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Lurking as Personal Trait or Situational Disposition? Lurking and Contributing in Enterprise Social Media

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ABSTRACT

We examine patterns of participation by employees who are members of multiple online communities in an enterprise communities service. Our analysis focuses on statistical patterns of contributing vs. "lurking." The majority of contributors (in one or more communities) were also lurkers (in one or more other communities). These results argue against hypotheses derived from three common theories of participation and lurking. We propose that contributing and lurking are partially dependent on a *trait* (a person's overall engagement), modified by the individual's *disposition* toward a particular topic, work task or social group. Contributions include critique of theory, an analytic framework, and implications for design of community services.

Author Keywords

Lurking, enterprise, community-of-practice.

ACM Classification Keywords

H5.3. CSCW

INTRODUCTION

The theme of "lurkers" (people who read social media data, but do not directly contribute) has received renewed interest in CHI and CSCW. Characterizations of lurkers have varied from pro-social [1,7,9,11] to universal [6] to derogatory [4]. Essentialist theories of lurking considered lurking as a trait (summarized in [4]) or a relatively invariant attribute [8] of a person. Developmental theories treated lurking as a stage through which a person passes on the way to more active, visible contribution [2,9,10]. In this note, we examine hypotheses derived from these theories, in a new dataset in which each person may act as a lurker or a contributor in multiple online communities.

We explored lurking using a dataset of 8711 online communities from an enterprise "community service" in a large multinational corporation. The service had been in opera-tion since 24 April 2007. During April 2010, we crawled the communities dataset, extracting all person and object data from the launch-date of each community until the crawl-date. Each community comprised a group of members, a group of organizers, and members' contributions.

Descriptive statistics appear in Table 1. All distributions were strongly asymmetric. Communities varied widely in size; in shared contributions; in duration of activity; and in percent of members making visible contributions. Of the 224,232 unique users, 62% were members of multiple communities. The entities in the communities service supported diverse organizational groups, including teams, communities of practice, and other emergent structures. In general, membership was voluntary, although some employees were "encouraged" to join certain communities.

Unlike email-based discussions, the communities service was accessed via of web pages on the company's intranet. Members were optionally notified of new entries, and a personalized summary page of the service showed recent activity in communities in which a person was a member.

A total of 22,949 people made at least one contribution in at least one community (10%). Contributions took forms such as shared bookmarks, shared feeds, posts in a discussion forum, items in a shared to-do list, blog entries or comments, shared files, or new or revised wiki pages.

Definitions of "lurker" in the research literature have used criteria of zero contributions, or zero *recent* contributions, or fewer contributions than other users [6,11] (see [3] for review). We choose the first of these definitions – i.e., a lurker is a community member who has made zero visible contributions to the community. We assume that lurkers are using information from the community in their work outside of the social media, as shown in [3,6,11].

Measure	Min	Max	Median
Members/Community	1	14997	9
% Contributing Members/Cmy.	0	100%	0.64%
Communities/Member	1	184	2
Shared Resources	1	1285	
Duration of activity (days)	1	1053	86

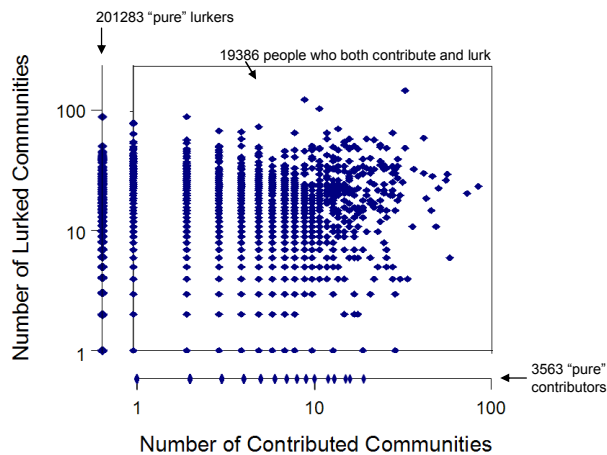**Table 1. Descriptive statistics of the 8711 communities.**

Figure 1. Scatterplot of 224,232 members of one or more communities, focusing on 19386 people who contribute in at least one community, and who lurk in at least one community.

Because each individual can be a member of multiple communities, this dataset allows a new type of analysis of lurking and contributing, by comparing an individual's usage patterns across different communities. We can ask: *How consistent was each person's pattern of lurking or contributing from one community to another community?*

Lurking as personal trait. Under this theory, lurkers are a type of person – a "loafer," "freeloader," etc. [4]. The personal trait theory would predict that a particular user was *either* a contributor *or* a lurker across all her/his communities. In the related "born vs. made" analysis [8], early behavior in a community is predictive of subsequent behavior (i.e., lurkers are "born" that way, and thus their behavior can be predicted as a personal trait).

Engagement. Under this theory, both lurking and contributing are acts of engagement with the community (as implied in [7]). Some users engage to a greater degree, and some users engage to a lesser degree. This theory would predict that users who *contribute* to many communities should *lurk* in many communities; users who *contribute* in few communities should *lurk* in few communities.

Social learning trajectory. In this approach, lurking and contributing are seen as developmental stages of membership in a community (e.g., a community of practice) [2,9]. Lurking is seen as an early stage, in which a person learns about the community, and eventually develops enough understanding to begin to contribute. The member's contributions grow over time, as s/he develops deeper knowledge and reputation among the other members of the community [2]. This theory predicts that a lurker would grow into a contributor, and (crucially) that a contributor's visible actions in a community would increase over time.

METHOD
The analyses were limited by sparse lurking data. The community service records no day-by-day view data

(lurking data). Therefore, we cannot tell how often a person visits a community. We use membership in a community as a potential indicator for viewing the contents of the community. We define a "lurker," then, as someone who has membership, but makes no contributions. Alternative definitions [3] are beyond the scope of this note.

We note that most internet community services (e.g., discussion forums) are similar to the community service in this study. That is, few production services record any "view" or "lurker" data. Our definition of "lurker" as "member without contributions" is thus applicable in studies in other production services, and may be the only definition that will work in services without "view" data.

Because of these limitations, we reduced our representation of contributor data so that it matched the detail of lurking data. For our first two analyses, we counted the number of communities in which a member had contributed, and the number of communities in which s/he had lurked (i.e., had membership, but did not contribute any comments or resources). As stated above, among the 224,232 users, 22,949 people contributed in at least one community, and 220,669 people lurked in at least one community. 19,386 people fell into both categories – i.e., each of them lurked in at least one community, and contributed in at least one community.

RESULTS
Personal trait theory would predict that each user would be either a lurker or a contributor. Figure 1 shows a scatterplot, in which each person is located by the number of communities in which s/he is a contributor, and the number of communities in which s/he is a lurker.[1] According to personal trait theory, users should fall on the *external* axes of Figure 1 (either a "pure" lurker with zero contributing-communities, or a "pure" contributor, with zero lurking-communities). There should be no one who lurks in some communities and contributes in other communities. The observation that 19386 people (84% of the contributors) both lurk (in at least one community) *and* contribute (in at least one other community) argues against this hypothesis.

Engagement theory makes predictions that are nearly the opposite of personal trait theory. This theory argues that contributing and lurking are both forms of engagement, and that a person who engages in some communities by contributing, is also likely to engage in other communities by lurking. The number of contributing-communities and the number of lurking-communities should be correlated. This hypothesis was supported by the data in Figure 1 (Pearson r=.375, Spearman rho=.352, both p<.01). However, Figure 1 also shows many users who do not fit this hypothesis.

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[1] For clarity, the axes of Figure 1 are logarithmic. Zero crossings cannot not appear on log axes, so we have represented the "pure" contributors (zero communities in which they lurk) and the "pure" lurkers (zero contributions) on separate axes, immediately external to the log-log plot.
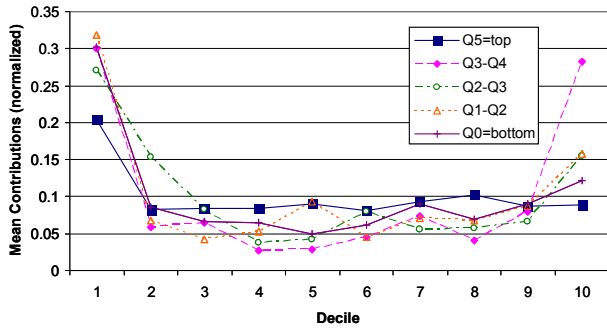
Figure 2. Contribution-timelines of five 100-person samples.

Social learning theory predicts that a new member of a community will begin with relatively few contributions – perhaps initially with no contributions, as a lurker. Over time, the new member gains knowledge and confidence, and begins to contribute. Her/his contributions increase over time, as s/he developers competence and confidence.

To examine this hypothesis, we focused on the more detailed contribution data. We wanted to analyze the pattern of each person's contributions to each community in a common framework. Each contribution was a data object or revision that was shared with other members. Our measurement period began with the date of membership of the user in the community, and ended with the most recent contribution by the user to that community (range 0-1058 days, median=37 days, across all users' tenures in each of their communities). We divided each measurement period into ten equal intervals (deciles). The deciles provided a *temporal normalization*, allowing us to analyze the pattern of each member's contributions across all of the communities in which s/he was a member.

There was one problem with this approach: We had defined the end of the measurement period in terms of each member's most recent contribution. The tenth decile was therefore guaranteed to contain at least one contribution by each member – an overestimation for that decile. Therefore we omitted the member's most recent contribution to prevent this potential distortion.

The decile-based representation allowed us to analyze all of each member's contribution-timelines in a normalized format that could be compared and combined across communities, to allow us to characterize a person's pattern of contribution across multiple communities. Computing the contribution-timeline for each of 19386 members across as many as 184 communities was computationally prohibitive, so we made an ordering of the number of communities per member, and created five samples of 100 people each, equally-spaced across quartile-boundaries of the distribution of number-of-communities per member: i.e., 100 people with the largest number of communities ("Q5," at the top of the highest quartile), 100 people at each of the inter-quartile boundaries (Q4-Q3, Q3-Q2, and Q2-Q1), and 100 people with the smallest number of communities
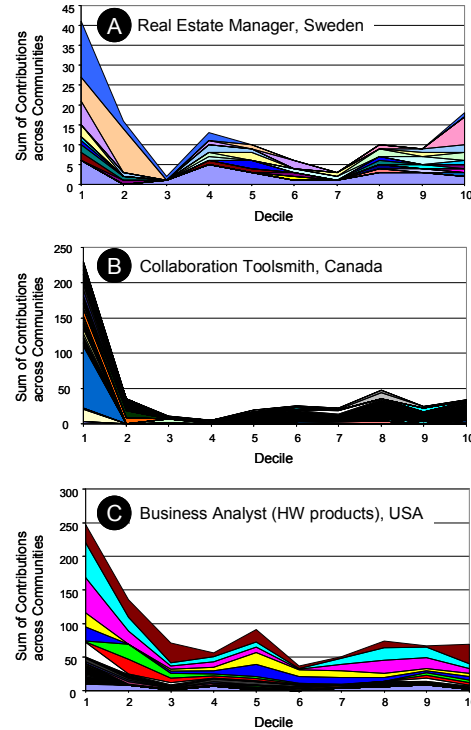

Figure 3. Decile contribution-timeline analyses. Each graph stacks the contributions for multiple timelines. The horizontal axis is a normalized timeline of contributions in deciles of each user's presence in the community (from date-of-membership to the day before the most-recent contribution). The vertical axis is sum of the number of contribution by that user in that community, in which each community has a different color.

("Q0"). A repeated measures ANOVA showed significant effects for deciles ($F_{(9,4455)}$=20.06, p<.001), for the five samples ($F_{(4,495)}$=86.06, p<.001), and for the interaction ($F_{(36,4455)}$=11.38, p<.001).

Figure 2 shows the contribution-timelines across the ten deciles, with one line for each of the five samples. Because the highest group (Q5) had 25 more contributions than the smallest group, we normalized the distribution for each timeline before plotting. The shape for each of the samples is roughly similar, except for one group in decile 10.

The pattern in the first nine deciles is the opposite of the prediction of the social learning hypothesis, with significantly *more* contributions *early* in the timeline. Similar patterns were found in [8].

The contribution-timeline representation allows to "stack" the communities for a user, resulting in the kinds of analyses in Figure 3 for three representative users. For the real estate manager of Figure 3A, the stacked timelines across 13 communities show roughly the same overall pattern as in Figure 2. The collaboration toolsmith of Figure 3B and the business analyst of Figure 3C show similar patterns across their 56 and 49 communities, respectively. These individual results are consistent with the statistical analysis, and provide little support for the social learning hypothesis.

DISCUSSION: LURKING AS DISPOSITION

The dataset provided data for each person in multiple online communities, allowing tests of three hypotheses of lurking and contributing derived from personal trait theory, engagement theory, and social learning theory. There was moderate support for the hypothesis from engagement theory, and little support for the other two theories.

We propose that each person's actions (i.e., lurking, contributing, or a combination) is driven in part by the person's overall engagement (i.e., a trait), but strongly modified by the person's attitude or disposition toward a topic, a group of colleagues, and/or individual or shared tasks. This view is a departure from the essentialism of earlier formulations [4], and from trajectory-oriented accounts of "delurking" [10] or "reader to leader" developmental models [9].

The next steps in this research programme will be to examine how members conceive of their levels of engagement, what use they make of community information *outside* of the communities service (e.g., [6,10], and particularly how they construct their dispositions to join, lurk, and/or contribute in our complex environment of multiple workplace communities – conceptually building on earlier investigations of single communities [7]. It seems likely that the nature of each type of community (team, community of practice, etc.) [5] will be crucial to determining the degree and type of contribution to be made, as will each member's role within those teams and communities [2]; these analyses are likely to test and extend the "born vs. made" predictive study of [8]. It will be interesting to compare the influences of individual traits, situated conditions, and social responsibilities, as they affect members' decisions to join, lurk, and contribute in communities and similar structures in organizations. These investigations will involve ethnographic work with members, as well as more formalized typologies of online groups (e.g., [5]).

CONCLUSION AND CONTRIBUTION

We tested hypotheses derived from three theories of lurking and contributing [4,9,10] in a complex dataset of many employees in multiple online communities, and we found only moderate support for one of those theories from the data. We proposed a more nuanced theory based on engagement, plus the individual's attitude or disposition, and we sketched a research programme to explore this theory.

In addition to theory implications, our work also provides a first look at a new contribution-timeline framework for analyzing complex ecologies in which multiple members join, lurk, and contribute in multiple communities. We anticipate re-using the contribution-timeline framework for analysis of individual communities and types of communities, extending the analysis in [5].

Finally, our work suggests the design of new features for online communities. Based in part on the roles analyses of [2,6], we argue against a binary distinction of lurkers vs. contributors [1,4,7]. Instead, we recommend a better

understanding of distinct types of enterprise communities (e.g., [5]), and a set of user interface features, such as previews, and recommendation services, that support each member to choose an appropriate role in each community.

Community roles are likely to emerge from the needs of each community [2], and members should be in a position not only to *choose* an appropriate role, but also to *co-create* and *co-refine* roles with other members. These developments will inform enterprise community services, organizational development, and the application of participatory principles to enterprise community governance.

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