Why be a Wikipedian

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Abstract: Wikipedia is a user-edited encyclopedia. Unpaid users contribute articles, edit them, and have heated debates about what information should be included or excluded. This study is designed to learn more about why people are willing to do this work without any fiscal compensation. Wikipedia administrators (n=115) completed an online survey with Likert-scaled items of potential types of satisfaction derived from participation as well as comments that were used to check the validity of the Likert-scaled items and allow participants to say in their own words why they were Wikipedian. Results showed that contributors in Wikipedia are driven largely by motivations to learn and create.

Introduction

One helpful way for understanding learning is to study how communities affect the learning process. For example, apprenticeships function as communities of practice (Wenger, 1998). In these communities, new members function as legitimate peripheral participants, at first taking on simple, but still essential, roles until they can become full-fledged participants in the activity, trade, or hobby. In classrooms, where learners are not expected to take on the role of teacher, and teachers themselves are typically not practitioners of their own subject (e.g., high school science teachers are usually not themselves scientists), a community of learners model can be used to guide and understand learning. In the community of learner model, students are assigned particular roles that they fill for a particular project or activity, but these roles are typically not determined by ones expertise in the subject or position in the learning community. This paper suggests that some web-based communities may function as a new type of community, a community of altruists. Working on Wikipedia has been documented to partly driven by the desire to be a member of a community (Forte & Bruckman, 2006), but some key differences exist between the well-studied communities of practice and communities of learners. Central to each of these communities are three elements: (1) the domain of knowledge, (2) the community itself, which creates relationships among members, and (3) the practice which creates a set of tools shared by the members (Wenger, McDermott, & Snyder, 2002).

Wikipedia is an interesting phenomenon, which has important implications for teaching and learning (Bruckman, 2002). It allows unpaid volunteers to edit and create entries without restriction and little barrier to participation and has resulted in a 2.5 million-entry encyclopedia that rivals *Encyclopedia Britannica* (Giles, 2005). One might be concerned that a document always in a state of change would often be wrong as a result of an editor was ignorant, careless, or malicious, but Halavais (2004) introduced thirteen "provably incorrect" errors into *Wikipedia* entries and found that all of these errors were removed within about two hours.

Research on how people contribute to *Wikipedia* indicates that regular contributors have a strong sense of community. Using how long characters in an edit remained in subsequent versions of an entry as a measure of quality, Anthony, Smith, and Williamson (2005) used statistical methods to show that as the number of edits for a contributor increased, the quality of their submissions rose for those contributors who worked under a pseudonym. For those working anonymously, the quality of edits dropped as the number of edits rose. The explanation for this phenomenon is that those who are using Wikipedia as an information source sometimes notice and fix small errors are "Good Samaritans". Those who make large scale changes anonymously are much more likely to be vandals.

Bryant, Forte, and Bruckman (2005) interviewed nine regular contributors and found further evidence supporting that explanation. Wikipedians reported that as they started contributing more and more, members of the Wikipedia community would encourage anonymous contributors to register for an account and make attributable contributions. This work showed that Wikipedia shares characteristics of a community of practice (Lave & Wenger, 1991): (1) members are mutually engaged, (2) they actively negotiate nature of the enterprise, and (3) they build a repertoire of shared, negotiable resources. They also found differences between how novices and experts worked. Novice contributors edit what they know and gather information, often starting to contribute when they notice pages about things they knew about were missing something. Novices see themselves primarily as consumers and are reluctant to make drastic changes. For experts, "Wikipedians", the whole of Wikipedia becomes more important than a particular set of articles. Further, Wikipedians become interested in improving not only Wikipedia, but also the community itself. This study also found evidence of mentorship consistent with CoP; some participants reported that they had been encouraged to edit under a pseudonym rather than contribute anonymously. One expert reported "We have a policy of don't bite the newcomers and forgive and forget." Some appreciated getting recognized, respect and recognition for their contributions. Rather than being defensive about their words being removed or changed, Wikipedians in this study were grateful to find that someone cared enough about their page to make corrections to it.

Though we agree with Bryant et al. (2005) with these similarities to communities of practice, we suggest that some of their findings point to a new kind of community. For example, many Wikipedians perceive their work as contributing to a greater good, and often cite the appeal of community (rather than the pages they maintain) as a key motivator for their participation. These seem different from communities of practice in which learning a particular skill or trade is the key motivator and participating in the community is a means to that goal. Also, the way that the experts interact with novices suggests that it is the experts who are invested in novices becoming experts rather than novices entering the community with an explicit goal of becoming expert. To the contrary, Bryant et al. (2005) suggests that people become Wikipedians almost by mistake.

Purpose and Rationale

The main objective of this study is to investigate the incentives of adults for contributing to Wikipedia– investing their time and effort for free. The motivations for contribution to Wikipedians are not fully understood and may provide new insights on motivations to participate in learning communities in and out of classrooms.

Theories of Motivation

We drew from five motivational theories to inform the design of our survey. Though none of these theories directly addresses why people might contribute to a volunteer project like Wikipedia, they served as a foundation for guiding the development of the survey.

Motivation to Learn

Dewey (1915) argued that humans possess an innate desire to learn. Wikipedia provides two kinds of learning, learning about the content of Wikipedia's 2.5 million pages, and learning about Wikipedia's features for managing the content.

Motivation to Create

Harel and Papert (1991) suggest that people learn better when they construct a public artifact. Constructionism, or "learning by making," helps people to acquire skills through personal creation and innovation. In the case of Wikipedia, contributors create new pages and participate with new ideas for improving the website. Project-and design-based pedagogies are similarly based on the assumption that providing opportunities for individuals, or groups of individuals, to create artifacts and evidence of their learning for others (Kolodner, Crismond, Fasse, Gray, & Holbrook, 2003).

Social Motivators

One of the intrinsic motivation factors acknowledged by Lindenberg (2001) is the obligation to the community. He proposed that people socialize when they work and interact consistently within the norms of a group. Also, the third level of Maslow's (1987) hierarchy of needs is belongingness and the need to be part of a group. Belongingness is also part of other educational motivation theories (e.g., Weiner, 1990; Ames, 1992; Ryan and Deci, 2000).

Extrinsic Motivators

Lerner and Tirole (2000) identified two types of payoff for contributions, an immediate payoff (e.g., ability to use the product) and a delayed payoff (e.g., potential future rewards in terms of recognition and reputation). Another extrinsic motivator that we considered is Murray's (1938) notion of dominance. He posited that individuals like to command, lead, and act as an exemplar for others. The dominative attitude is shown by the need to convince others of the "rightness" of one's opinion, to influence, to persuade, and to organize the behavior of a group.

Flow

Csikszentmihalyi (1975) who pioneered the study of enjoyment-based motivation suggested a state of "flow" where enjoyment is maximized. His work was based on experience sampling in which people were surveyed periodically, typically about seven times per day. He was interested in the activities that people were doing and their level of engagement (Csikszentmihalyi & LeFevre, 1989). He found that flow is attained when challenge and ability are balanced and increases as the level of challenge and ability rise. Other factors contributing to flow include clear goals and feedback, loosing track of time, and a feeling of personal control. Flow is also characterized by intense focus and concentration, an integration of action and awareness, and the satisfaction of the activity itself (Nakamura & Csikszentmihalyi, 2003).

Method

Participants

Wikipedia administrators were targeted because this was a convenient way to target Wikipedia contributors who were devoted, as opposed to casual contributors to the project. Wikipedia administrators have access to special features that help with maintenance such as deleting pages and blocking other editors. To become an administrator, a user is typically nominated for the role by another user (self nominations are permitted). If, after a week-long discussion period, a consensus of administrators approves, the user is nominated an administrator. As of October 2007 when the study began, the Wikipedia administrators' page listed 1372 members and 300 potential participants were randomly selected.

Materials

We constructed a 40-question survey based on the questionnaires employed in other motivational studies of open source projects and hobbyists (Hars & Ou, 2002; Pfaffman & Schwartz, 2003; Wu, Gerlach, & Young, 2007). Questions categories included demographic characteristics, the degree of commitment to the project, motivational factors, and comments to check validity of the items while providing further insight into participants' motivations. Participants were asked to rate the 30 Likert-scaled items on a scale of 7 (1 being unimportant and 7 being very important).

Procedure

We created a Wikipedia account for this project and, using that account, posted requests for participation on the "talk pages" of 300 administrators in our random sample. The call for participation was posted to the users' talk pages the first week of December, 2007. By the first week of January 2008, 21% of the potential participants had responded. The first week of February 2008, we again posted the call for participation to all 300 members of the sample (because the survey was anonymous we could not know who had responded already). By March 2008, we had 115 respondents (38% response rate). Because we knew only the pseudonyms of the administrators in our sample we have no indicators of how the demographics of those who responded may different from the whole sample.

Analysis and Results

Demographic data are reported in Table 1. The respondents were mostly (88%) male, half of whom were 18-29 years old; most of the rest were 30-49. Only 55% of the respondents reported being employed full-time. The majority of respondents (66%) reported that being a Wikipedian is "rewarding" or "very rewarding." This is not surprising since we expected administrators to be devoted to this unpaid work. Respondents are also long-term participants in this community with 73% of respondents reporting being involved for more than three years.

These wikipedians, though, don't spend much time completing wiki-related tasks such as participating in discussion or searching in the wiki. Apparently, finding the needed information to include in the website as well as editing the WebPages require much more time from the administrators. Proofreading the articles to obtain a better quality with more accuracy could be sometimes a complicated task. Also, a great part of the participants declared that they spend time searching the online libraries, newspapers, periodicals, journals, encyclopedias, and books in order to obtain information for addition or improvement of the Wikipedia website.

Measures

The survey included 30 questions related to the potential motivational factors for the administrators in Wikipedia. These questions are presented in Table 2. Descriptive statistics were calculated to obtain the measures of central tendency as well as the measures of variability of each of the identified items. Cronbach's alpha indicated 0.907 by determining how all items on test relate to all other test items and to the total test.

Though the potential motivators were grouped *a priori* according the motivational theories that informed them, we did not expect it to be the case that all items based on a particular motivational theory would have equal importance to respondents. To see which items seemed to be connected, an exploratory Factor Analysis (FA) was employed in order to determine which of the thirty items formed related subsets. FA combines into factors variables that are correlated with one another but largely independent of other subsets of items (Tabachnick & Fidell, 2007; Kim & Mueller, 1978; Rummel, 1970; Thurstone, 1947). This method was used as an expedient way to identify a smaller number of constructs (subsets) that represent the Likert-type items.

The first step to form the potential factors was performed by applying FA with principal components extraction, eigenvalues greater than 1.00, and choosing the absolute value to be more than .40 (Field, 2005; Ho, 2006). An orthogonal varimax rotation was used to maximize the variance of loadings for each factor – within factors, across variables – so that all the factors are uncorrelated with each other (Tabachnick & Fidell, 2007).

Therefore, varimax rotation tries to load a small number of variables highly onto each factor resulting in more interpretable clusters of factors.

Table 1: Participants' demographics and their activity in Wikipedia

		Frequency	Percent
Gender	Male	101	87.8
	Female	14	12.2
Age	18-29	57	49.6
	30-49	46	40.0
	50-64	8	7.0
	64+	4	3.5
Occupation	Full time student	38	33.0
	Full time job	64	55.7
	Part time student/job	13	11.3
Education level	High school diploma	11	9.6
	Some college	34	29.6
	Bachelors	34	29.6
	Masters	18	15.7
	Ph. D/J.D/M.D	18	15.7
Number of years of contribution to Wikpedia	1-2	31	27.0
	3-5	77	67.0
	6+	7	6.1
How rewarding the membership in Wikipedia is	I don't care	3	2.6
	Unrewarding	1	0.9
	Not very rewarding	4	3.5
	Sort of rewarding	31	27.0
	Rewarding	53	46.1
	Very rewarding	23	20.0
Hours/week spent on searching in Wikipedia	<1	30	26.1
	2-5	51	44.3
	5-10	25	21.7
	10-20	5	4.3
	>20	4	3.5
Hours/week spent on participating in discussion for Wikipedia	<1	31	27.0
	2-5	49	42.6
	5-10	23	20.0
	10-20	10	8.7
	>20	2	1.7
Hours/week spent on editing articles in Wikipedia	<1	15	13.0
	2-5	45	39.1
	5-10	32	27.8
	10-20	15	13.0
	>20	8	7.0
Hours/week spent on finding information to include	<1	36	31.3
	2-5	51	44.3
	5-10	21	18.3
	10-20	7	6.1

The FA yielded to eight factors with eigenvalues greater than 1.00. Kaiser-Meyer-Olkin (KMO) measure of sampling was equal to .825 which represents the ratio of the squared correlation between variables to the squared partial correlation between variables. This value close to 1 indicates that patterns of correlations are relatively compact and so FA should yield distinct and reliable factors (Kaiser, 1970; Field, 2005). Also, the Bartlett's test of sphericity which investigates the adequacy of the correlation matrix is significant (<.001). Therefore the hypothesis that the correlation matrix is an identity matrix – the variables are independent – is rejected. And therefore, the results of both KMO measure of sampling and Bartlett's test showed that using FA is appropriate for this study. However, since the main objective of FA is to reduce as much as possible the number of items, FA was re-applied to the 30 items to extract a fewer number of factors.

Table 2: The 30 likert-scaled items of potential types of motivation

Item#	Statement	Example	Mean	Deviation
1	Learning1: To read about my areas of interest	I enjoy reading Wikipedia pages to learn more about my favorite subjects.	5.5	1.5
2	Learning2: To know about dates, places, people, things	Wikipedia is full of information about different subjects from all over the world.	5.5	1.6
3	Learning3: To learn about tools	There are many tools used in Wikipedia where I can learn how to edit and delete pages and so on.	3.4	1.9
4	Learning4: To learn strategies and methods in Wikipedia	Wikipedia is one of the most popular wikis; editing the pages provides me with information about wikis strategies.	3.2	1.9
5 (Omitted)	Learning5: To know the little-known facts and stories around online communities	As a community member, it's interesting to know the rules in Wikipedia.	3.5	2.0
6	Learning6: For my personal growth	Being a Wikipedian adds different types of information to my knowledge	5.5	1.4
7 (Omitted)	Extrinsic1: To increase academic or professional success	Contributing to Wikipedia is helping me move forward in my education/job.	3.1	2.0
8 (Omitted)	Extrinsic2: To be better than others	Looking at the pages that I have edited adds to my confidence and self-esteem.	3.4	2.0
9	Extrinsic3: To enter competitions with others	Contributing to Wikipedia is a chance to compete with people about all kind of subjects.	2.0	1.5
10	Extrinsic4: To do something that few others know how to do	One thing I like in being a Wikipedia administrator is that few people are in such a position.	3.4	2.1
11	Extrinsic5: To gain social stature	Being an administrator in Wikipedia makes me more important and gives me respect from people who might not otherwise associate with me.	2.6	1.9
12 (Omitted)	Extrinsic6: I need this information in Wikipedia	I want to use this information in my studies/work.	3.3	1.9
13	Social1: To be liked	Being a Wikipedia administrator makes people like me.	2.5	1.7
14 (Omitted)	Social2: To share what I know	I am a Wikipedia administrator because it gives me a chance to share my knowledge with others.	4.7	2.0
15	Social3: To belong to a group	I joined Wikipedia, and participate on a list where people discuss types of wikis issues.	3.2	1.9
16	Social4: To help others appreciate or participate	As a Wikipedian, part of my mission is to show people that Wikipedia is as interesting and reliable as other encyclopedias.	4.7	1.7
17 (Omitted)	Social5: To use Wikipedia to stimulate conversation	When people learn that I am a Wikipedian, they are often interested in talking about it.	2.9	1.6
18	Social6: As a commitment to the Wikipedia community	Editing Wikipedia pages is one of my duties toward all the Wikipedians.	4.3	1.9
19	Creation1: To see fruits of labor	Seeing a page that I have fixed or updated is very satisfying.	5.7	1.2
20	Creation2: To adjust or personalize methods	I enjoy contributing to Wikipedia partially because I've created my own techniques for tracking and updating pages.	3.0	1.9
21	Creation3: To express myself	Being an administrator in Wikipedia gives me an opportunity to express myself by choosing what rules and strategies to add.	3.2	1.8
22	Creation4: To find or create something new or rare	I take great satisfaction in contributing new information or creating new pages that are succinct and correct.	5.7	1.5
23	Creation5: To nurture or sustain to completion or maturity	Once I edit a page, I work to see that the process is completed successfully by being sure that the rules are well fulfilled.	4.3	1.9
24	Creation6: To see my work/achievements	After editing pages, I like to go and check if someone changes or deletes my edits.	5.0	1.7
25 (Omitted)	Flow1: To feel time change	It's sometimes surprising to realize that I've spent 8 hours editing pages when it seemed like I just started.	3.1	2.1
26	Flow2: To feel a sense of control	Being an administrator gives me control over the processes and procedures of Wikipedia so that the pages I care about are of high quality.	3.5	1.9

Item#	Statement	Example	Mean	Deviation
27	Flow3: To overcome new challenges	No page is ever perfect or complete so as I learn more I can continue to correct and add to Wikipedia.	4.8	1.7
28 (Omitted)	Flow4: To do something as an end in itself	Though editing in Wikipedia obviously has an end, at least some parts of the process are fun in end of themselves. It's also great to just watch Wikipedians adding and editing pages.	4.9	1.7
29	Flow5: To have clear goals and feedback	When editing pages, I know what I want, and I know when I've to do it. When I look at the pages, I know whether it's good.	4.1	1.9
30	Flow6: For fun/enjoyment	I enjoy spending time editing Wikipedia pages.	5.7	1.2

The maximum likelihood extraction was used to find the factor solution which would best fit the observed correlations. This approach of extraction maximizes the correlations between the variables and the factors (Kim & Mueller, 1978; Harris, 1975). Finally, six factors were retained while ensuring the Chi-Square goodness of fit test between the model and the data (Harris, 1975; Kim & Mueller, 1978).

Items Removed from Factor Analysis

As a means to check the validity of questions, we first looked at their variance since high variability could be an indicator that respondents feel very differently about that item or it was misunderstood. Also, participants were provided with a comment box for each question as another approach for validity checking.

Item 25, with the highest variance 4.3 was "To feel time change" whose example was "It's sometimes surprising to realize that I've spent 8 hours editing pages when it seemed like I just started." Several responses indicated that respondents understood and experienced this aspect of flow (e.g., "This also applies to the Internet in general, as well as video games," and "[not lately, but] I used to edit almost all night.") Further analysis of the comments suggested that, though people did indeed experience this loss of time in their work on Wikipedia, they were split on whether this was one of the things that contributed to their wanting to do this work. For example, one participant who rated this statement as [7], entered in the comment box "Definitely—I work a very dull office job and often kill time just reverting vandalism or fixing links;" another respondent who rated this item a [1] said "This is a result, not a motivating factor." Several respondents who rated this item [1] or [2] mentioned "Not significantly" or "that hasn't happened to me." We elected to omit this item because respondents' ratings might have different meanings. It is interesting to note that though losing track of time is one of the feelings associated with flow, for some, at least, it is an unpleasant side effect.

Similarly we omitted the next highest standard deviation item 14 with variance 4.2 because our example drew respondents' attention to what it meant to be an administrator rather than whether the item contributed to their enjoyment of working on Wikipedia. "To share what I know" with the example "A big part of being a Wikipedia administrator is sharing my knowledge with others" caused respondents to focus on the meaning of being an administrator rather than whether sharing knowledge was why they liked to contribute to Wikipedia (rating [1]:"You can share knowledge without being an admin," rating [6]: "That's important, but it has nothing [to] do with admin status").

Item 8, "To be better than others" with the example "Looking at the pages that I have edited adds something to my confidence and self-esteem" with variance 4.0 was intended to be one of many reasons that being better than others might contribute to one's satisfaction, but upon looking at the comments, respondents were more likely to focus on confidence and self-esteem ([4]"adding to self-esteem is not the same as feeling better than others") than ones that indicate that respondents do feel superior to others ([7] "My articles should be worthy of featured status;" [1] "I already know I'm great").

Item 7, "To increase academic of professional success" with the example "Contributing to Wikipedia is helping me move forward in my studies or my job" with variance 3.9 was also omitted because it did not load on any factor, perhaps because it was bi-modal. Most comments were like "I doubt it will ever benefit my 'real-world' pursuits," or "It's a hobby," but some made claims to the contrary. Of particular interest to those interested in using Wikipedia in educational settings is this comment "I didn't think [working on Wikipedia] would [help me academically], but after getting to college I feel a lot more acquainted with the intellectual community than a lot of my peers do —it's like I had already been visiting this place for 2 years every day before this."

Item 5, "To know the little-known facts and stories around online communities" with the example "In Wikipedia it is interesting to know the rules as a community member" with variance 3.9 proved to be confusing. Nearly half of those commenting said something like "I don't understand this question or example," and therefore, it was omitted too.

Item 12, "I need this information in Wikipedia" with the example "I want to use this information in my studies/work" with variance 3.6 did not load under any factor. Several respondents commented that the example did not make sense (e.g., "seems [like] reasoning" and "don't understand the question"). The item was omitted.

Item 17, "To use Wikipedia to stimulate conversation" with the example "When people learn that I am a Wikipedian, they are often interested in talking about it" with variance 2.7 was also omitted because it did not load under any of the factors. Interestingly, many respondents included comments like "I try to avoid letting "real life" people know I'm Wikipedian…it just seems embarrassing."

Item 28, "To do something as and end in itself" with the example "Though editing in Wikipedia obviously has an end, at least some parts of the process are fun in end of themselves. It's also great to just watch Wikipedians adding and editing pages" with variance 2.9 did not load under any of the factors. The zero loading and mixed comments supported omitting this question from the factor analysis.

Having removed these items, a confirmatory FA was conducted using this reduced set of 22 items with the principal components extraction method for factors with eigenvalues greater than 1.00. The rotated varimax extraction of the 22 items yielded six factors accounting for 65.7% of the total variance (see Table 3). The sizes of the loadings reflect the extent of relationship between each variable and each factor. A statistical indication of the extent to which each item is correlated with each factor is given by the factor loading. In other words, the higher the factor loading, the more the particular item contributes to the given factor. For items that were loaded under two factors, only the higher loading was retained.

To check validity of the generated categories, we inspected comments on these questions. Factor 1, which accounted 28.8% of the variance, was labeled Dominance Motivation. Factor 2, which accounted 12.5% of the variance, was labeled Creation Motivation. Factor 3, which accounted 7.4% of the variance, was labeled Benefit Motivation. Factor 4, which accounted 6.2% of the variance, was labeled Learning Motivation. Factor 5, which accounted 5.6% of the variance, was labeled Social Motivation. Factor 6, which accounted 4.9% of the variance, was labeled Flow Motivation.

Once the factors were labeled with descriptive names, several of which were same as a priori groups, six new variables were computed based on the mean of the items falling under each factor. A one-way repeated measures ANOVA was conducted to detect the main effects between the located variables. The results revealed significant differences among the six factor scores, ($F(5, 570) = 118.81$, $p < .001$).

Figure 1 shows the Learning Motivation factor as the most powerful motive for the contribution to the Wikipedia with a mean of 5.47 on a scale of 7. The Creation Motivation factor is the second important aspect (5.08) over the Flow Motivation factor (4.89) and the Social Motivation factor (4.48). Finally, the Benefit Motivation and Dominance Motivation factors have the lowest importance with means equal to (3.21) and (2.88) respectively.

Discussion

These data suggest that Wikipedians are most motivated by their desire to learn. Since adults are able to identify their needs, they may engage in learning situations to meet a goal and to achieve competence because social competencies might affect their academic achievement (Knowles, 1980; Wlodkowski, 1989; Wentzel, 1994). Another indication of the desire to learn is that they rated reading highly. Another type of learning that could occur in the Wikipedia contribution is to *learn* new subjects involved in the process of participation which might affect their *personal growth*. For instance, the Wikipedia community has its own guidelines for contribution that encompasses a set of regulations. Some participants provided comments such as "excuse to learn new things all the time" and "adding to my own knowledge while updating content."

The second highest-rated factor is the creation of a public artifact. Constructionism or "learning by making" is shown to be a significant motivational factor that might help contributors acquiring skills through personal creation and innovation (Harel & Papert, 1991). Wikipedians develop and proofread pages for others to experience. Also, the act of *creation* itself might provide satisfaction through the process itself: from the initial stages to the completion of the project in order to witness the end of the course of action. Contributors to Wikipedia might be exercising their autonomy in the website design by *creating something new* and *overcoming new challenges*. The comments from participants show the importance of the creation factor through "creating new articles" and "seeing your changes appear immediately online."

The flow-driven motivation comes after the creation factor significance. Wikipedians considered *fun and enjoyment* with their Wikipedia-related activities. Hence, flow can arise when the challenge of the task matches the contributors' skills (Nakamura & Csikszentmihalyi, 2003). One of the participants reported "It's the best way I've found so far to kill time while I'm at work."

The social factor was next. Wikipedians seem to contribute as a *commitment to the community* since being a member of a community is one of the fundamental human needs (Maslow, 1987, Deci et al., 1991; Ryan & Deci, 2000). Therefore, social factors might affect motivation just as they affect learning. For instance, Anderson, Manoogian, and Reznick (1976) showed that children's motivation to work is to share their activity of drawing. Hence, members in the Wikipedia community could be interested in *helping others to appreciate* the contribution in order to expand the group or to share their knowledge. Some typical comments show the social motivational factor such as, "the realization that others share my obscure interests", "collaborating with others", and "interaction with the community."

Somewhat surprising is that the dominance as well as the benefit factors were not as important as the other incentives. Such findings indicate that having a social stature or possessing powerful qualifications inside the community is not the most significant objective for administrators. Obviously, some administrators might have strong benefit or dominance driven motivational factors. However, their percentage appears to be very modest compared with others within the sample.

Table 3: Rotated factor matrix with extraction method: principal component. Rotation method: varimax with Kaiser Normalization.

	Component					
Items	Dominance	Creation	Benefit	Learning	Social	Flow
Extrinsic5: To gain social stature	**0.780**					
Flow2: To feel a sense of control	**0.747**					
Social1: To be liked	**0.737**					
Extrinsic3: To enter competitions with others	0.627					
Extrinsic4: To do something that few others know how to do	0.613					
Creation3: To express myself	0.565					
Creation1: To see fruits of labor		**0.799**				
Creation4: To find or create something new or rare		**0.742**				
Creation6: To see my work/achievements		0.624				
Flow3: To overcome new challenges		0.589				
Creation5: To nurture or sustain to completion or maturity		0.530				
Learn4: To learn strategies and methods in Wikipedia			**0.714**			
Social3: To belong to a group			0.697			
Creation2: To adjust or personalize methods			0.668			
Learn3: To learn about tools			0.650			
Learn2: To know about dates, places, people, things				**0.847**		
Learn1: To read about my areas of interest				**0.817**		
Learn6: For my personal growth				0.660		
Social6: As a commitment to the Wikipedia community					**0.798**	
Social4: To help others appreciate or participate					**0.700**	
Flow6: For fun/enjoyment						**0.720**
Flow5: To have clear goals and feedback						0.589

Limitations

This study used Wikipedia administrators as a proxy for Wikipedia contributors who were invested in the activity. Because administrators have powers and responsibilities not available to all Wikipedia contributors, this group may not be representative of all contributors. A problem with any survey is that items may not be interpreted by respondents as intended by the instrument's creators. We used exploratory factor analysis to reduce the number of variables and to identify items that seemed confusing or not shared by most respondents. Analysis of the per-item comments showed that respondents' understanding of the various variables was consistent with our own and with each other.

Conclusion

Though space and time preclude thorough analysis and presentation of these data, also present in these comments were indications that Wikipedians function as a community of practice (consistent with the findings of Bryant et al., 2005). Initial analysis of these comments suggests that another strong motivator is an altruistic desire to create a resource for others to use. This suggests that perhaps Wikipedia, and perhaps other Web-

based communities, may be driven partly by altruism. A framework for how these communities of altruists relate to communities of learners and communities of learners is presented in Table 4.

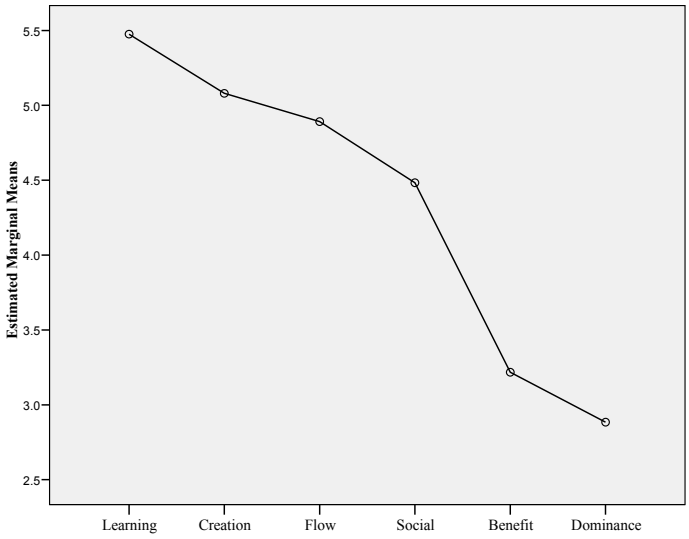

Figure 1. Estimated Marginal Means of Motivation on a scale of "7".

Table 4: Motivation for participation in different types of communities

Motivations for participation			
	Community of Practice	Community of Learners	Community of Altruists
Learning	Learn strategies/trades	Learn specific topics	Learn in order to share
Social	Become a full-fledged participant	Become a learner	Attract and develop more full-fledged participants
Flow	Balance challenge and skills	Sense of control uncommon in many classrooms	Enjoyment
Creation	Create artifacts for profit or beauty	Create projects	Create a shared resource for the common good
Extrinsic	Profit	Evaluation/Grades	None?

Further analysis of these data may provide some insight into this possibility, but further study and interview data are planned to investigate further this aspect of motivation in Wikipedians and Open Source Software developers. The study looked only at the English-language Wikipedia. Investigations of other-language wikipedias are in order to broaden see whether these findings hole across cultures. We were also surprised to find that only 12% of respondents were female. It is generally believed that the number of Internet users is now fairly balanced by gender (Horrigan, 2007), and there is little reason to believe that female Wikipedians would be significantly less likely to respond to our survey. Further research is needed to learn more about whether few women contribute to Wikipedia, or whether they are uninterested, or somehow excluded from becoming administrators. We are planning a further study to interview some wikipedians (perhaps by contacting contributors who are not administrators) to probe them for their hypotheses. We also plan to expand this research to Open Source Software developers to investigate their motivations to participate in those programming projects and whether those groups function as communities of practice as well.

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