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Decentralized Expertise: The Evolution of Community Forums in Technical Support

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Social Software and the Evolution of User Expertise:

Future Trends in Knowledge Creation and Dissemination

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Chapter 17

Decentralized Expertise: The Evolution of Community Forums in Technical Support

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ABSTRACT

This chapter discusses the authority structures found within the community support forums of open and closed source operating systems (Linux, Windows, and OS X), demonstrating how, because of these forums, technical expertise is shifting away from the organizations responsible for creating these systems and into the community using them. One might expect this kind of migration within Linux communities, where in theory anyone can contribute to the code of the project, but it is also being seen in closed source projects, where only certain people, usually employees, have access to the underlying code that controls the operating system. In these situations, expertise is becoming decentralized despite the fact that members of the support community sometimes lack access to the code behind these operating systems.

INTRODUCTION

The moment one buys a personal computer, the countdown begins to the moment when the computer will fail in some way. It is one of the inevitabilities of computer ownership.

Once a computer fails, if the user cannot resolve the issue herself, she will try to find someone who can help. It sounds like a relatively simple prospect, but as anyone who has tried to repair a computer will tell you, determining the problem

is often quite challenging. Is the issue related to hardware or software? Or is there another variable, like a wireless router or the Internet connection? According to a Pew Internet & American Life Project report, 29% of surveyed users whose computers had failed in the past year had contacted user support for help, while the same percentage had tried to fix the problem themselves (Horigan, 2008, p. 6). It is not surprising that some telecommunication companies are considering offering technical support as an add-on service (Gubbins, 2009, p. 34).

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The even split between users who seek formal support and those who try to repair their computers themselves is significant as it also represents a split in authority structures. For some users, vendors represent authority. For these kinds of users, because the vendor made the product, the vendor is responsible for repairing the product. Other users try to fix their own product because they do not trust the expertise of the vendor, because they feel they can resolve the issue on their own, or because the vendor could not help them to their satisfaction.

As more online support forums are becoming available, many users are becoming less dependent on the centralized expertise of a vendor and are coming to rely on the decentralized expertise of a community of users. This shift is quite visible in the support forums associated with various operating systems. These forums allow users of all skill levels to post support questions to a community at large, possibly bypassing formal support channels (although, as we shall see, some vendors do provide formal support within these community areas). This type of community-driven technical support would be much more challenging to implement without the aid of the Internet.

Finding formal, centralized support for Windows is relatively straightforward, once one understands who to contact for help. Although the operating system is produced by Microsoft, Microsoft directs users to contact the computer manufacturer for assistance with the operating system.¹ It does, however, provide phone, email, and chat support to customers who purchase Windows separately from their computer.

Apple users have a less complicated path to follow for help. All Apple hardware and software have a one-year warranty and up to 90 days of technical support via telephone.² That warranty can be extended if a customer purchases AppleCare, Apple's technical support package. Apple users without AppleCare can also purchase customized support.

Linux is an open source operating system based on the Unix operating system. As an open source project, Linux is developed collaboratively, with people from around the world contributing code, time, and energy to the project. Linux is freely available for anyone who wants it and most contributors are volunteers. Unlike OS X and Windows, it is not a commercial product, although some vendors have created commercial versions of Linux.

Its open source status means that most Linux users have no formal technical support options. Some Linux providers offer an enterprise solution for businesses, but the average home user looking to install Linux on a personal machine is pretty much left to her own devices (although there are vendors who sell hardware with Linux distributions already installed and who provide varying levels of technical support).

Open source refers to software that is developed using publicly available source code:

There are three dimensions to the concept of "open source" as it applies to computing. First, open source is a philosophy about computing and sharing programming code to improve the quality of computing. The term "open source" also refers to a wide array of operating systems and applications that have been developed under this philosophy, and, finally, it represents a general approach to the treatment of intellectual property, usually in reference to licensing software or related documentation. (Tomer, 2002, p. 155)

Users seeking technical support usually visit forums based upon their Linux distribution (a distribution is a more specific version of the Linux operating system), so an Ubuntu distribution user who cannot connect to the Internet on his Dell laptop would probably start his research with a search of the Ubuntu forums.³ Even if a user does not know he wants to search a forum, forums tend to come up high in Google searches for Linux distributions and problems. At time of writing, a

Decentralized Expertise

Google search for “Ubuntu no volume” has its top two results from forum sites, with Google giving users the option to pull more results from forums. Closed source operating systems like OS X and Windows also have forums, though, and while users might not be aware of them, they too often come up in Google searches. For instance, as of this writing, a Google search for “can’t open explorer” leads users to the Microsoft-hosted support forums. So even if a user is not aware of a specific forum or an operating system, it seems general Internet searching can often direct him to one.

Different forums have different procedures, processes, and cultures. But the common functionality is that users can post questions about the operating system and other users will attempt to answer the question. Some forums are a mix of employees and users; others are all volunteers.

These decentralized, community-based forums are changing the structures of expertise and authority. Where operating system support was once purely the domain of the vendors who produced them (or, in the case of Microsoft, the hardware companies who installed them), now we see technical support expertise distributed out into the community of users. Vendors might have authority in the creation of some of these operating systems, but their users—users with no formal affiliation to the organization responsible for these operating systems—might demonstrate greater expertise in repairing and understanding them.

Where once users had to turn to formal, company-sponsored experts for operating system technical support, now users have the option of turning to experts working independently of the company or organization producing the operating system. While in the past operating system support was solely in the hands of company-sponsored experts, now many users not affiliated with a company have enough expertise to offer support to other users on various issues.

In this chapter I will examine the support forums of closed source and open source operating systems (Windows, OS X, and Linux), investigat-

ing the authority structures within those forums and demonstrating how technical support expertise for these projects is moving away from the entities responsible for the creation of the software (a centralized model) and into the community of users (a decentralized model). Where operating system technical support expertise was once limited to those creating the operating system, now expertise is more an issue of who can provide the correct solution to a given technical challenge in a given moment.

BACKGROUND

The literature exploring the dynamics of operating system support in forums is sparse. Lakhani and von Hippel (2003) looked at online support in open source projects (specifically, the Apache server software project), and found that users helped other users for a variety of reasons, including reputation enhancement and to learn more about the project (p. 940). Knuppel (2000) investigated Linux newsgroups as communities of practice and found that most Linux newsgroup messages were users giving their opinion, followed by users giving orientation (p. 24). A study by Ahmed, Campbell, Jaffar, and Capretz (2009) explored the role of online forums in open source software support, and found that the forums are crucial to identifying software defects (p. 178).

Many researchers have also explored the social dynamics of open source communities. Chopra and Dexter’s (2008) comprehensive overview of free and open source software touches on just about all the social components of these communities; others who have explored this world include Toral, Martinez-Torres, Barrero, and Cortes (2009); Xu, Jones, and Shao (2009); and Zhao (1999).

There have also been more specific studies of the Debian community. Debian is a Linux distribution (and the one on which Ubuntu is based). Mateos-Garcia and Steinmueller’s (2008) research was not directed specifically to the issue of support,

but did discuss the authority structures that exist within the project (p. 337). The authors reported that, despite Debian's established governance structure, technical decision making was sometimes too decentralized, delaying development of the distribution (p. 342). While decentralized technical support might have some advantages, according to this case study of Debian, decentralized development is not always advantageous. Coleman and Hill (2005) do not discuss support forums explicitly, but do explore the ethical volunteerism that is a part of the Debian community culture (p. 275). Obviously, this volunteerism will have an impact on support forums in the future in some way, since very few people are paid to participate in those kinds of support channels.

There is also a body of work on online question and answer sites, of which support forums could be considered a subset. Shah, Oh, and Oh (2009) divided online question and answer sites into three categories: digital reference services, expert services, and social question and answer sites (p. 205). The authors defined a digital reference service as one where librarians answer questions as opposed to an expert service, which features some sort of specialized non-librarian expert answering questions (p. 206). Finally, they defined a social question and answer site as one where anyone within the community can answer a question.

These forums represent an interesting space. Because forums are often used for question and answer purposes, they might be considered a type of question and answer site. Contextualizing the forum using Shah, Oh, and Oh's three categories of question and answer sites is not simple, though. Just about all forums are social question and answer sites to some extent, since anyone can attempt to answer any questions. But there is also a degree of expertise within these forums. Some people answering questions might have formal ties to the operating system with which they are helping but others might be experts simply because they know a lot about a product, despite having no role in the development of the project.

However, Shah, Oh, and Oh (2009) provide a relatively broad definition of expert services that can apply to understanding expertise in the forums: "Expert services are question asking and answering services offered by various types of commercial and noncommercial organizations other than libraries, including professional societies and organizations, schools, corporations, and even individuals in specific subject domains" (p. 206). This definition would apply to someone with formal developer-based ties to a project, as well as to someone who is merely proficient in using a particular operating system. This study is also relevant to the current context in that it discusses how a tool like the ability to rate answers can help users understand the quality of answers given in these forums (p. 206). In expert forums that allow user ratings, expertise is not just a matter of a respondent's personal belief in her expertise, but also quantifiable matter, based upon the ratings of other users. Users cannot view and assess expertise in the same way as in most traditional, centralized support channels, like telephone support. Ratings can make expertise easier to assess. When expertise is easier for end-users to assess, it is easier to decentralize, since users do not have to depend upon a centralized authority to confer expertise.

Users posting questions about their computers online is nothing new. Howard Rheingold (2000) discusses it in his book, *The Virtual Community*. He quotes Dan Ben-Horin, founder of the CompuMentor project:

The CompuMentor project began four and a half years ago when I couldn't get my new 24-pin printer to print envelopes without smudging. I had just started logging onto the WELL, so I posted my printer question in the IBM conference. The answers I received were not only informal but also profuse, open-hearted, full-spirited. The proverbial thought balloon instantly appeared. These computerites on the WELL wanted to share their skills...

Decentralized Expertise

...My own learning had really commenced when my next-door neighbor expressed a willingness to help me whenever I needed him. And I needed him frequently. Now, here on the WELL was a whole community of helpful electronic next-door neighbors. (pp. 277-78)

Given that *The Virtual Community* was originally published in 1993, we see Ben-Horin discussing a period of time in the late 1980s. It is worth pointing out that WELL was an early dial-in bulletin board system featuring forums that predated the rise of the World Wide Web. So it seems that very early on, users latched onto the idea of asking questions and having peers, as opposed to vendors, answer their questions. Ben-Horin uses the metaphor of helpful neighbors when talking about getting computer help from a forum, which presumably differs from going through an official technical support channel, where one might not have that same kind of experience. While the people helping Ben-Horin were not necessarily credentialed experts or official vendor representatives, he still accepted their advice because it was authoritative enough for his purposes.

Lankes (2008) explores this distinction, juxtaposing authority against reliability:

Reliability commonly refers to something or someone perceived as dependable and consistent in quality. If you have a reliable car, it is one that runs well over time. Reliability to the scientist is simply the consistency of data, such that the same treatment (e.g., questions, experiments, or applications) yields the same result over time. If an authority approach is exemplified by believing that a given news anchor will give a credible answer; then switching from news station to news station looking for commonalities in the same story exemplifies a reliability approach. (p. 109)

Forum users seem to trust the reliability of the forums, if not the necessarily the authority of the individual respondent. This kind of trust in

answers found in certain forums is not surprising, given the number of open source projects that use forums as a communication mechanism and as a form of technical support (Ahmed et al., 2009, p.174). Linux is an open source project, so it has a conceptual framework that would involve forums as a support channel.

EXPERTISE AND AUTHORITY WITHIN SUPPORT FORUMS

Ubuntu Forums

Because Linux is a freely available operating system, it's difficult to tell how popular one distribution is as opposed to another. There are no sales numbers to indicate what people are buying. Anecdotally, however, it seems that Ubuntu is one of the more popular Linux distributions, if not the most popular.

The Ubuntu project is an open source project sponsored by Canonical, a private company. Despite being privately owned, the project has its own governance structure (Bacon, 2009, p.247). Support forums are a part of the Ubuntu governance and are overseen by a forum council. The council has a few responsibilities:

- Encourage all forum members to follow the Forum Code of Conduct, and abide by the Ubuntu Code of Conduct.
- Appointing or recalling administrators, moderators and forums staff or determining criteria by which they are appointed.
- Resolving disputes between forums staff and moderators as per the existing dispute resolution system and forums guidelines.
- With advice, feedback, and help from the forums staff, maintaining and enforcing the Forums Guidelines and associated infrastructure (e.g., the resolution center).⁴

In addition to the council, there are also forum moderators, who are users who have been granted an elevated status within the forums. Their names appear in red and their role is to help users get their questions answered.

Despite this formal structure, the format of the forums is relatively simple: users of all skill levels post questions about Ubuntu and other users answer them. One question might have a few different answers, so the user must decide which answer is best. The best answer might originate from someone on the forum council, or someone closely associated with the Ubuntu project, but that is not a given.

The forum actually reinforces the idea that correct answers can come from anyone by not giving much information about the expertise of the answerer. The site will indicate how many times a user has posted, but that is all. There is no reputation ranking metric. Users are not required to list their expertise or credentials anywhere in their user profile.

Consider how different this process is from typical technical support. Rather than contacting a company and being delegated to an expert, or at least someone one hopes is an expert, in the Ubuntu community, users must instead ask each other for help (although, like Apple, Ubuntu does offer fee-based support in a service that seems more for corporate users than personal ones).

In some ways, Ubuntu is deferring to its users in how to support their own product. This might be for financial reasons, as it is cheaper to use volunteers than to pay support technicians. But this model of operation also aligns with Ubuntu's status as an open source product (as Linux is by definition).

Because open source software often does not yield much financial reward, it is frequently built by volunteer communities. These communities depend upon other community members to report bugs in software—and to fix them. As Ahmed et al. (2009) reported that a high volume of messages in an online forum correlated positively

with open, or unresolved, bug reports (p. 177), meaning that the forums were successfully being used to document bugs, which were then claimed for repair by developers on the project.

Open source projects, like Linux, have a history of users reporting problems to the community at large. Traditionally, the reporting has been about bugs. This form of reporting easily evolves into the current scenario where users report all kinds of problems with software. In the case of Linux forums, we see users reporting problems that might not be the fault of the software, but instead could be user error or the fault of hardware.

This evolution is visible in the Ubuntu Forums, where the forums are not used for bug reporting (Ubuntu has a separate site for reporting and tracking bugs), but instead are used purely for issues of user support. The two community elements of the bug reporting paradigm are still present: one part of the community reports a problem while another part of the community attempts to fix it. But rather than reporting and fixing problems in the software, the Ubuntu forums are for reporting and fixing problems with the usage of the software itself, wherever the problem might actually lie. It is a subtle but important difference.

This movement of message forums from a bug reporting tool to a support tool does not affect the authority structures of open source projects. In fact, it reinforces their decentralized authority structure. With proprietary operating systems, only certain people have permission to make changes to code. Programmers with that access, who work for the company selling the software, have more authority than programmers without that access. But with an open source operating system, like Linux, anyone can submit changes to the code, thus giving anyone with technical skill an authority that does not hinge on employment status. The decentralized authority to submit changes to enhance code would also extend to the decentralized authority to provide support for that very same code.

Decentralized Expertise

Within the Ubuntu Forums, expertise is a quality unrelated to employment or project contributor status. Even in the Ubuntu Forums, a forum moderator might provide answers with less authority than a knowledgeable community member who is not formally recognized by the Ubuntu governance. For users trying to solve problems, the important thing is they trust the reliability of the forums as a whole, even if an answer comes from someone with no formal affiliation with Ubuntu or Canonical.

Ask Ubuntu

Ubuntu Forums represents just one community of one operating system. Ask Ubuntu⁵ is another community where users can post support requests that are answered by their peers.

Ask Ubuntu does not have an official relationship with Canonical, the company behind Ubuntu. It is an independent site that is part of a network of technology-focused question and answer sites, where users post questions and other users answer them, making for a support model even more decentralized than the one seen in the Ubuntu Forums.

Ask Ubuntu uses a complex algorithm that gives users certain privileges as they increase their reputation score. In addition to reputation, all users can vote on specific answers, indicating whether each answer is useful. Finally, someone who has posted a question can mark a response as the best answer. These answer assessment tools could be why some users might post a question there rather than in the Ubuntu Forums. The ability to accrue points might also make some users more inclined to answer questions in Ask Ubuntu, rather than the Ubuntu Forums.

Like the Ubuntu Forums, Ask Ubuntu is moderated by community members. Unlike the Ubuntu Forums, where moderators are selected by figures within the Ubuntu governance power structure, within the Ask Ubuntu site, moderators are voted

in by the community. Community members and the elected moderators might have no formal connection to Canonical or Ubuntu.

This structure, while possibly complicated and challenging for some new users, allows users to assess authority using a number of metrics. For instance, most users might give more weight to answers from users with a higher reputation score, since the reputation score should indicate some degree of expertise. However, by allowing users to vote on each individual answer, someone with a lower reputation score but a high in-question rating for a particular answer might become more authoritative within the context of an answer to a single question. That is because the in-question answer rating is quantifying expertise in a very specific context—the answer to a single question. Other users might know more about the various parts of Ubuntu as a whole, and thus have high reputation scores, but if their expertise does not include the answer to a particular question, another, less expert user, who knows that one piece of information, might actually have the best answer. Finally, a questioner marking an answer as the best answer might send a message to users researching their own Ubuntu challenges. The best answer mark usually indicates that the answer worked for the asker, and so is an endorsement of sorts. This is context-based authority that might not carry over from answer to answer.

Writing on relevance and credibility in the context of new media, Benkler (2006) points out that both relevance and credibility depend on the extent to which users trust a given piece of information and find it useful. Forum users want a credible, correct answer, but even if there is no centralized authority structure to help establish credibility, they will be inclined to trust an answer that relates to their problem and helps them resolve it.

Chen, Ho, and Kim (2010) closely examined Google Answers, Google's now defunct question and answer site that allowed users to set prices

for answers. In their examination of the Google Answers service, they found that “answerers with high reputations are seen as spending more time [crafting answers to questions] and producing higher quality answers” (p. 660). Ask Ubuntu’s reputation tracking makes it easier for users to assess reputation, but raises the question of whether users with higher reputations have answers perceived as better because the answer is better or because their reputation leads users to interpret the answer as better.

Either way, again we see authority moving away from the creators of the software (although there’s nothing that prohibits Ubuntu developers from participating in the Ask Ubuntu forums), and becoming decentralized into a larger community of users. Where a phone call or email to technical support requires the person being helped to trust in the expertise of the person helping them, based upon the fact that the person is employed by the software creator and thus seems to have an institutionally vested form of authority, within Ask Ubuntu, the person asking or researching a question can use a number of different metrics to assess the authority of the person answering the question, or, perhaps even more helpfully, the reliability of a given answer.

The organization of the Ask Ubuntu forums allows for an authority based on the reputation of a person answering a question, although there is always the possibility of a person with a high reputation having their answer corrected by someone with a lower one. This contributes to the reliability of the forum as a whole.

Microsoft Answers

As with the two Ubuntu forums discussed earlier, answers.microsoft.com, users can answer other users on the official Windows support forums.⁶ They can also indicate if a particular post was helpful.

What’s interesting about Answers, though, is its heavy presence of Microsoft support personnel (a user’s status is indicated next to her name in the question thread). The structure of the forums,

while not precluding a non-Microsoft–employed user from answering questions about Windows, is Microsoft-centric.

Community Moderators

These are volunteers who are here to help the community, answer questions, and work to keep the community healthy and fun. Community moderators are members of the community, not Microsoft employees. People who make extraordinary contributions to the community may be asked to be community moderators.

Support Engineers

Support engineers are experts who are engaged [by] Microsoft to answer your questions.

Forum Moderators

Forum moderators are experts engaged [by] Microsoft to mark the best answers, manage abuse, and maintain community health.

Forum Owners

These are Microsoft employees in charge of a particular forum. Forum owners are ultimately responsible for the health of the forum.

MVPs

Most Valuable Professionals are independent experts who are offered a close connection with people at Microsoft. They can often answer the most challenging questions.

Microsoft Employees

Microsoft employees participating in the forums have a badge that says Microsoft. These community members may work in the forums, or they may be general employees participating by asking or answering questions.

Content Creators

Content Creators are community members who have consistently contributed excellent content to the forums. Their posts are often marked as answers.

Content Curators

Content Curators are community members who have consistently identified good, helpful content on the forums. Many of the posts they've voted as helpful end up being voted "most helpful" or being marked as answers.

Site Sheriffs

Site Sheriffs are community members who have consistently identified and reported cases of abuse on the forums.⁷

We see that while non-Microsoft-affiliated personnel can certainly contribute and enhance their reputation through well-regarded, well-received answers, the forums have a decidedly Microsoft focus that is not seen in Canonical's Ubuntu Forums or Apple's support forums. While the Microsoft forums have the look and feel of a decentralized support space, reviewing these forum member titles reveals many Microsoft personnel participating in various capacities, making the forum more like publicly viewable traditional technical support than community-driven decentralized support. While users are free to help each other, Microsoft creates an environment where Microsoft-affiliated personnel can also assist users.

There are many possible reasons for this heavier presence of Microsoft-affiliated personnel within the forums. Microsoft is a large company and can probably better afford to deploy personnel to its forums. Because Windows is a closed source product, only Microsoft-affiliated personnel have access to how it works at the code level. That can

make it difficult for non-Microsoft employees to answer and address certain types of questions.

Within the Microsoft-controlled forums, the authority structure could give more power to Microsoft-affiliated contributors, because in many ways they are best equipped to answer many questions. Non-Microsoft-affiliated users can answer questions and become authoritative, but it seems a challenging prospect. When a user is confronted with two answers, one from a user who has accrued reputation points in the Answers forum and one who has a clearly listed Microsoft affiliation, which one will be more trusted?

Answering that question would require further study of forum users, but the very fact that it is a question to ponder says much about authority structures within the Microsoft Answers forum. Microsoft allows for the possibility of decentralized expertise while also providing traditional expertise based on company credentials.

Apple Support Communities

Like Microsoft, Apple also has operating system support forums on its site⁸ where users can post questions and other users will answer them. Like the Ask Ubuntu forums and Microsoft Answers, users can accrue points based on the quality of their answers. In theory, points correlate with answer quality.

Unlike Microsoft Answers, Apple Support Community does not indicate affiliations, except for forum moderators, sometimes called Community Hosts or Community Mods. One cannot tell if someone answering a question is related to Apple or another member of the community. Apple employees were once identified as such in the forums, but that is no longer the case.⁹ Like Microsoft Answers and Ask Ubuntu, the Apple discussion area is point-based, with users earning points for either correct answers (10 points) or helpful answers (5 points). As users accrue points, they earn privileges on the site, although Apple does not outline what those privileges are.

Answers flagged as correct (by the asker), are immediately moved to the top of the thread, in addition to being indicated as correct in the order in which the answer was posted.

The choice to move correct answers to the top of threads and out of context is interesting in that it places a focus on the correct answer, or the answer that has been identified as being correct, but it takes away the conversation that might surround an answer. Within the realm of online technical support, this conversation may include things like exceptions to a correct answer or another approach that is equally correct. A questioner indicating that someone has posted the correct answer means the answer worked for the questioner but it does not necessarily mean the answer will work for all users. Pulling an answer out of context and directly linking it to the answer could prevent other users from discovering alternative answers.

One reason for this approach might be because Apple has tight integration between its software and hardware (the support community is broadly organized by software type and hardware type—it does not get more specific than that, the way both the official Microsoft and Ubuntu forums do). The Macintosh OS X operating system is only available on Apple hardware, meaning the hardware and software have been optimized to work with each other. In theory, this should mean fewer technical issues than a user might see with Windows and Linux, which have to work across a multitude of hardware configurations. Despite Apple's tight integration of hardware and software, though, the board represents a more decentralized approach to technical support, with users supporting users, rather than Apple-affiliated personnel supporting users.

MacRumors Forums

Another popular site for getting Macintosh OS X support, as well as sharing feedback on the operating system itself, is the MacRumors Forums.¹⁰

The forums area is a sub-area of the popular MacRumors site¹¹ where many Apple enthusiasts go to for news about Apple products.

The MacRumors forums are geared more toward discussion of Apple and Apple-related issues, but there is a support component to it. It uses the same discussion board software as the Ubuntu Forums and has a lot of the same functionality. Users are easily identified by the date they joined the forums and by a user title that is based on the number of posts they have made. A newbie has fewer than 30 posts, while a G5 has at least 30,000 posts. In theory, this helps users get a sense of who is experienced and who is new, although there is not necessarily a correlation between the number of posts made by a user and the accuracy of their responses.

MacRumors is a completely separate entity from Apple. It is a site run by enthusiasts but not anyone officially affiliated with Apple. This forum is another example of a decentralized authority structure when it comes to user support. It is certainly possible for Apple employees to interact with users on the forums, but there is no way to identify these employees. Authority within the MacRumors support forums is therefore based entirely on the authority of the answers, not on any publicly viewable affiliation or reputation metric.

DISCUSSION

Technical support has long been an issue of expertise. Software creators are assumed to have authority and expertise because they created the software. But two factors are changing that assumption. One is that closed source software vendors, like Apple and Microsoft, have embraced online support forums and are allowing its users to help each other. While the specifics of the authority structure vary between forums, for the most part, it's a fairly straightforward issue of users asking questions and then deciding who best answered

Decentralized Expertise

them. Vendors, to a certain extent, are deferring to the decentralized expertise of their users, allowing them the chance to answer questions previously reserved for formal, centralized technical support.

Both Microsoft Answers and Ubuntu Forums have hybrid support forum structures that provide expertise both from within their respective projects and also external to those projects. With Ubuntu (and Linux in general), the difference between internal and external expertise is a bit more complex, since, in theory, anyone can enter a project at any time. For a project like Windows, becoming a member of their team is less straightforward, involving an entire hiring process.

Interestingly, Apple's support forum structure is entirely community-based, with no publicly acknowledged Apple employees participating, although it is possible that employees monitor the Apple-hosted forums to make sure damaging misinformation is not being shared. And the MacRumors forum expertise would be even further decentralized, as there is no formal relationship between those forums and Apple.

While one could argue that the presence of Microsoft-affiliated personnel within their support forums shifts expertise away from the community and back to the vendor, there seems to be an opportunity for non-Microsoft-employed forum participants to cultivate their own reputation. Of course, a major challenge for non-Microsoft-employed forum participants is that they do not have access to the Windows source code the way many Microsoft employees do.

Even without access to the code, as is the case with both the Windows and OS X operating system codes, the model for technical support is starting to decentralize. It is no longer necessarily a case of users needing to approach software creators for technical support. Now users also have the option of bypassing the software creator and working with a decentralized community of users. While vendors have an economic interest in keeping the code behind their operating systems private and centralized, there does not seem to be the same

impetus to centralize technical support, creating the opportunity for users to support each other.

The second factor in this changing attitude toward technical support is the rise in popularity of open source software. Because anyone can contribute to open source projects and because the code is available to anyone who wishes to see it, technical support expertise lies in what is probably a bigger pool of users. There is not just the expertise of anyone who has formally contributed to the project, but there is also the expertise of the volunteer-based community that has seen or understands the underlying operating system code. As Benkler and Nissenbaum (2006) point out, open source projects are driven by unpaid help:

The [open source] effort is sustained by a combination of volunteerism and good will, technology, some law—mostly licensing like the GNU Public License that governs most free software development—and a good bit of self-serving participation. But all these factors result in a model of production that avoids traditional price mechanism or firm managers in organizing production or motivating its participants. (p. 396)

Open source communities thrive on the community helping to grow the product, and technical support is a way to help projects (by actually helping users of said software).

Operating system-level technical support is moving from centralized experts knowledgeable in all parts of the system to a decentralized community, where a given member might be knowledgeable about only one aspect of the operating system, but is knowledgeable enough to help other users fix that one thing.

FUTURE RESEARCH DIRECTIONS

Future researchers might consider examining answer accuracy by user affiliation. It might be interesting to see if users with formal ties to projects

have more accurate answers than non-formally affiliated users do. It might also be interesting to track user perceptions of these answers. Are answers from someone publicly affiliated with a project seen as more authoritative than those from someone with no visible affiliation?

Another direction to explore is the accuracy of the answers provided in these community forums. Do people formally affiliated with a project tend to provide more accurate answers than those who are unaffiliated? Do these community-driven forums give accurate advice? How does the accuracy percentage compare with typical one-to-one formal technical support?

It also might be interesting to examine how problems and challenges reported on the forums make their way into formal bug reports. Do the various software developers monitor the forums to see where users are facing challenges? How many of the technical support requests posted in forums are actually software defects? The various support forums represent an interesting data set. If software developers were to consider users reliable and/or authoritative to a certain extent, they might see the support requests as potential software bugs that might be repairable. But that would probably mean that developers would have to assume users are asking for help because they do not know how to use software, or are using it incorrectly, as well as that their problem might be related to the software itself.

Tracking this sort of movement might be complex, but comparing forum posts to bug reports might help investigate if there is a correlation between end-user issues reported on the forums and user issues filed as bug reports (this would not be possible for Windows and OS X, which do not have publicly viewable bug tracking reports). Although it might be more complicated to track, it would be interesting to see if user-reported issues with software are addressed in future software releases and to what extent.

Future researchers might also explore the content of the forums, categorizing the types of

questions asked for each operating system, and seeing if any patterns emerge in terms of who answers each type of question, and if the answers are consistently reliable.

CONCLUSION

Supporting an operating system can be a challenging task for users of all technical skill levels. In the past, users trying to fix their computers had little choice but to work with the vendor behind an operating system (or, in the case of Windows users, to interface with the hardware vendor), or to hire a third party to help troubleshoot their computer problems.

However, the rise of both official and unaffiliated community forums gives users the chance to help each other. Proprietary, closed source operating systems are adapting the decentralized support techniques of the open source world and are deferring to the expertise of their users, even when those users have no formal ties to a project. For closed source software creators, this is a huge conceptual shift. In essence, they are taking full responsibility for the creation of their operating system, developing all of their code in-house, but in terms of supporting that code, they are allowing for the possibility that users can support their software without even having access to the underlying code.

There are many possible reasons for this new view of community-based technical support. It could be because it is less expensive than a formal, centralized technical support channel. It could be a way of preventing users from visiting third-party sites for technical support. Whatever the reason, Microsoft and Apple are in a position to offer this kind of community support because of the expertise found in their user communities.

Regardless of whether a user is using OS X, Windows, or Linux, all users now have access to technical support communities beyond whatever is offered by the entities responsible for the pro-

duction of the operating systems. Expertise and authority now rest in these communities. For open source projects, like Ubuntu, expertise and authority have always resided, to a certain extent, in a decentralized community of users, but for closed source projects like Mac OS X and Windows, this represents a significant shift in the role users assume in using their operating systems.

REFERENCES

- Ahmed, F., Campbell, P., Jaffar, A., & Capretz, L. (2009). Defects in open source software: The role of online forums. *Proceedings of World Academy of Science: Engineering & Technology*, 52, 174–178.
- Bacon, J. (2009). *The art of community: Building the new age of participation*. Sebastopol, CA: O'Reilly Media.
- Benkler, Y. (2006). *The wealth of networks*. New Haven, CT: Yale University Press.
- Benkler, Y., & Nissenbaum, H. (2006). Commons-based peer production and virtue. *Journal of Political Philosophy*, 14(4), 394–419. doi:10.1111/j.1467-9760.2006.00235.x
- Chen, Y., Ho, T.-H., & Kim, Y.-M. (2010). Knowledge market design: A field experiment at Google Answers. *Journal of Public Economic Theory*, 12(4), 641–664. doi:10.1111/j.1467-9779.2010.01468.x
- Chopra, S., & Dexter, S. (2008). *Decoding liberation: The promise of free and open source software*. New York, NY: Routledge.
- Coleman, E. G., & Hill, B. (2004). The social production of ethics in Debian and free software communities: Anthropological lessons for vocational ethics. In Koch, S. (Ed.), *Free/open source software development* (pp. 273–295). Hershey, PA: Idea Group Publishing. doi:10.4018/978-1-59140-369-2.ch013
- Gubbins, E. (2009, December 22). Move over, geek squad. *Telephony*, 34-36.
- Horrigan, J., & Jones, S. (2008). *When technology fails*. Washington, DC: Pew Internet and American Life Project. Retrieved September 21, 2011, from http://www.pewinternet.org/~media/Files/Reports/2008/PIP_Tech_Failure.pdf
- Knuppel, M. (2000). *A characterization of the Linux community of practice using Linux newsgroups and Bales' Interaction Process Analysis*. Unpublished Master's thesis, University of North Carolina at Chapel Hill.
- Lakhani, K. R., & von Hippel, E. (2003). How open source software works: "Free" user-to-user assistance. *Research Policy*, 32(6), 923–943. doi:10.1016/S0048-7333(02)00095-1
- Lankes, R. D. (2007). Trusting the internet: New approaches to credibility tools. In Metzberger, M. J., & Flanagan, A. J. (Eds.), *Digital media, youth, and credibility* (pp. 101–121). Cambridge, MA: The MIT Press.
- Mateos-Garcia, J., & Steinmueller, W. E. (2008). The institutions of open source software: Examining the Debian community. *Information Economics and Policy*, 20(4), 333–344. doi:10.1016/j.infoecopol.2008.06.001
- Rheingold, H. (2000). *The virtual community: Homesteading on the electronic frontier*. Cambridge, MA: The MIT Press.
- Shah, C., Oh, S., & Oh, J. S. (2009). Research agenda for social Q&A. *Library & Information Science Research*, 31(4), 205–209. doi:10.1016/j.lisr.2009.07.006
- Tomer, C. (2002). Open source. *Computer Sciences*, 3, 155–158. New York, NY: Macmillan Reference USA.

- Toral, S. L., Martínez-Torres, M. R., Barro, F., & Cortés, F. (2009). An empirical study of the driving forces behind online communities. *Internet Research, 19*(4), 378–392. doi:10.1108/10662240910981353
- Xu, B., Jones, D. R., & Shao, B. (2009). Volunteers' involvement in online community based software development. *Information & Management, 46*(3), 151–158. doi:10.1016/j.im.2008.12.005
- Zhao, H. (1999). *A qualitative study of the linux open source community*. Unpublished Master's thesis, University of North Carolina at Chapel Hill.
- ADDITIONAL READING**
- Antweiler, W., & Frank, M. Z. (2004). Is all that talk just noise? The information content of internet stock message boards. *The Journal of Finance, 59*(3), 1259–1294. doi:10.1111/j.1540-6261.2004.00662.x
- Barcellini, F., Detienne, F. A., Burkhardt, J.-M., & Sack, W. (2008). A socio-cognitive analysis of online design discussions in an open source software community. *Interacting with Computers, 20*(1), 141–165. doi:10.1016/j.intcom.2007.10.004
- Baytiyeh, H., & Pfaffman, J. (2010). Open source software: A community of altruists. *Computers in Human Behavior, 26*(6), 1345–1354. doi:10.1016/j.chb.2010.04.008
- Bekkers, V. (2004). Virtual policy communities and responsive governance: Redesigning on-line debates. *Information Polity: The International Journal of Government & Democracy in the Information Age, 9*(3/4), 193–203.
- Casaló, L. V., Flavián, C., & Guinaliu, M. (2010). Relationship quality, community promotion and brand loyalty in virtual communities: Evidence from free software communities. *International Journal of Information Management, 30*(4), 357–367. doi:10.1016/j.ijinfomgt.2010.01.004
- Chopra, S., & Dexter, S. (2008). *Decoding liberation: The promise of free and open source software*. New York, NY: Routledge.
- Crowston, K., Li, Q., Wei, K., Eseryel, U. Y., & Howison, J. (2007). Self-organization of teams for free/libre open source software development. *Information and Software Technology, 49*(6), 564–575. doi:10.1016/j.infsof.2007.02.004
- da Cunha, J. V., & Orlikowski, W. J. (2008). Performing catharsis: The use of online discussion forums in organizational change. *Information and Organization, 18*(2), 132–156. doi:10.1016/j.infoandorg.2008.02.001
- Desouza, C. (2004). A framework for analyzing and understanding online communities. *Interacting with Computers, 16*(3), 579–610. doi:10.1016/j.intcom.2003.12.006
- Di Gangi, P. M., & Wasko, M. (2009). Steal my idea! Organizational adoption of user innovations from a user innovation community: A case study of Dell IdeaStorm. *Decision Support Systems, 48*(1), 303–312. doi:10.1016/j.dss.2009.04.004
- Evans, B. M., Kairam, S., & Pirolli, P. (2010). Do your friends make you smarter? An analysis of social strategies in online information seeking. *Information Processing & Management, 46*(6), 679–692. doi:10.1016/j.ipm.2009.12.001
- Flanagin, A. J., & Metzger, M. J. (2007). The role of site features, user attributes, and information verification behaviors on the perceived credibility of web-based information. *New Media & Society, 9*(2), 319–342. doi:10.1177/1461444807075015

Krieger, B. L. (2003). Making internet communities work: Reflections on an unusual business model. *The Data Base for Advances in Information Systems*, 34(2), 50–59. doi:10.1145/784580.784587

Kwok, J. S. H., & Gao, S. (2004). Knowledge sharing community in P2P network: A study of motivational perspective. *Journal of Knowledge Management*, 8(1), 94–102. doi:10.1108/13673270410523934

Lee, H. (2005). Implosion, virtuality, and interaction in an internet discussion group. *Information Communication and Society*, 8(1), 47–63. doi:10.1080/13691180500066862

Martínez-Torres, M. R., Toral, S. L., Barrero, F., & Cortés, F. (2010). The role of internet in the development of future software projects. *Internet Research*, 20(1), 72–86. doi:10.1108/10662241011020842

Metzberger, M. J., & Flanagan, A. J. (Eds.). (2009). *Digital media, youth, and credibility*. Cambridge, MA: The MIT Press.

O'Mahony, S. (2003). Guarding the commons: How community managed software projects protect their work. *Research Policy*, 32(7), 1179–1198. doi:10.1016/S0048-7333(03)00048-9

Searls, D. (2003). Linux for suits: Original and ultimate communities. *Linux Journal*, 107, 50.

Shirky, C. (2008). *Here comes everybody*. New York, NY: Penguin Press.

Sowe, S. K., Stamelos, I., & Angelis, L. (2008). Understanding knowledge sharing activities in free/open source software projects: An empirical study. *Journal of Systems and Software*, 81(3), 431–446. doi:10.1016/j.jss.2007.03.086

Swift, M., Balkin, D. B., & Matusik, S. F. (2010). Goal orientations and the motivation to share knowledge. *Journal of Knowledge Management*, 14(3), 378–393. doi:10.1108/13673271011050111

Toral, S. L., Martínez-Torres, M. R., & Barrero, F. (2010). Analysis of virtual communities supporting OSS projects using social network analysis. *Information and Software Technology*, 52(3), 296–303. doi:10.1016/j.infsof.2009.10.007

von Krogh, G., & Spaeth, S. (2007). The open source software phenomenon: Characteristics that promote research. *The Journal of Strategic Information Systems*, 16(3), 236–253. doi:10.1016/j.jsis.2007.06.001

Vujovic, S., & Ulhoi, J. P. (2006). An organizational perspective on free and open source software development. In J. B. Bitzer & P. J. H. Schroder (Eds.), *The economics of open source software development* (pp. 185–205). Amsterdam, The Netherlands: Elsevier. Retrieved September 21, 2011, from www.sciencedirect.com/

Walther, J. B. (2007). Selective self-presentation in computer-mediated communication: Hyperpersonal dimensions of technology, language, and cognition. *Computers in Human Behavior*, 23(5), 2538–2557. doi:10.1016/j.chb.2006.05.002

KEY TERMS AND DEFINITIONS

Community Forum: An online environment where users can post questions and statements and other users within the community can respond.

Kernel: The part of the operating system interacting with hardware.

Linux: A collaboratively developed open source operating system, where anyone can contribute and distribute code. Linux is based on the Linux kernel which is based on UNIX.

Moderator: A forum user with additional administrative powers and responsibilities, such as the ability to delete other users' comments and to ban users from posting. Moderators also often help to steer conversations and guide new users.

Open Source: Software projects where anyone with the desire and technical skill can contribute

and where the underlying source code must always be publicly available for anyone to use or modify.

Operating System: The software layer between computer hardware and its programs. Examples include Windows, OS X, and Linux.

Question and Answer Sites: Sites where users can post questions and other users will answer them. Where community forums might include statements and opinion sharing in addition to questions and answers, question and answer sites are specifically for the purpose of answering questions.

Software Bug: An error in the coding of software that can usually only be resolved by fixing the software at its code level.

UNIX: An operating system developed by AT&T that was one of the first to be usable across different hardware configurations.

ENDNOTES

- ¹ <http://windows.microsoft.com/en-US/windows/help/contact-support>
- ² <http://www.apple.com/support/products/>
- ³ www.ubuntuforums.org
- ⁴ <https://wiki.ubuntu.com/ForumCouncil>
- ⁵ www.askubuntu.com
- ⁶ <http://answers.microsoft.com/en-us>
- ⁷ <http://answers.microsoft.com/en-us/Page/faq#faqWhosWho1>
- ⁸ <https://discussions.apple.com/>
- ⁹ <https://discussions.apple.com/message/15045852#15045852>
- ¹⁰ <http://forums.macrumors.com>
- ¹¹ <http://www.macrumors.com>