RC24440 (W0711-208) November 28, 2007
Computer Science

IBM Research Report

Motivating Online Expertise-Sharing for Informal Learning: The Influence of Age and Tenure in Knowledge Organizations

David Huffaker
Northwestern University

Jennifer Lai
IBM Research Division
Thomas J. Watson Research Center
P.O. Box 704
Yorktown Heights, NY 10598

Research Division
Almaden - Austin - Beijing - Cambridge - Haifa - India - T. J. Watson - Tokyo - Zurich

Motivating Online Expertise-Sharing for Informal Learning: The Influence of Age and Tenure in Knowledge Organizations

David Huffaker
Northwestern University
d-huffaker@northwestern.edu

Jennifer Lai
IBM Research
lai@watson.ibm.com

Abstract

This paper examines motivations of knowledge workers to contribute expertise to online knowledge repositories that support informal learning, and presents findings from both a survey and an experimental study. Results indicate that younger workers and those new to an organization, are more motivated by 'self-interest' factors such as gaining name recognition and impressing management, while older workers, and those with a longer tenure, are motivated by more altruistic factors such as sharing and mentoring. These findings point to a need for designers of expertise-sharing systems to emphasize attributes that rapidly build a sense of community, as well as structuring rewards that appropriately motivate those that are new to the community who will not be satisfied by the intrinsic values alone.

1. Introduction

Online communities are multiplying on the Internet, and through them, a vast amount of information is being created and accessed. While communities that focus on everyday things such as exchanging goods, sharing opinions or co-authoring articles (e.g. X1) are becoming better understood, it is still unclear which models of participation to apply when these communities exist in the workplace, where the public good must compete with demands like achieving business goals, satisfying shareholders and maintaining respect for the bottom line.

Also, while many of these online communities grow and become self-sustaining, just as many wither away into oblivion. The primary difference between one that grows and one that dies is usually related to the rate of participation of its community members. Since the core currency of these communities is content created by members for other members, if people are not motivated to contribute it is safe to assume that the online community is destined for failure. As corporations begin to understand the value of informal learning that can be derived from online expertise-sharing communities, it is important to define the parameters that contribute to learning and participation in this context. Studies of traditional communities have reported contradictory findings, with some citing altruism as the primary motivating factor for contribution and others citing self-interest as the driving factor. Clearly motivation for participation depends not only on the type of community, but also on the nature of the contributions, and the context of the interaction. In this paper we attempt to define part of the landscape for that range of motivators/communities by studying the motivations of knowledge workers contributing to an online expertise-sharing community in the workplace. We ask, to what extent does age of knowledge workers and tenure in a knowledge organization influence motivation to share expertise in online communities? In order to answer this question, we draw on literature in learning science, economics, psychology and computer-mediated communication.

2. Background

Communities in the physical world have been fairly well understood for some time; where a 'sense of community' is often defined as a shared faith that members' needs will be met through their commitment to be together [1]. Scholars have argued that a strong sense of community contributes to better collaborations and learning outcomes [2], and economists have demonstrated how a sense of belongingness in the workplace results in greater productivity [3].

More recent research has shifted focus from physical world communities to contributions in online

communities. Studies of Usenet [4], open-source software communities [5, 6] and a movie-rating web site [7] find that users with a stronger sense of community contribute more than their counterparts. Previous research has also shown that a sense of community is directly linked to reciprocal knowledge-sharing [8] and that students who are prominent and central to a learning community have a strong influence on the perceptions and behaviors of other learners in the group [9].

Less work has been done studying motivation to contribute to online communities in workplace settings. Generally, users often cite intrinsic reasons for participating in an online community, including contributing to a public good, and helping or mentoring others [10-12]. However, other studies suggest that users are motivated by self-interest, including personal gain, an expectation of reciprocity, or recognition among peers [13, 14].

For example, Hars & Ou [5] found both intrinsic factors (i.e., altruism) and external rewards (i.e., future financial gain) as key motivators for contributing expertise to open-source software communities. While Hummel et al [15] found that tangible incentives, such as rewarding learners with a point system that opened additional features in an online learning community, improved participation rates, Hemetsberger [13] found that most knowledge is exchanged voluntarily in online communities, and that users are strongly motivated by intangible factors such as peer interaction and social exchange.

Given this wide-ranging set of motivators, which encompass both altruism and self-interest, the question arises as to whether certain motivators actually result in more contribution, and if some factors are more effective than others for a given user profile. For example, the age and tenure of a worker might impact their motivation to contribute to an organization including their concern with intangible rewards such as name recognition or being noticed by management versus tangible rewards such as a token monetary bonus [16].

The purpose of our study is to probe in greater detail what motivates individuals to contribute to an online community in a workplace setting, and to gather a better understanding of the effects of altruistic and self-interested factors on different types of knowledge workers. Thus we first sent out a survey to begin to categorize the primary motivators for participation amongst a range of knowledge workers – with varying job roles and ages, from both genders. We followed up the survey with an experimental study, to test if people actually followed through on what they 'said' they would do in the survey. In other words, under what circumstances would people actually take time out of their busy days to contribute expertise to an online community,

3. Survey

We sent a mass email within IBM that included researchers, interns, engineers and consultants, with a link in the email to an online survey. In total, 168 participants (58% male, 42% female) completed the entire survey (instances where parts of the survey remained unanswered were discarded).

3.1. Survey Method

Participants were provided with an expertise-sharing scenario and were asked to rank-order their reasons for contributing to such a community. The scenario given was as follows:

For these next questions, the setting is an online community at IBM where you have the opportunity to ask and answer questions of your peers in the community. The community is specific to your job role and you have the ability to specify whether you prefer to receive questions by Instant Messaging or by email. You can also specify the number of questions per week you are willing to answer. A co-worker would see your name associated with expertise for a specific topic or set of topics. Think about what motivates you to contribute or not.

Participants were also asked their preferred type of feedback mechanism (e.g., a point system or written feedback); and how they would like to be recognized/rewarded for contributing (e.g., by their manager or with a token monetary bonus). The survey relied on 5-point Likert-type scales to capture attitudes and preferences (1 = weakest, 5 = strongest). Demographic data was also collected for each survey respondent so that we could analyze the results to see if any trends emerged along gender, job role, age group or years with the company.

3.2. Survey Results

ANOVAs were used to find significant differences, and contrast tests were used to reveal where the differences lay between age groups and years at IBM with regard to motivation. Tables 1 and 2 show the statistically significant findings from the survey by age group (table 1) and years with the company (table 2).

The reason "helping the community" demonstrated significant differences ($F(3,163)=6.07$, $p<.01$) with contrast tests revealing that employees in the 41-50 age

group identified this reason as the primary motivator significantly more than employees in the 21-30 age group. Additionally, mentorship (i.e. 'I contribute because I enjoy being a mentor to others') was selected as a primary motivator by employees in the 51+ group significantly more often than knowledge workers the 21-30 group ($F(3,163) = 3.12$, $p<.05$).

There were also significant differences among employees regarding management recognition ($F(3,163) = 7.12$, $p<.01$), and name recognition among peers ($F(3,163) = 3.35$, $p<.05$). Contrast tests revealed that employees in the 21-30 age-group were significantly more likely to select management recognition (i.e. "I contribute because I want my manager to notice my work") as the primary motivator, than employees in the 51+ age group. Similarly, the 31-40 age group significantly preferred peer name recognition than their counterparts in the 51+ age group.

	Age Group			
I contribute because…	**21-30 N = 57**	**31-40 N = 27**	**41-50 N = 44**	**51+ N = 39**
Helps IBM community	3.30*** (1.32)	3.59 (1.34)	4.27*** (0.87)	3.92 (1.16)
Being a mentor to others	3.21* (1.49)	3.70 (1.30)	3.43 (1.15)	3.97* (0.93)
Gain name recognition from my peers	2.84 (1.18)	3.41* (1.22)	2.75 (1.164)	2.51* (1.02)
Want my manager to notice my work	2.25* (1.26)	2.04 (1.32)	1.25* (0.53)	1.74 (1.19)

Note. *p<.05, **p<.01, ***p<.001, denoting pairwise differences

Table 1. Means and (Standard Deviations) by Age Groups

Since there is often a strong correlation between age and years at work, it was not surprising that the results were similar with regard to years at IBM. The 'community' motivator was significantly different ($F(3,164) = 5.395$, $p<.005$) with contrast tests revealing that those with more years at the company select the 'community' reason as a primary motivator significantly more than those with fewer years. Management recognition was also significantly different ($F(3,164) = 4.68$, $p<.005$); being preferred by those with the fewest years at IBM.

	Years at IBM			
I contribute because…	<1 N=57	1-4 N=23	5-10 N=22	11+ N=66
Helps IBM community	3.37* (1.36)	3.39 (1.27)	3.82 (1.22)	4.17* (0.97)
Want my manager to notice my work	2.23** (1.24)	2.04 (1.33)	1.73 (1.20)	1.48** (0.93)

Note. *p<.05, **p<.01, denoting pairwise differences

Table 2. Means and (Standard Deviations) by Years at IBM

4. Experimental Study

Based on the results from the survey, we developed an experimental study in which participants were required to actually contribute their knowledge to an online community, as opposed to the survey which only required them to speculate as to what they would do.

4.1. Study Method

We sent an initial email to the same employees, asking users to reply if they were interested in participating in a study. Approximately 70 participants responded, of which 60 were selected to meet the requirements of evenly balancing gender and age groups across conditions.

Using a 4×3 Matched Random design, participants were randomly assigned to one of three conditions. The three conditions were 'community' which was our test for altruistic motivations, 'self-interest' to test non intrinsic motivators, and 'control' which was the control group. These participants were then sent another email where the text of the email message was manipulated to reflect the condition that the participants had been assigned to. In all conditions, the email message began with the same text:

"*Please click on the web link below to answer a series of questions about working at IBM. The answers, once published, will be anonymous*."

We added the following additional text to form a community or self-interest manipulation. The control group had no additional text.

1. Community: *Your contribution will help your IBM Community by jump-starting new community members and/or by sharing knowledge among existing community members".*

2. Self-Interest: *"Your contribution may be helpful for career advancement since senior management has recognized the importance of having people contribute*

to the handbook and your manager will be notified that you have participated."

In all cases, participants received the same link which directed them to a web page with the look-and-feel of the company intranet, where they were asked to answer as many of 20 open-ended questions as they wanted to. The questions focused on life at IBM, including asking for a description of a typical day at work, what types of employees thrive, or the type of collaborations that occur. Participants were also asked for some demographic data such as their age group, job role, and years with the company.

4.2. Study Results

Our very first result was the variance in the response rate to the email that contained the link to the intranet page for expertise-sharing. In the Control condition the response rate (35%) was half what it was in the Community (80%) and Self-Interest (70%) conditions. There were no significant findings in the response rate associated with either age group or number of years at IBM. For the participants that did follow the link and answer questions about life at IBM, we measured the number of questions answered since of the 20 possible questions available, participants were instructed to answer as many as they wanted to.

We used a two-way general linear model to examine age and years with the company, the email conditions and the number of questions answered. There were significant differences among age groups and contribution level, $F(3, 37) = 5.835$, $p<.01$, as well as an interaction effect between Age and Condition, $F(5,37) = 10.259$, $p<.001$. As seen in Figure 1, the 21-30 age-group (the red line) contributed more in the self-interest condition than in the community condition while the opposite effect occurred with the 41-50 age group (the green line). The vertical axis in Figures 1 and 2 is the total number of questions answered.

Contrast tests using Tukey's HSD revealed that the 21-30 age group ($M=16.83$, $SD = .65$) answered significantly ($p<.05$) fewer questions than the 31-40 ($M = 19.500$, $SD = .396$) and the 51 and older ($M = 19.583$, $SD = .396$) age groups. The 31-40 and 51 and older age groups also contributed significantly more than the 41-50 ($M = 17.833$, $SD = .501$) age group.

Although there was not a main effect for the number of years at the company, there was an interaction in terms of contribution between Years and Condition similar to the one seen for Age and Condition, $F(5, 37) = 2.593$, $p<.05$, $\eta 2 = .333$.

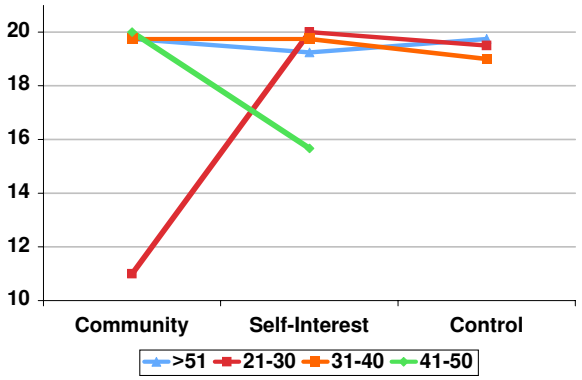

Figure 1. Interaction between Age, Condition and Number of Questions Answered

As shown in Figure 2, workers with 1–4 years contributed more in the self-interest condition than in the community condition; the opposite occurs for both 41-50 and 51+ age groups.

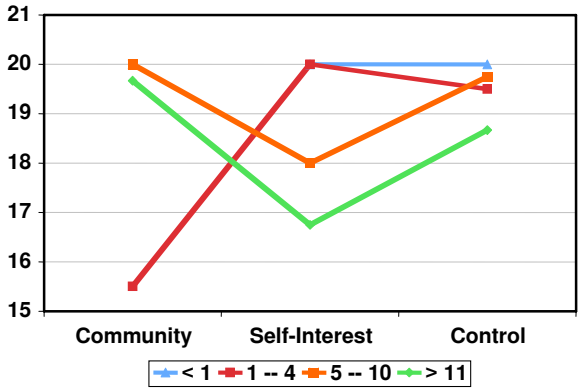

Figure 2. Interaction between Years at Company, Condition and Number of Questions Answered

5. Discussion and Future Work

While the survey and study conducted give us a fairly conclusive data point about age-related differences in motivations for knowledge workers, we do not suggest that these findings could be applied to any online community discussing any topic. We designed the study to understand the motivations of a particular user group in a particular context.

It is interesting to note that the control group - the 35% that actually participated in the study - had high levels of participation. Clearly in that group a self-selecting process weeded out the 65% that were not motivated to participate since they did not have additional motivating text, and those that remained

were highly self-motivated individuals. These are most likely the type of people who are active in other online communities such as Wikipedia. In the future we would like to analyze the characteristics of this group, as well as run the survey and study in a completely different context (e.g. university).

6. Conclusion

In this paper we examine the factors that motivate knowledge workers to contribute to online communities in the workplace, as well as the effects of age and number of years with an organization. Both altruism and self-interest have been debated as the chief reasons for contributing to online communities, yet most of the work has been theoretical or based solely on survey research. Our purpose was to identify these factors in work settings and to test the strength of the motivations in terms of actual contribution to a community.

Results indicate that there are significant differences, both in terms of worker perceptions of what motivates them, and in actual participation levels. Our findings suggest that younger workers, and those new to an organization, are motivated more by factors such as gaining name or management recognition, which are aspects of career advancement. By contrast, older workers, and those with several years at a company, are more motivated by altruistic reasons such as giving to the community or providing mentorship.

This research provides insight into designing online communities and informal learning networks in organizational settings, while beginning to tease apart the complex and subtle motivations of why people contribute to any organization or community.

6. References

[1] D. W. McMillan and D. M. Chavis, "Sense of community: A definition and theory," *Journal of Community Psychology*, vol. 14, pp. 6-23, 1986.

[2] E. Wenger, *Communities of practice: Learning, meaning, and identity*. New York: Cambridge University Press, 1998.

[3] S. M. Lee, "An Empirical Analysis of Organizational Identification," *The Academy of Management Journal*, vol. 14, pp. 213-226, 1971.

[4] C. M. L. Chan, M. Bhandar, L.-B. Oh, and H.-C. Chan, "Recognition and participation in a virtual community," presented at HICSS'04: 37th Annual Hawaii International Conference on System Sciences, 2004.

[5] A. Hars and S. Ou, "Working for free? Motivations for participating in open-source projects," *International Journal of Electronic Commerce*, vol. 6, pp. 25-39, 2002.

[6] A. Mockus, R. T. Fielding, and J. Herbsleb, "Two case studies of open source software development: Apache and Mozilla," *ACM Transactions on Software Engineering and Methodology (TOSEM)*, vol. 11, pp. 309-346, 2002.

[7] K. Ling, G. Beenen, P. Ludford, X. Wang, K. Chang, X. Li, D. Cosley, D. Frankowski, L. Terveen, A. M. Rashid, P. Resnick, and R. Kraut, "Using social psychology to motivate contributions to online communities," *Journal of Computer-mediated Communication*, vol. 10, 2005.

[8] M. Sharratt and A. Usoro, "Understanding knowledge-sharing in online communities of practice," *Electronic Journal of Knowledge Management*, vol. 1, pp. 187-196, 2003.

[9] H. Cho, M. Stefanone, and G. Gay, "Social information sharing in a CSCL community," presented at ACM Computer-Support for Collaborative Learning (CSCL), Boulder, CO, 2002.

[10] A. Ardichvili, V. Page, and T. Wentling, "Motivation and barriers to participation in virtual knowledge-sharing communities of practice," *Journal of Knowledge Management*, vol. 7, pp. 64-77, 2003.

[11] Y. Wang and D. R. Fesenmaier, "Assessing motivation of contribution in online communities: An empirical investigation of an online travel community," *Electronic Markets*, vol. 13, pp. 33-45, 2003.

[12] J. Weisz, T. Erickson, and W. Kellogg, "Synchronous broadcast messaging: The use of ICT," presented at CHI'06: Proceedings of the SIGCHI conference on Human Factors in computing systems, Montreal, Canada, 2006.

[13] A. Hemetsberger, "Fostering cooperation on the Internet: Social exchange processes in innovative virtual consumer communities," presented at Annual Conference of the Association for Consumer Research (ACR), Austin, Texas, 2001.

[14] P. Kollock, "The Economies of online cooperation: Gifts and public goods in cyberspace " in *Communities in Cyberspace*, M. Smith and P. Kollock, Eds. London: Routledge, 1999.

[15] H. G. K. Hummel, D. Burgos, C. Tattersall, F. Brouns, H. Kurvers, and R. Koper, "Encouraging contributions in learning networks using incentive

mechanisms," *Journal of Computer Assisted Learning*, vol. 21, pp. 355-365, 2005.

[16] R. Gibbons and K. J. Murphy, "Optimal incentive contracts in the presence of career concerns: Theory and evidence," *Journal of Political Economy*, vol. 100, pp. 468-505, 1992.