Whither the Experts?

Social affordances and the cultivation of experts in community Q&A systems

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Abstract— **Community based Question and Answer systems have been promoted as web 2.0 solutions to the problem of finding expert knowledge. This promise depends on systems' capacity to attract and sustain experts capable of offering high quality, factual answers. Content analysis of dedicated contributors' messages in the Live QnA system found: (1) few contributors who focused on providing technical answers (2) a preponderance of attention paid to opinion and discussion, especially in non-technical threads. This paucity of experts raises an important general question: how do the social affordances of a site alter the ecology of roles found there? Using insights from recent research in online community, we generate a series of expectations about how social affordances are likely to alter the role ecology of online systems.**

Keywords- online community; Q&A; experts; social roles; affordances; social media; computer mediated collective action; emergence.

I. INTRODUCTION

Since the early days of the Internet, people have gathered online to share knowledge and expertise as well as to socialize. Early systems for distributed conversations, like message boards or the Usenet, offered a minimalist text-based conversation. While these systems were notoriously plagued by poor signal to noise ratios, they also cultivated communities where people could find answers and experts thrived [8,18]. Early interfaces offered grouped threaded messages but lacked features typical to current web forums such as personal profiles, reputation scores, and avatar images. Recently (since late 2005) purpose-built systems like Yahoo! Answers and Live QnA [1,10] have been created explicitly as communities that offer expertise, as the "collective brain" and as "searchable databases of everything that everyone knows" [18].

Part of the justification for creating community based Q&A systems stems from the success of earlier discussion systems to harness the creativity and energy of experts [6,10,11,16,24]. Microsoft recognized this dynamic early,

through formal recognition of hundreds of Microsoft "Most Valuable Professionals" who contributed extensively to technical discussion related to programming and use of MS products [15]. The MVP is a formal designation of a much more general social role of expert, or 'answer person' that emerges in many online communities [6]. Such experts and their willingness to share their specialized knowledge are often crucial to the success of work teams and online communities. However, declaring an online system to be "Questions and Answers" does not necessarily cause it to become a place for experts to congregate and share their useful knowledge. As Q&A systems have proliferated, they have come under increasing research scrutiny [1,10,22]. However, two foundational questions have not yet been addressed: (1) To what extent do these systems foster experts who provide technical and factual answers? (2) Which social affordances of these systems encourage or discourage the cultivation of expertise and the performance of the expert role?

We address our questions through content analysis of 5,972 messages from 288 contributors to Live QnA. Messages were differentiated by types of questions, answers, and discussion.. We characterized each contributor by the proportion of their coded messages that were technical answers. In short, we find that specialization in provision of technical answers is incredibly rare. None sampled devote more than 80% of their posts to technical answers, and only 1.3% (4) of those sampled devote more than 60% of their time to the expert role. We were surprised by these findings because the setting is explicitly defined as a source for expert advice. It is possible that our descriptive observations about the paucity of experts in this system are anomalous and due to unique Live QnA features. However, we suspect that further research will show this case to be consistent with a general pattern across community Q&A sites: the posting of trivial, non-serious questions is common and opinion and discussion predominate. Similarly, dedicated experts who contribute primarily through technical and factual answers will be rare, partly

because they get crowded out by the high activity of less serious contributors. Our suspicion is based on the nature of the social affordances highlighted by community Q&A sites. The second half of this paper establishes some general expectations for how specific social affordances are likely to affect the distribution of roles in these online communities.

II. Online community in Q&A systems

People seeking answers online have many alternatives. Topical web pages, online encyclopedias, web forums, email archives, newsgroups, and Question and Answer systems are all potential sources of expert knowledge. However, these systems should also be understood as sources of digital objects that result from interactions.

A. Community Q&A systems

First, Recently researchers have paid increasing attention to the Q&A systems and the answers produced there [1,10,22]. While online Q&A services can be divided into digital reference services, expert services, and community Q&A sites [10], our focus is community-based systems like Answerbag, Yahoo! Answers, and Live QnA. Community-based systems employ a threaded conversation built around user's questions. Those questions and subsequent responses can be searched, browsed, and rated by other users. Contributors develop persistent digital identities and reputations related to their contributions, especially their answers. In the case of Yahoo! Answers, with its large population, the system design has the potential to generate answers very rapidly. However, the system also has the potential to draw attention to non-serious answers, jokes, insults, and off topic comments. For instance, researchers found that, while answers to test questions were of acceptably high quality, the quality varied dramatically, and high quality answers were often accompanied by a host of low quality or non serious answers [10].

While the primary focus of recent [10] research compared the quality of the answers generated at a range of Q&A services, the authors also made a number of important observations. Google Answers stood out as a source of high quality answers, which may have been because "...the community of researchers and regular users was passionate about answering questions, and appeared to enjoy the 'game' of answering challenging questions" [10: 873]. Our study shifts focus from the quality of answers to the behaviors of the answerers and narrows the focus from Q&A in general to community based systems like Yahoo! Answers and Live QnA. Maintaining the Integrity of the Specifications

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B. Social Roles

Contributors can be distinguished by the social roles they play. Social roles are complex cultural and structural features of social life [8]. An example social role like "father" is explicitly recognized in society, has a wide set of culturally shared meanings and expectations, is associated with particular goals and interests, and is partly defined by the content and structure of actions directed towards other distinctive role holders. While social roles like experts may not be as clearly defined or explicitly recognized by all the actors in a given social setting, they have identifiable content, behavioral, and structural features.

We employ a behavioral definition of social roles: experts are contributors who provide technical and factual answers for the majority of their contributions, typically 80% of their messages or more. Earlier research on Usenet showed that, within technically oriented newsgroups, it was common to find a sizable percentage of highly active contributors who participated almost exclusively by providing answers to questions raised by other users. Additionally, these experts, or 'answer people' exhibited distinctive structural signatures, which allowed them to be subsequently identified without having to read the content of their answers [24].

III. Setting, data and methods

Microsoft Live QnA is a community based Q&A system, similar in many respects to Yahoo Answers, but smaller. Live QnA structures threads initiated with questions, followed by answers, and comments on those answers. The system encourages all users to participate and has various ways that new questions and threads are highlighted or are made available for search. Messages that receive sufficient votes by community members become labeled as "Best Answer". The threads are associated with tags to categorize the nature of the subject matter. Live QnA employs an open tagging system that allows users to label or 'tag' their questions using any words, phrases, letters, and numbers. Thread life span is limited to four days, encouraging users to answer questions quickly. Users can choose an avatar image, and each user automatically develops a personal page that summarizes relevant dimensions of their past contributions.

A. Data Collection

Following previous research [24], we employed a stratified sampling strategy that focused on the most active contributors. We drew an initial subset of all participants from a 5 month activity window (September 2007 – January 2008). We divided our sample equally between selections from the top ten percent and one percent activity levels as defined by the number of messages (questions, answers or comments) posted. Contributions to Live QnA, as many other online communities, follow a skewed distribution. The contributors in the top 1 percent activity level posted over 70% and the contributors in the top 10 percent activity level posted over 95% of all messages. So, while we sampled from the top 10% of users, these users effectively represent the vast majority of the site's activity.

Messages from each sampled author were submitted to a panel of five content analysts. These analysts coded, per case, at least 20 messages from randomly selected threads. A team of 6 researchers developed, tested, and confirmed an inter-coder reliability rate (simple percent agreement) of at least .80 for all reported variables. A total of 5,972 messages were coded for 288 contributors.

B. Variable Definitions

Technical answers are explanations or descriptions of courses of action. Technical answers are instructive and will often define terms and connect to resources that aid in the solving of some problem or task. A factual answer provides a statement of fact that can potentially be verified, is general, and is not dependent upon the identity of the author. Factual answers can be looked up with a reference, tend not to require extensive expertise, and do not describe a course of action. However, providing both types of answers are actions that experts are likely to make, hence we combine them in our definition of answers. All non-answer posts can be classified generally as discussion. However, within the range of non technical or factual contributions, we highlight the giving opinions because it is a common behavior in Live QnA. Opinion provides an assessment, evaluation, or judgment about something. The opinion provided in the response is not used to provide support, guidance, or advice; it simply involves a stated opinion.

IV. ANALYSIS

We report descriptive statistics for the rates of answering and discussion related behaviors in Live QnA. We also provide some evidence of how answering behavior varies across different types of threads, based on the tags assigned to those tags. We conclude the analysis by presenting brief qualitative examples from Live QnA messages that illustrate challenges related to the provision of high quality answers in that setting.

A. Distribution of Roles

Tables 1 and 2 describe the proportion of the sampled population who post either answers or opinions at different rates. If we adopt a strict definition of an expert, then none of those sampled constitute experts. When we adopt a less strict definition, only 4 cases devoted over 60% of their posts to technical or factual answers. Moreover, the vast majority of the sampled participants (80%) provide factual or technical answers less than twenty percent of the time.

TABLE I.   ANSWER AND OPINION RATES IN LIVE QNA

Rate	Answers		Opinions	
0 to 20%	229	80%	41	14%
20 to 40%	44	15%	81	28%
40 to 60%	11	4%	86	30%
60 to 80%	4	1%	65	23%
80 to 100%	0	0%	15	5%

If the most dedicated members of the Live QnA community are not playing the expert role, what roles are

they playing? As one of the slogans behind community Q&A systems suggests, everyone knows something. In this case, the thing that everyone seems to know is their own opinion. Nearly a third of the dedicated Live QnA community members spend most of their posts granting their opinion. Expertise, when defined as consistently providing technical and factual questions, seems to be extremely rare in this community. Furthermore, opining seems to be quite common. The rarity of the expert role begs the question: Is it reasonable to expect to observe "experts" as we have defined them in any online community? What sort of baseline distribution of answering behavior is observed in other settings?

The best comparison set we are aware of comes from a 2007 study using data from a selection of three Usenet discussion groups [24]. We re-analyzed that data, distinguishing between answers and discussion. The sample included the top contributors to technical discussion groups devoted to the topics of server maintenance, programming in Matlab, and the flying of kites.

TABLE II.   ANSWER AND OPINION RATES IN USENET

Rate	Answers		Opinions	
0 to 20%	20	18%	66	59%
20 to 40%	9	8%	28	25%
40 to 60%	13	12%	14	13%
60 to 80%	11	10%	3	3%
80 to 100%	58	52%	0	0%

In that data 52% of contributors posted answers over 80% of the time, and thus would be defined as experts according to our criteria. The contrast between Live QnA and the Usenet sample is striking. The expert role, performed by very large portion in the Usenet sample, is not observed in QnA.

B. Distribution of Behaviors across Tags

We also examined the proportion of message types within different tags in Live QnA. Fig. 1 is a stacked histogram of ten illustrative Live QnA tags. The lower portion of each bar indicates the fraction of all contributions to that tag that were coded as factual or technical. The thick black line indicates how many of the coded messages were tagged with the corresponding tag, defined as proportion of the largest tag, "fun".

The proportion of factual and technical content varies significantly across tags. In Fun, People, Relationships and Classic Rock, factual and technical contributions make up less than 10% of the total. In Science and Education, factual and technical contributions make up between 20% and 40% of the total.

Only in Software are factual and technical contributions the majority, and even their proportion (60%) is less than we might expect for a technical topic. The least technical tags are also the ones with the most messages. In general, the technical tags saw less traffic, although many non-technical tags also saw low traffic. Although the proportion of

technical answers that we measured varied by tag, technical answers were seldom the majority.
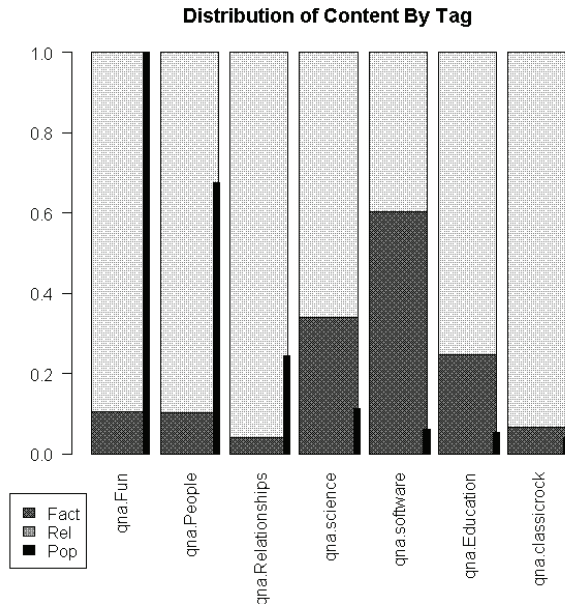

Figure 1. Distribution of factual and technical by tag

C. Qualitative Insights into Non-Answers

There are several ways that question threads in Live QnA diverge from the goals of factual exchanges. We highlight three that our coders frequently observed: threads that lack real questions from the start; those that begin with legitimate questions, but receive non-serious answers; and those that receive serious answers but the "best answer" label is granted to a non-serious answer.

1) Non-question Thread: This initial post is not a question by our definition. Initial non-question posts of this type can easily be found throughout Live QnA:

"THANK YOU HOT SLAP DADDY, I LOVE IT!>>>I LOVE IT I LOVE IT I LOVE IT!"

2) No Good Answer: A significant number of initial messages in Live QnA are questions, but a good question does not guarantee a good answer. A legitimate question is asked, but no posts answer the question:

Has anyone ever hear of Alice in Wonderland Syndrome?
(I found this on Wikipedia, and am pretty sure I suffered
from it when I was a child. Does anyone know anything
about this? Just curious!)
Best Answer:
Fear of falling down holes??? LOL LOL
One other answer:
I have heard of it but I do not know anything about it.

3) Legitimate answer neglected: The message selected as the "best answer" below is a joke while a factually oriented message is neglected. Definitions of "best answer" clearly vary by person and context. The following

example illustrates the label being used to highlight an amusing response over a factual one. The more frequent that joke content is deemed the best answer the less value experts are likely to see in offering a serious answer.

What do you call a male ladybug?
(I want to be politically correct!!)
Best Answer:
Sir :)
(Laddie bug)
10 other answers, including:
Hi Lisa, Boy ladybugs are called ladybugs too. You might
find this interesting: [link]

The initial post may well be a legitimate question, but users, who make the ultimate decision as to what the "best answer" is, have had their say: clever puns are approved, while factual answers with informative links are not. Instances like this may deter experts oriented to serious answers from engaging in the community.

V. THEORETICAL FRAMEWORK

In any social system, human behavior can be understood as the result of how individual models of action (habitual, valued, expressive, and instrumental) intersect with and the opportunities and constraints inherent to that system. Researchers who study online community are increasingly looking to general theoretical frameworks [21], general social mechanisms [14], and general social scientific concepts [11] to explain and predict the patterns found in online community [10]. Researchers [2,5,21,22,] are also paying increasing attention to how attributes and affordances of a computational system affect theoretically important individual level behavior, including the establishment of trust, encouragement of contribution, and increased probability of retention. In the following we describe connections within a general theoretical framework for modeling the behaviors of individuals, the setting they are in, and how different social outcomes are likely to emerge from the combination of the attributes of the social setting and the goals and actions of individuals.

A. Emergence of Collective Outcomes

The cultivation and retention of experts in an online community can be understood as a type of collective outcome. Collective outcomes in any social system result from the ways that system level attributes both enable and constrain the actions of people who participate in it [4]. This approach draws attention to three key transitions: the fit between the system constraints and the interests and goals of actors, the transition from a model of individuals to the actions they take, and the networked combination of those actions that results in the collective outcome. The distribution of roles in the Live QnA system is the collective outcome investigated here.

Figure 2 illustrates a conceptual model for studying emergence of collective outcomes due to the combination of social affordances, individual goals, and social actions. The absence of a direct connection between social affordances and collective outcomes reflects the "methodological individualist" or "emergence" based approach that

emphasize that explanations of collective outcomes must first take the individual level and social interaction into account.
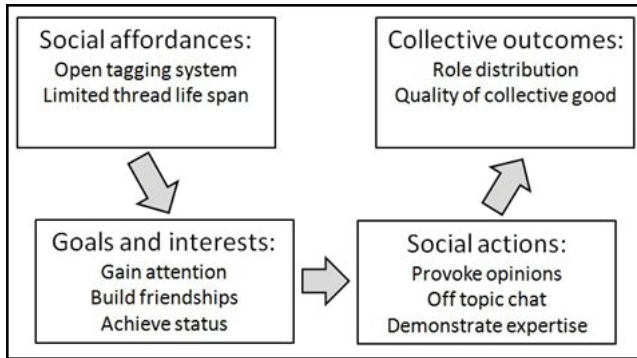

Figure 2. Emergence of collective outcomes

Consider an example of computer mediated collective action. We might expect that an open tagging system would make it easier for some users to attract attention to their posts by assigning a wide array of existing tags as well as generating new, sensational tags. In contrast, a system with isolated readership embedded withing particular named groups might be unlikely to notice messages posted outside their group. This balkanization would make it harder to attract widespread attention but easier to reach specialized audiences. In the first case, we might suspect that, all other things being equal, we should see more attempts to provoke opinions in an open system than in the segmented audience situation. The collective outcome of interest would be, given similar levels of participation, should we expect to see role distributions that favor discussion in the open tagging system and favor expertise in the segmented audience? This example, while central to the issues of this paper is just one example of connections that can be made between social affordances and collective outcomes by thinking about the transitions from one level of the diagram to another.

B. Reputation, Reactions and Roles

Researchers and managers are increasingly aware that reputations are important incentives for desired participation [21]. When reputation systems are explicit the system designers have essentially altered the reward structure for different behaviors, and not necessarily in a way that reinforces the desired behavior. For instance, if reputation scores are based on quantity rather than quality of posts, the system is likely to tend towards trivial contributions, one possible shortfall of the Live QnA system.

Social reactions can have a significant impact on subsequent social activity [2]. In Usenet, contributors were shown to be more likely to receive a reply if they included key references to their role and involvement in the group. In general, incentive systems that highlight the social context of user contributions can have powerful effects on the nature and tenure of subsequent participation [14]. Systems that lack ways for individuals to record and preserve contributions (like FAQs, sticky threads, walls of fame) will have greater difficulty integrating new members into a sophisticated set of normative standards, another possible short-coming of community Q&A systems.

Participation in voluntary activities is shaped by individuals' commitment to role identities that they already hold [3]. Similar role commitments can emerge from roles that are specific to the online setting. Thus Microsoft MVPs in Usenet might be more likely to contribute and conform to normative definitions of good contributors if their MVP status is made salient in the system. In Live QnA, "Top Contributors" may similarly shape their behavior in accordance to normative definitions of appropriate behavior for top contributors.

C. Context, Boundaries and Tags

How does thread organization influence the behavior of contributors and the quality of their contributions? Previous studies of Usenet [6] have shown qualitative differences in user activity between newsgroups. The "computers" newsgroup may be full of short threads aimed at answering technical questions, while the "divorce" newsgroup is more likely to have long, involved discussions oriented towards social support. One possible interpretation of this finding is that the content of a newsgroup acts as a set of unwritten norms that, over time, encourage the posting of similar content and discourage the posting of very different content.

Contextual boundaries seem to be fuzzier in Live QnA than in Usenet. It is possible that this allows the large volume of discussion content to bleed into technical contexts. This phenomenon would hinder the creation of content-homogenous technical tags and corresponding norms that promote relevant, factual posts and censure off-topic discussion. In absence of these norms, users may lack the motivation to make factual or technical contributions, which require more effort than idle chatter or spam, and experts may never arise or comprise such a small segment of the population as to escape our sample.

D. Reinforcing Norms of Dedicated Contributors

Technical experts were prevalent in the Usenet sample. One reason for their prevalence stems from the types of newsgroups sampled. The server, Matlab, and kites newsgroups were all selected because preliminary analysis had shown that there was some tendency for the asking and answering of technical questions. In active newsgroups, the experts had more than enough legitimate questions to consume hours of their time every day. In the context of their answers, they often took the time to recognize other experts in the system who were participating in the same thread. The richness of the technical questions provided a context for long-term participants to repeatedly connect with each other, similar to the culture that emerged among the dedicated answer people at Google Answers [10]. This raises the general issue of how implicit and explicit reputation systems alter how people behave and can result in different online role ecologies [21].

VI. CONCLUSION

While we observed several possible connections between the social affordances of Live QnA and the role ecology we observed, future research is needed to test these connections. A range of comparative studies where systems

vary primarily in such affordances would be a great direction for future research. One of the strongest directions will investigate how reputation systems can cultivate particular social roles. A second important direction will examine how contextual boundaries affect development of role ecologies. Finally, research should test how temporal constraints affect the quality of data repositories and the roles emergent in them.

An important limitation of the current study stems from the small size of the Live QnA. It may be the case that Yahoo! Answers, which shares many of the design features of Live QnA, may cultivate some answer people simply by virtue of being extremely large and thus more likely to contain rare types of participants. Similarly, Live QnA may be tapping into a subset of the internet population that is less interested in providing technical contributions. Future research should address this limitation by extending similar methods to other systems of question and answer.

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