

Specialists and Synthesists in a Question Answering Community

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The most sustainable online communities are those that allow and encourage their users to have a voice in how the community evolves. The proliferation of online communities with collaborative filtering mechanisms, where user feedback is aggregated to shape future interactions, makes it necessary to understand why participants in online communities value the content they do. Building on the concepts of users as specialists and synthesists developed in previous research, this study examines Answerbag, an online question answering community where users rate one another's answers to provide collaborative filtering. In this environment, specialists are operationalized as those who claim expertise in a given topic and answer questions without referencing other sources, and synthesists as those who include one or more references to external sources in their answers. The results of the study suggest that within the Answerbag community as a whole, the answers of synthesists tended to be rated more highly than those of specialists, though answers provided by specialists were rated more highly within certain categories. The consequences of differences in the perceived value of information provided by specialists and synthesists are examined, and avenues for future research are discussed.

Introduction

It is somewhat ironic that we live in a culture that rewards specialization, yet most specialized scientific and professional knowledge is built on syntheses of diverse data and ideas (Klein 1990, Becher 1989). In a previous study, Gazan (2004) examined the distinctions between specialists and synthesists in a study of the work practices of scientists and professionals involved in the collaborative design of an environmental digital library. Data was collected via a year-long participant observation, document

analysis and interviews, and resulted in a narrative and social network analysis of the project. The resulting typology of some characteristics of specialists and synthesists is summarized in Table 1.

Table 1: Characteristics of specialists and synthesists

Specialists	Synthesists
Give information	Receive information
Use specialized terms	Translate specialized terms
Can't articulate the roles of others	Can articulate the roles of others
Strong sense of role	Role more flexible
Fewer ties in social network	More centrality in social network
Work is featured	Work 'under the radar'

Also among the findings was a key suggestion: that the work of specialists was valued more highly by the project participants than the work of synthesists. The current study seeks to extend this investigation outside the academic and professional realm to an online question answering community, and to examine how community participants provide and evaluate information as specialists and synthesists.

Background

Online communities, just like communities of other types, benefit from the work of both specialists and synthesists. The phrase 'communities of practice' is often used to refer to groups of people who share a concern, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis (Wenger, McDermott and Snyder 2002). Although their purposes can vary, they all share a basic structure that combines three elements:

- **A domain of knowledge:** This creates common ground and a sense of common identity. A well-defined domain affirms a community's purpose and value to stakeholders.
 - **A practice:** This is a set of frameworks, ideas, tools, information, styles and documents that community members share.

Lave (1991) has also argued that domains of knowledge are socially constructed over time by communities of practice. Whether as formal as the world of

mathematics researchers or as informal as the fans of a garage band, community membership is based on both mastery of a domain of knowledge and indoctrination into a culture. Those who navigate the journey successfully generally find themselves considered specialists, institutionally sanctioned to create or evaluate knowledge within the community.

Synthesists, in contrast, tend to work across communities. They are information receivers and translators, who may be lacking a specialist's pedigree, but who also have a role to play in social knowledge creation. Due to its low perceived prestige, the work of synthesists is often done passively or unintentionally. Since it requires a focus on the expertise and needs of others, it tends to be undervalued, even "invisible" (Star and Strauss 1999).

Synthetic work is related to the concept of articulation work, which Fujimura (1987, 1992) uses in a wider sense, to refer to the work of merging heterogeneous actors, practices and social worlds into a coherent whole. Suchman (2000) is interested in the social and political aspects of the relationship between cultural practices and technology production. She uses 'articulation work' to refer to the translations effected by people from disparate groups that make a technological artifact sufficiently coherent to be transferred to other groups, such as from developer to marketer to purchaser. This includes activities such as integration, local configuration, customization, maintenance and redesign.

The creation of an online community by means of a technical or design innovation is by no means sufficient to guarantee participation (Cabrera and Cabrera 2002). The diverse motivations and personality types of online community participants has been widely studied (Wasko and Faraj 2000; Bartol and Srivastava 2002; Bock and Kim 2002) and even parodied (Reed 2006). An online community that interprets its discrete domain of interest as an assumption of user homogeneity will likely alienate many potential participants.

In an online question answering community with a collaborative filtering component, participants translate their knowledge, experience and opinions into content that both adheres to and continuously redefines the standards of the community. Some do so as specialists, explicitly claiming expertise and providing information they feel is authoritative enough to require no references to other sources. Others participate as synthesists, taking a collaborative approach to question answering by including explicit references to outside sources. How these different types of answers are rated by participants in an online community is the focus of this study.

Site and method

Answerbag (<http://www.answerbag.com>) is an online question answering community of roughly 50,000 registered users, and draws over one million unique visitors per month. Registered users submit frequently-asked questions in a nearly limitless variety of categories, submit answers under a screen name, and also rate answers as useful (100%), somewhat useful (75%), or incorrect/not useful (50%). Multiple answers to a question are permitted, and the highest-rated answers are listed first, providing a collaborative filtering function while still allowing users to browse the range of different answers. Participants with the highest answer ratings in various categories have their screen names and statistics posted on the site. Unlike Yahoo! Answers (<http://answers.yahoo.com>), questions remain on the site and can accumulate answers and ratings indefinitely. Unlike Google Answers (<http://answers.google.com>), Answerbag is a free service, and answers are provided by other users, not paid researchers. Answerbag is both a public Website and a research testbed, and administrator-level access to all real-time and legacy site data was readily available.

Though not a formal reference tool, Answerbag employs moderators who edit and recategorize question submissions when necessary, to reflect the interests of diverse communities. The Answerbag taxonomy evolves as new questions are added—there are currently over 3,000 categories, many of which have become hubs for online communities of people interested in particular topics. For example, a recent question featured on the main page was submitted in the general *Criminal law* category:

How do polygraph tests work, and how accurate are they?

This question drew many thoughtful answers, from anecdotes about one user's personal experience with a polygraph test to a (self-proclaimed) detective's brief on how the results are used by the police, to a summary of the physiological responses the instrument is designed to measure. Perhaps the current popularity of police procedural television shows contributed to the interest in this question as well. As more questions related to criminal procedure were submitted, the *Criminal law* category quickly surpassed the 30-question flexible standard for a crowded category. Many of the new questions focused on the pure science involved in discovering and processing evidence, for example:

How can a bullet be traced to a particular gun?

So a new *Forensics* category was created, initially populated with relevant questions from *Criminal law*, but also *Chemistry*, *Physics*, *Psychology* and others, even some that had been submitted in *Television shows*. In the nine months that the *Forensics* category has been in existence, it has become a thriving community, with so many questions submitted that a subcategory has already been spun off. Participants include retired police officers, detective show enthusiasts-perhaps even people who are planning crimes. In this category, there are a sufficient number of questions, answers and answer ratings to begin to use rating statistics to analyze structural differences in answers.

Specialists and Synthesists

For the purposes of this study, specialists are those who have proclaimed their expertise in a community, and who answer a given question without making reference to any other source. Answerbag users have profile pages where their participation statistics are posted, including the categories in which they post answers, percentage of useful ratings, and about a dozen other measures. There is also a free-form 'About me' section where users can provide links and other content, and many discuss their background, either professional (e.g. botanist) or personal (e.g. mother of a special-needs child). Expertise can be triangulated by the number of answers a user contributes and the strength of their answer ratings in the categories associated with their claimed areas of expertise. Other indicators of expertise can also be found within answers themselves, for example in a subcategory of *Automobile engines*, a user might preface an answer with a claim such as "I've rebuilt a half-dozen Chevy V8s..."

Synthesists, on the other hand, do not claim to be experts in the category in which they provide answers (though they may claim expertise in other categories). Answers coded as synthesist make explicit reference to other sources of information to support their answers, such as naming persons or organizations, linking or referring to content both inside and outside Answerbag, citing published sources, or relating the experiences of people other than the author of the answer.

One example of the difference between specialist and synthesist answers can be found in the *Rabbits* category:

Are rabbits afraid of heights?

This question has yielded two answers at this writing:

We raise rescued eastern cottontails. Currently we have a male as a house rabbit. He went through a phase of jumping up onto objects. I found him balancing on the shade of a floorlamp one evening...on another occasion he had jumped from a chair onto top of the same floorlamp and then up onto the mantle above the fireplace...

This answer includes both of the criteria to be coded as a specialist answer: a statement of expertise, and content consisting solely of personal experience and observation. The other answer codes as synthesist, though somewhat subtly:

It is not nice to scare your rabbit by putting it in high places. A show said rabbits like to feel safe and do not like to be up high in the air. So yes they are afraid of heights and it will make them nervous if you put them on a high counter top specially if it [is] not a soft service (sic) for their feet to be secure on. Be smart with your rabbits, you would be nervous if you were being put in weird places [you're] not used to.

Though it is certainly not clear which 'show' the author of this answer is referring to, this answer does meet the criteria to be coded synthesist. In this case, the content of the specialist and synthesist answers was in conflict, but that need not be the case.

The evaluation metric used for the answers was the rating system native to Answerbag, which comes with several caveats. Offering recognition on the site to contributors whose answers are highly rated increases site traffic, but also invites unscrupulous gaming of the rating system to advance one's position, for example by vindictively rating down the answers of a competitor. Answers can be edited after submission by their authors or by moderators, and answer ratings can be changed by the person who left them if the answer content changes. However, as with any collaborative filtering system, the more answer ratings there are, the more likely that the impact of rogue users will diminish. Therefore, for the most direct comparison between the answer ratings of specialists and synthesists within a given community, this study focuses on questions that had at least one answer coded as specialist and one coded as synthesist, and answers that received three or more ratings overall. For comparison, data without this constraint are also reported.

Results and discussion

The results of the study suggest that across all Answerbag communities, answers of synthesists tended to be rated more highly than those of specialists, though answers provided by specialists were rated more highly within certain categories. Table 2 shows the overall answer sample and ratings data, based on Answerbag's answer rating scale of 100% useful / 75% somewhat useful / 50% incorrect or not useful. The average answer rating across the entire site is 92.9%, which is close to the average rating in the sample.

Table 2: Overall answers and ratings

Number of answers sampled (% of total)	9,953 (22.1%)
Number of answers with 3+ ratings (% useful)	1,920 (93.3%)
Number of specialist answers (% useful)	259 (91.6%)
Number of synthesist answers (% useful)	446 (94.4%)

From Table 2, it is interesting to note that only 36.7% of answers in the sample coded as either purely specialist or purely synthesist. The remaining 63.3% contained elements of both, usually users who claimed some expertise but also referenced sources outside their own experience. Any potential relationship between specialist- and synthesist-coded answers on ratings for these 'hybrid' answers would have to be determined via a different method, and thus are not analyzed here. Also, since the content of the questions in the sample could not be controlled to be equally likely to draw a specialist or synthesist answer, raw numerical counts and percentages are used to report findings, instead of a test of statistical significance.

When the same question had both a specialist- and synthesist-coded answer attached, the difference in the average answer rating became slightly more pronounced (Table 3). This may be due to the fact that all answers to a question can be displayed on a single page, allowing viewers to juxtapose and react to different answers without navigating through different screens.

Table 3: Specialist and synthesist answers attached to the same question

Number of questions with both specialist and synthesist answers	134
Specialist answers (% useful)	(89.5%)
Synthesist answers (% useful)	(94.9%)

The data in Table 4 address the question of whether some communities value specialist or synthesist answers more highly than others. In the sample, the number of categories in which specialist- and synthesist-coded answers appeared is understated, and requires some clarification. Since many areas of the Answerbag taxonomy have multiple levels of subcategories (e.g. under the Dogs category, there are 9 subcategories and 11 sub-subcategories), to better reflect the breadth of the community, subcategories such as these were conflated into their more general category.

Table 4: Preferences by category and community

Number of categories with both specialist and synthesist answers	45
Categories in which specialist answers were most strongly preferred (% rating difference)	<i>Parenting</i> (+9.9%) <i>Divorce law</i> (+9.1%) <i>Criminal law</i> (+9.1%) <i>Taxes</i> (+9.0%) <i>Mormon religion</i> (+7.8%) <i>Relationships</i> (+7.5%)
Categories in which synthesist answers were most strongly preferred (% rating difference)	<i>Drugs & Medicine</i> (+8.5%) <i>Science</i> (+8.1%) <i>Travel</i> (+7.2%) <i>Home remedies</i> (+7.2%) <i>Fashion</i> (+6.8%)

Several of the most specialist-friendly categories in Table 4 are not unexpected. Those interested in answers to legal and financial questions would naturally seek the advice of a professional, and several who claim to be legal and financial professionals regularly contribute specialist-coded answers. However, the preference for specialist-coded answers in *Parenting* and *Relationships* revealed a distinction alluded to earlier: the personal specialist as opposed to the professional. Answers in *Parenting* and *Relationships* tended to be coded as specialist when the author stated that he or she was a parent who had been in the position of having to discipline a child in front of company, for example, or someone who had been cheated on in a relationship and had to decide whether to forgive.

Communities partial to synthesists tended to have more answers and answer ratings than those partial to specialists. Many questions in the *Drugs & Medicine* category concern adverse effects of prescription and non-prescription drugs, and answers provided without substantiation tend to be rated quite poorly in this category. Answers that include references to studies or links to articles are particularly common in *Drugs & Medicine*, and are usually rated highly. Interestingly, though many participants in the *Science* communities did claim expertise, many more referenced outside works and did not explicitly claim expertise, thus positioning *Science* as one of the more synthesist-friendly

communities. Similarly, though both *Travel* (“I’ve been there”) and *Fashion* (“I’ve worn that”) contained many self-proclaimed experts, they were outstripped by those who referenced review articles or brought in the perspectives of other cultures to evaluate, for example, public transportation in southeast Asia, or appropriate office attire.

These results suggest that there are measurable variations in what different online communities consider useful information, and a significant factor may be whether the information is presented with authority, as a specialist, or from a more collaborative perspective, as a synthesist.

Conclusion

Whether or not there is a formal collaborative filtering system in place, members of communities of practice both create and evaluate knowledge. In academic and professional communities, roles and reward structures are so ingrained that they tend to disappear into the social infrastructure, making it difficult to examine tacit assumptions about the relative value of the work of specialists and synthesists. Though statistical and content analyses of online information behavior cannot provide the data richness of observation and interviews of community members, online communities are a fruitful object of study to examine how community members in the aggregate evaluate useful content, without quite so much of the overarching institutional baggage that privileges specialists. In this study, the answers of synthesists tended to be rated more highly across all communities, though the answers of specialists were preferred in some communities. Future research will refine the concepts of specialists and synthesists, build on the distinctions found in the data between personal and professional specialists, and formulate testable criteria for answers-and people-that demonstrate aspects of both.

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