproduce the questionnaire in its entirety. Rather than tailoring the questionnaire to address context-specific motivations, the questionnaire will be structured so that it is broadly applicable and reproducible in a variety of contexts. The final survey will ask approximately 50 questions using a seven-point Likert-type scale plus an additional 15 questions to obtain demographic information, information on respondents' patterns of contribution to the project, and information on how long respondents have been involved with the project. Respondents will be asked to indicate whether or not they are willing to be contacted for a follow up interview. The survey recruitment device will emphasize that all contributors are welcome to participate, including peripheral participators and lurkers.

Case Study #1 - #hcsmca

#hcsmca (Healthcare Social Media Canada) is a Twitter community devoted to making healthcare more open and connected through discussion. The community was founded in September 2010 by Colleen Young and is maintained through four social media platforms: Twitter, a LinkedIn group, a Facebook page, and the founder's blog. Twitter is the primary media platform for the group. The group meets on Twitter weekly to discuss healthcare related topics. To streamline the discussion, all posts include the hashtag #hcsmca. Topics and moderators are announced in advance. Gruzd and Haythornthwaite (2013) conducted a network analysis on the #hcsmca Twitter network and found that social media health content providers were the most influential group in the network, but found that connections between community members was not constrained by professional status. The network analysis provided insight into the structure of the community and the relationships between members; however, community members' motivations for contributing to the discussion or following the hashtag are unknown. This case study will contribute to research that is currently being conducted as part of the GRAND NCE (Graphics Animation and New Media Network of Centres of Excellence) project LEARNSOCIAL. As project champion of LEARNSOCIAL, Colleen Young has granted

permission to use #hcsmca as a case study. GRAND is Canada's largest digital media research network and is federally funded through the Networks of Centres of Excellence Program. GRAND supports 23 interdisciplinary research projects including LEARNSOCIAL.

Research Challenges

As highlighted by the background literature, there are a variety of types of collectively sourced projects that emphasize elements such as task type and project source. The most significant research challenge I expect to encounter is identifying appropriate and representative cases from a variety of project types from the spectrum of weight models.

Currently, the primary focus of my research is examining the effect of one independent variable (weight) across types and constructs of motivations. I would like to discuss the possibility of including other independent and dependent variables in my analysis.

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