

actKM Online Journal of Knowledge Management

Volume 2, Issue 1

2005

ISSN: 1834-3554

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www.actkm.org

Proceedings from the actKM Sixth Annual Conference 2005

This journal and individual papers published at www.actkm.org

First published in Australia in 2005 by actKM Forum

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ISSN: 1834-3554 (Online)

Cover design by actKM Forum.

Copyediting by Maxine James.

The actKM Online Journal of Knowledge Management is a peer-refereed journal. Full papers submitted for publication are refereed by the Consulting and Associate Editors through an anonymous referee process.

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Throwing pebbles into a dark cave: a study of participation and behaviour in the {act-km} Online Community

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Abstract

This paper defines online communities and its constituent elements. It provides a framework in which online communities can be discussed and compared irrespective of topic or content. It explores the notions of core and peripheral membership and behaviour and provides a set of metrics for determining the activity profile of the community. Finally it presents a case study of an online community and discusses it using the framework and metrics presented.

Introduction

Online communities are a universal phenomenon bringing together geographically dispersed groups for discourse on topics ranging from business finance to religious artefacts. To underscore the popularity of online communities, Yahoo! hosts over one million different communities.

Little work has been done to produce a comprehensive list of definitions of terms concerning online communities or a general framework in which to consider them. Wenger et al (2002) has provided such definitions and frameworks for (offline) communities of practice and this study both extends and builds on his approach for online communities. The advantage of such a framework will improve descriptions of and comparisons between online communities. Further, this study presents a descriptive case study of an online community, {act-km}, that is described using the framework. {act-km} is one of the world's leading knowledge management forums with over 1000 members including several thought leaders in the discipline.

A number of key research questions are considered in this study. These include: What is an online community? What are the elements of an online community? What drives activity in an online community? How does one define the 'core group'? What metrics can one use to measure activity and 'coreness' in an online community? Each of these questions will be addressed in the paper.

The authors also provide an addenda of additional 'online community' terms and some techniques for extending thread length and eliciting replies.

What is an online community?

Internet technology provides the means for people to connect on a global scale. These connections manifest themselves in a variety of ways including bulletin boards, instantaneous chat rooms, multi-user games, and email or web-based discussion groups. Some exist for social or recreational purposes while others focus on professional and work-related topics.

Asynchronous global internet communications such as email is cheap, readily available and constantly accessed in professional offices within developed countries allowing discursive communication with fellow practitioners outside of their organisation. The phenomenon of using email to communicate with others sharing similar technical or conceptual interests is the focus of this paper.

Wenger et al (2002) describe communities of practice as ‘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 and his colleagues further maintain that a community of practice is ‘a unique combination of three fundamental elements: a domain of knowledge, which defines a set of issues; a community of people who care about this domain; and the shared practice that they are developing to be effective in their domain.’ Recognising that not all communities rely on face-to-face meetings as their primary vehicle for interaction Wenger describes such as groups as distributed communities of practice (Wenger et al, 2002). Wenger prefers the term ‘distributed’ for ‘online’ or ‘virtual’ because distributed communities may connect in any manner of ways, including face-to-face contact.

Sharratt and Usoro (2003) label communities mediated by information systems as online communities of practice or more simply online communities. Preece (2004) refers to communities connected through the Internet or World-Wide-Web as online communities of practice. Zhang and Watts (2004) view text-based, asynchronous online communities of practice as an extension of conventional communities of practice to include technology-centred knowledge repositories that enable members to proactively extract knowledge from a repository created by the collective contributions of members. Virtual communities of practice (Ardichvili et al., 2003), or simply virtual communities (Whitaker and Parker, 2000) Lueg, 2001), is also used frequently to describe these groups.

Whitaker and Parker (2000) characterise virtual communities as having a group of members; a distinctive focus; member-generated content and information; the provision of information and/or resources relating to the community’s distinctive focus; and a computer-mediated method by which members communicate and obtain information. Lueg (2001) draws a distinction between communities of practice and communities of interest. Examining a Usenet ‘newsgroup’ on body-art, he found that the group satisfied the following community elements: there was a sense of belonging together; a group-specific attitude; and, shared knowledge and artefacts. However, Lueg had difficulty finding a shared practice for the members in the group, and argues that it is more likely to qualify as a community of interest. Where Usenet ‘newsgroups’ are characterised by situated learning, distributed cognition, shared motivation and persistence, he suggests they be considered communities of practice (Lueg, 2001).

Wasko and Teigland (2002) use Brown and Dugiud’s (2002) term for these communities: networks of practice: ‘social spaces where individuals working on similar problems self-organise to help each other and share perspectives about their occupational practice or common interests, and exist primarily through computer-mediated exchange.’

The focus of this paper is online communities and this is the term preferred by the authors. The preceding discussion draws little distinction between a community’s behaviour and activities when interacting online or face-to-face. The implication being that an online community is a mere extension of a community that operates without technical mediation

devices. The authors suggest that there are differences between online communities and offline communities arising from their medium of communication and consequent interaction.

Differences between Online and Offline Communities

The first distinction is that the discussion that occurs within online communities is based on the written word. Unlike the fleeting spoken-word discussions of a face-to-face encounter with a group of like-minded individuals, the outputs of an online community is recorded for both immediate consumption by the other members and often stored for future reference. For those contributors who express themselves confidently and persuasively in written form, the online community is a comfortable environment. In an online community there is no body language or visual cues (Wasko and Teigland, 2002) and few tools to impart emphasis in our words. Unless a participant is known by other means then reputations are built and personalities portrayed solely via the written word.

The second distinction is one of size. Posting to an online community is like throwing a pebble into a dark cave. You hear the echo of the pebble as it hits, and you sometimes get the rattles of other people's replies. You know there could be 30, 800 or 2000 people in that cave who hear your pebble perfectly, and you have no idea how they feel, except for those occasional replies. It's frightening (see also Milne and Callahan, 2004) for many to communicate in the dark, and it's hard to be sure you are adding, not diminishing, value.

The third distinction is the atomic and equal nature of the intercourse. The perception of the majority is that: no-one interrupts or talks over the top of you; you are always 'recognised by the chair'; anyone can talk at any time about any topic; no-one is obliged by any courtesy to reply to anyone; and, you always have the 'right of reply'. Behind the scenes, however, a moderator may be sifting out contributions that do not meet the policy or the mores of the group. While this role is influential, from the perspective of a community member, it is mostly invisible.

The knowledge-related purpose of an online community

Another characteristic of both offline and online communities is their knowledge-related purpose. Let us recall and further explore Wenger's (et al, 2002) three basic elements of a community of practice: community, domain of knowledge and shared practice.

In his dissertation, Wenger (1990) observed the term 'community of practice' as a dual unity: that the practice and the community were inseparable. Wenger (1990) expresses his deep-felt sense of the 'belongingness' in a community saying it provides material for the construction of identity; that it defines relations among members by providing ways of participation; and, extending this notion defining relations between the community and other communities (including organisations); and also provides existential coherence. Membership in a community may be temporal.

The other two elements, domain of knowledge and practice, might be incorrectly interpreted as the common dyad, theory and practice. Wenger, however, defines these more specifically within the community context. Wenger (2002) sees a domain not as an abstract area of interest but consisting of key issues or problems that practitioners commonly experience. The binding nature of the domain of knowledge is more akin to a practically-oriented research program in academe. And the practice element 'denotes a set of socially defined ways of doing things in a specific domain: a set of common approaches and shared standards that

create a basis for action, communication, problem solving, performance and accountability' (Wenger et al, 2002).

The 'communities of practice' concept was developed by Wenger while studying the work within an insurance claims department (Wenger, 1990). His development and discussion of the concept often implies the face-to-face nature of their operation. The authors of this paper maintain that online communities may not necessarily behave in the manner of Wenger's communities of practice and that one or more of Wenger's elements of community, domain and practice may not conceptually apply to online communities' members' activities in the way he describes them. Terms such as online communities of practice, distributed communities of practice or networks of practice that build on or allude to similarity with Wenger's concept of communities of practice are useful if they also assume similarity with the very specific perceptions of Wenger's framework. When these computer-mediated groups diverge from Wenger's elemental foundations, the more general term, online communities, is preferable.

The authors prefer the term online communities to virtual communities because the term 'virtual' refers to phenomena 'not physically existing as such but made by software to appear to do so from the point of view of the program or the user' (OED, 1989). The physical existence of the community is unquestionable. The main feature of these communities is their medium of communication viz. online. In order to further discussion on the typology of online communities the authors thought it would be helpful to deconstruct online communities into facets.

Facets of Online Communities

Wenger (1990) has developed an excellent framework (domain-community-practice) for communities of practice. The following framework draws on Wenger's work to develop a framework for discussing online communities, recognising that they are not merely extensions of communities of practice. Six facets of online communities are suggested:

- 1) Topic
- 2) Membership and Milieu
- 3) Medium
- 4) Operating principles
- 5) Theory-Practice Propensity
- 6) Activity

Each facet is described and discussed below.

1) Topic: The topic that a community discusses is the general or overall subject of the discourse. While a face-to-face community may have emergent qualities in both organisation and subject, an online community is more often an engineered phenomenon started by an individual or group with the express purpose of discussing a pre-determined topic. Online communities discuss a variety of topics from growing roses to studying abroad.

2) Membership and Milieu: Membership can be anonymous or non-anonymous. The use of pseudonyms, or using web jargon 'handles', protects the privacy of the user. For some groups, however, anonymous entries will be rejected in accordance with the community's operating principles.

An online community may have closed or open membership. Closed membership will be more appropriate to groups who already have some sort of entrance criteria. Such groups could include: staff of an organisation; a member of a profession with traditional barriers to entry eg doctor's medical licence; members of an existing society, club or religion; residents of a town or municipality; shareholders; and / or customers of a company. Open membership allows anyone to join the group. Open membership does not, however, guarantee tenure or participation rights in the group. Members who join but do not work within the operating principles of an online community may lose certain rights ranging from posting rights to access rights.

Milieu refers to the general social groupings within the online community. It could refer to the overall or individual levels of expertise within the group, their affinity to a region, language, company or other elements of association and community. Within any online community, sub-communities can emerge. Within the concept of milieu we can discuss sub-groups such as the 'core' group and peripheral members. Defining sub-groups such as lurkers can be quite simple, however, defining 'core' members presents several problems. A full discussion of this follows later.

3) Medium: The medium refers to the way in which online contributions are created and delivered. The principal mediums include command-line text based systems such as the original bulletin boards (now mostly defunct), web-page, instant message and email based systems. The medium is important because it will influence the interaction and participation behaviours.

4) Operating principles: The group may have a set of policies or operating principles. These are rules that are either published or culturally inbuilt within the membership. They may cover issues such as etiquette, focus, post length, storage, contribution expectation, advertising, membership, and anonymity. These operating principles are enforced through formal moderation or group pressure. Cultural operating principles are more likely to emerge within the discussion eventually flowing into formal policy.

5) Theory-Practice Propensity: The five virtues of thought discussed by several early Greek philosophers including Plato, Aristotle, and Xenophon are *technê*, *epistêmê*, *phronêsis*, *sophia*, and *nous* (Parry, 2003).

The soul has two main parts; one without reason (*alogos*) and one with reason (*logos*), which is unique to humans. *Logos* has two distinct functions: a calculating part (*tò logistikòn*) and a scientific part (*tò epistêmikòn*) (Wetlesen, 2002). The calculating part consists of two parts: technical reason (*techne*) and practical reason or prudence (*phronesis*). The activity of *techne* is production (*poiesis*), while the activity of *phronesis* is action (*praxis*). The scientific part consists of theoretical reason or wisdom (*sophia*), and the activity of *sophia* is contemplation (*theoria*). *Sophia/theoria* is again divided into pure knowledge/science which is *episteme*, and intuition (*nous*). As we can see, on the one hand, *techne* and *phronesis* go together forming the practical (*praxis / poiesis*) part of the soul. On the other hand, *Sophia*, *epistêmê* and *nous* fit together to form the scientific part of the soul (Wetlesen, 2002).

The theory-practice propensity of an online community is their partiality to discussions that are based in practical art / craft or science / theory. If the online community is 'developing a practice within their domain' (Wenger et al, 2002) then they could be correctly termed an online community of practice. If, however, their propensity is developing the science or

theory of a topic without regard to practical application a better term could be an epistemic online community. Online communities can engage in both propensities giving rise to schisms within the ranks. Too much theory will disengage the more practically oriented and vice versa. Using a circus analogy, those members whose propensity is towards the theoretical or 'blue sky' discourse we consider to be like trapeze artists while the more grounded, practical discussants we liken to tumblers.

6) Activity Profile: The activity profile of the group describes the interaction between members. To properly describe interaction it is necessary to develop a distinct vocabulary of terms and their meanings within the field of online communities. To date, such ontological exercises have been disparate in the online community's literature. In the following section we define the mechanical elements that make up online communities and formulate a set of pertinent metrics. These defined terms will allow future researchers to analyse activity both within groups and between groups. It also lays the foundation for other higher-order concepts within online communities such as the identification of the 'core group'.

The importance of the 'core' group has been identified by several researchers examining face-to-face communities of practice. Wenger et al (2002) describes the 'core' group as those people who actively participate in discussions in the forum. They 'identify topics for the community to address and move the group along its learning agenda'. Wenger et al (2002) estimate that for conventional communities of practice the core and active groups of the community constitute around 30% of the members. Wasko and Teigland (2002) measured the extent to which members of an online community responded to others directly or others responded to them directly as a measure of their 'coreness'. The authors have developed a number of metrics to measure activity with a group and posit that some of these metrics could combine to determine the 'coreness' of a community member.

Another important group identified in the literature are the community members who do not participate in discourse. This group, who exist on the periphery of the community, have been labelled 'lurkers'. The origin of this term in computer parlance seems to have originated within the early USENET communities (Pickering and King, 1992). The term might have made its way from the original Norse meaning (one who sneaks away) into internet jargon via its usage in science fiction.

In an online community, lurkers are members who do not post (Pickering & King, 1992) or who post very infrequently (Nonnecke and Preece, 2000). They exist on the periphery of the forum and enjoy the discourse between the more active members. Members may lurk to learn the operating principles of the community before becoming active. Wenger describes their activity as peripheral participation and states that their reasons for staying out of the activity is because they feel their contribution to be of little value or they simply don't have time to contribute (Wenger et al, 2002). Ardichvili et al. (2003) found similar barriers to knowledge sharing include 'fear of criticism, notion of own inadequacy, and fear of misleading'.

Nonnecke and Preece (2000) studied lurking in detail finding that online communities have high percentages of lurkers noting that if all lurkers were active the high posting rates would be unsustainable. They are certainly not just 'free riders' as suggested by Kollock & Smith (1996). Lurkers are the 'Silent Majority'. They are consumers of the written word in the same way people consume newspapers and books. Lurkers increase the size of the group giving more credibility to the discourse acted out by the 'core' members. In our study, lurkers are community members who are not active at all in the discourse.

Since the driver of activity within a group is most often attributed to the core members several authors have claimed that a self-sustaining community must achieve 'critical mass' (Oliver et al., 1985, Oliver and Marwell, 1988, Wasko and Teigland, 2002) some even predicting that as the size of the group increases critical mass is more likely to be achieved.

The notion of critical mass in this context is teleological. In other words you achieve a self-sustaining group when you achieve critical mass AND you achieve critical mass when the group is self-sustaining. While researchers suggest that an increased size will increase the probability of critical mass, no researcher has put forward a minimum number at which critical mass should be achieved.

In nuclear physics there are approximate minimum amounts of fissile material, which under certain conditions eg reflective containment, will result in a nuclear reaction. For the isotope of Uranium U-235 it is around 50 kilograms whereas the more potent isotopes of Plutonium Pu-239 or Pu-238 it is approximately 10 kilograms. The use of this analogy borrowed from nuclear physics, where its meaning is based on measured cases, to the topics such as online communities, where its meaning is teleological, is misleading.

Rather than the physical notion of a critical mass determining self-sustenance it is more likely to be a social phenomenon: the absence or presence of specific individuals who interact with the community in a leadership capacity. For example, Storck and Storck (2004) identify leadership and trust in the leadership as two important hygiene factors for online communities.

Towards a Vocabulary for Online Communities

If we wish to achieve a deeper understanding of the nature of online communities and to render visibility to the various activities of these complex groups, we similarly need to build a more differentiated descriptive capability. Our vocabulary to date has been woefully thin – indeed, as the previous discussion has shown, it is difficult even to establish the general characteristics of an online community, let alone describe the detail of its internal workings, or compare activity across multiple online communities.

Physical communities are no less complex, organic or co-constructed than online ones: however, physical communities have had the benefits of generations of experience and scholarly study from sociologists, political scientists and ethnographers, resulting in a rich pool of concepts, vocabularies and typologies – all of which can be harnessed in concerted and sustained attempts to design their environments, influence their activities and manage their outcomes. Online communities do not need to be mysterious simply because they are complex. We simply lack sufficient richness of language to describe them.

In this section we attempt to define more closely some of the core pieces of vocabulary that are required for a more nuanced and granular understanding of online communities. Our definitions fall into three main categories, in ascending order of complexity: definitions relating to Posts, Threads, and Activity.

POSTS

Definition: A post is a communication sent by an online community member to the public space shared by that community, with the presumed intention that it should be seen by all the members of that community.

Attributes: A post will usually have a *post topic* which describes the subject matter of the post, and the contents of the post makes up the post body.

Discussion: Our definition of a post includes the presumption of intent by other members of the community, even where the original intent of the poster was not to make their message publicly available and excludes any communications which are automatically generated by computers such as automatic replies or messages from 'listbots'. The core characteristic of a post is to make a communication publicly available to the members of a community. This distinguishes posts from *messages* which are privately directed.

Response Post

Definition: A response post is a communication sent by a member of an online community to another member or members of the online community, replying to the whole or part of a prior post or series of posts.

Attributes: Response posts are most frequently indicated by sharing a topic name with the posts to which they are a response. Response posts can be either *addressed posts*, explicitly addressed to the intended recipients by name or nickname in the body of the post, or *non-addressed posts*, intended for the community at large.

Discussion: Response posts do not always carry the same topic name as the posts to which they are replying, especially if it is an integrative response, referring to a number of prior posts, or if it is an innovative response, opening up a new area for discussion.

Addressed Posts and Non-Addressed Posts

Definition: An addressed post is one that is explicitly intended to address or respond to a specific member or group of members of the online community, in public view. The corollary of an addressed post is a non-addressed post.

Attributes: An addressed post usually mentions its intended recipients by name or nickname in the body of the post.

Discussion: Addressed posts do not always explicitly mention the names of their intended targets. Online communities give an illusory sense of privacy, and while the public visibility of posts is an implicit feature of activity there, it is easy for this background awareness to be overlaid by the immediacy of a heated debate with an individual.

Post Topic

Definition: A post topic is a brief description or label that communicates the subject matter of the post.

Attributes: A post topic is most easily found in the subject line of an email or bulletin board post.

Discussion: Except for new or seed posts where subject lines are crafted afresh, post topics are not always reliably inferred from subject lines, and in synchronous online community environments, subject lines are completely missing. The nature of human discussions is that they are often non linear, fragmented, integrative, or multi-faceted.

Post Genre

Definition: A post genre is a common type of post. Recognition of the genre enables online community members to form expectations about what information or understanding they might be able to extract from it.

Attributes: Post genres are sometimes flagged in the subject line of the post (eg the use of the term 'Announcement' is an indicator of genre).

Discussion: Member of online communities with high volumes of posts use genre recognition to filter the flow of communications and pay selective attention to those posts that will satisfy their individual needs and interest. Examples of typical post genres may include: announcement or informational posts; inquiry posts; opinion posts; debating or counterpoint posts; and, moderating posts.

Threads

Definition: A thread is a sequence of posts, initially sharing the same post topic, which collectively comprises a discussion or conversation among members of the online community. A typical thread consists of a *seed post* (Wasko and Teigland, 2002; also see below) followed by one or more *response posts*.

Attributes: Threads are most easily but not infallibly identified from the post topics as expressed in subject lines. However new directions within a thread may be flagged by modified or entirely new subject lines, in which case the content of the post itself needs to render clues as to the identity of the *seed post* (or the *response post* with which this post shares a post topic, and it needs to indicate the continuity of post topic.

Discussion: It is an important characteristic of a thread that it is only recognised retrospectively – ie after a response has been posted. The existence of at least one response post constitutes a thread, and transforms a normal post into a *seed post*. A *singleton* transforms to a *seed post* of a thread when a *response post* is posted. The *post topic* of the *seed post* thereby becomes the *thread topic*. The length and vitality of a thread may be measured through: temporal duration (length of time that the conversation lasts); the number of response posts that share the thread topic; the number of individuals that participate in creating response posts; or any combination of these three. Threads are indicators of resonant topics, interests, opinions and relationships (potential or actual) within the community. Threads are the visible manifestation of the community's knowledge (in the content of the posts) and of its potential knowledge (in the relationships being publicly established or articulated). Threads are also the most important means by which an online community publicly negotiates shared meanings, socialises differences and bridges diverse contexts, naturalises newcomers, establishes and maintains cultural norms, or exerts practices of inclusion or exclusion.

Singleton

Definition: A singleton (Wasko and Teigland, 2002) is a post that has no subsequent response post.

Attributes: A singleton is an original post referring to no prior posts so is not itself a response post. No subsequent post can be found to point to the singleton either by continuity of *post topic* or the clues afforded by an *addressed post*.

Discussion: A post becomes a singleton by virtue of its failure to generate a response. It is therefore an indicator of non-resonance in the public arena of the community, for any number of reasons including lack of interest, respect, or attention.

Seed Post

Definition: A seed post (Wasko and Teigland, 2002) is a post that begins a thread.

Attributes: A seed post is an original post referring to no prior posts so is not itself a response post. A sequence of subsequent response posts can be found to originate in the seed post either by continuity of *post topic* or the clues afforded by an *addressed post*.

Discussion: A seed post affords clues to the social status of the poster in the online community as well as clues to the resonances within the shared world of the community. Seed posts that generate long threads are important contributors to the *activity* of an online community. Where social status or topic resonance can be discounted, they also suggest that there might be successful community stimulation strategies at play in the way that the post is constructed. Seed posts therefore offer a potentially fruitful area of research for understanding the dynamics and drivers for activity in an online community.

Activity

Definition: Activity refers to actions between members of the online community in relation to that community. It includes both visible activity (eg posts) and invisible activity (eg messages).

Attributes: In most cases activity is comprised of and represented by all communications undertaken between members of the online community, whether private or public. However, where there are physical opportunities for meetings and other social activities, activity may include these as well.

Discussion: Activity in its broadest sense relates to the life of the community. An online environment may consist of fragmentary clusters of social networks and relationships. It takes the public arena to pull these into a common identity and purpose. However, as we have noted above, the private arena is also important as a sustaining, ameliorating, socialising and naturalising environment for members, to support the deficiencies of a signal-poor online public arena. The flow of messages between members behind the scenes of an online community may be difficult to track and measure, but they are nevertheless essential indicators of the health, character and interests of the community that inspires them. When we look at metrics of *participation* later on, then, it's important to note that although the easiest metrics to log are those in the public arena, one of our challenges for understanding the dynamics of an online community must be to be able to compare public activity and participation with private activity and participation.

{act-km}: A Case Study

{act-km} is an online community that uses Yahoo! Groups to facilitate email distribution and online interaction. Members must register with Yahoo! and once registered can join {act-km} or other similar groups. The Yahoo! group system includes facilities for uploading files, photos, calendar, links, real-time chat, and polls. The following is a description using the aforementioned facets of online communities.

The **Topic** of {act-km} is Public Sector Knowledge Management. The community was originally set up in Canberra, the capital of Australia by an IBM consultant who specialised in public sector and a senior bureaucrat, both of whom were interested in knowledge

management. The founders were sceptical that knowledge management experiences reported from the private sector would transfer directly into the public sector. The aim of the group is improve the practice of knowledge management and to become the key source for knowledge management issues in the public sector (Callahan, 2004, Yahoo!, 2004). In practice, however, all issues relating to knowledge management, whether, public or private sector, are open to debate.

The **Membership** is open and non-anonymous. Members will often ask new contributors who use pseudonyms to identify and introduce themselves to the group.

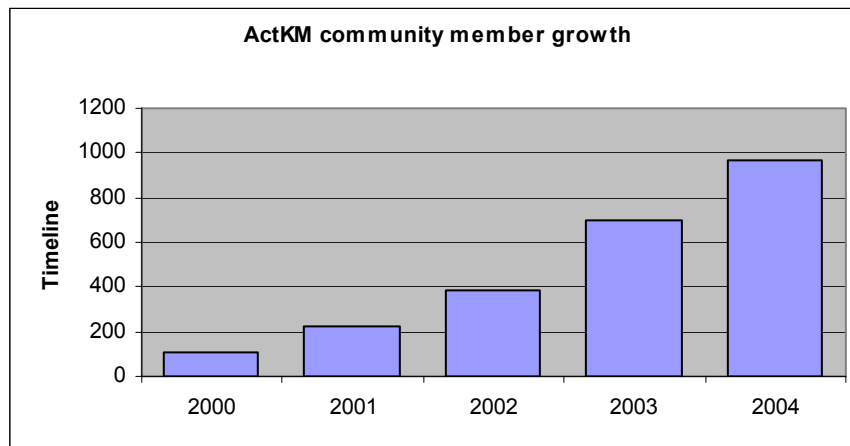


Figure 1: {act-km} community member growth

Membership growth has been consistent since the group's inception in late 1999. The online community was established on December 8, 1999 and approximately 30 members were moved from a prior temporary system 3 days later to form the initial community. {act-km} has experienced exceptional growth since its inception (Figure 1).

While it is difficult to determine whether a member is male or female in every case a sample of 120 gender-identifiable names provided in the membership data showed the split to be approximately 34% female and 66% male.

Details of the **Milieu** of the group can also be approximated from membership records. Many contributors include company information and other affiliation information. Callahan (2004) used email extensions to estimate the demographics of the community in 2002 based on email-addresses: 44% public sector (.gov), 29% private sector (.com), 6% academic (.edu), and 21% unidentified (eg yahoo, hotmail, lycos etc.). A more recent breakdown is set out in Figure 2.

Over time the community became more international. The online community spread to other English speaking countries including the United Kingdom, Canada, New Zealand and the United States of America. The reason for this spread is anecdotal but seems to stem from referrals by members to overseas colleagues and the presence of knowledge management thought leaders from Wales and America. There are also participants from Japan, Singapore, Hong Kong, Malaysia, France, Norway, South Africa and several other countries.

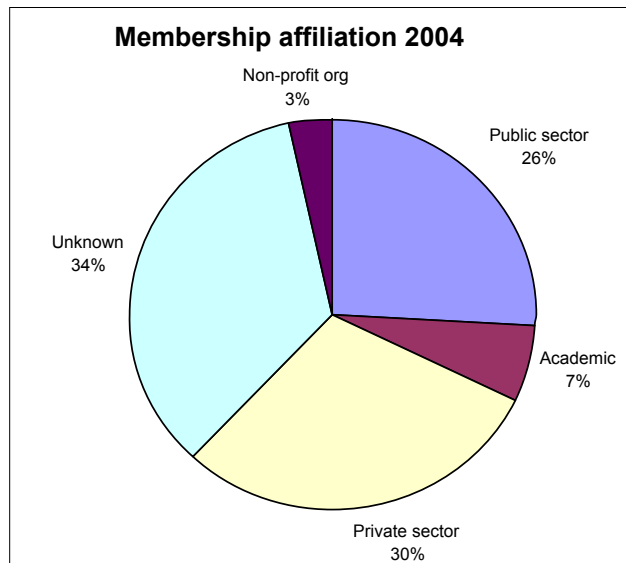


Figure 2: Affiliation in {act-km} as at October 2004

Many of the more active participants have full-time or predominant roles in knowledge management such as consultants, academics, company executives and senior bureaucrats. Milne & Callahan (2004) found that in a survey of 200 members that 47.6% claimed they had a designated knowledge management role in their organisation, though the authors alluded to definitional variation in these designation claims (eg. records manager, IT manager).

The **Medium** of {act-km} is via the Yahoo! Groups system that provides a web-based interface and a number of email options. The options are to receive individual emails, a daily digest, only special notices, or no email at all. A cumulative history of {act-km}'s delivery mechanism in Figure 3 shows that around 50% like to receive emails as soon as they are released by the moderator. The receipt of individual emails suggests an immediacy of wanting to access the latest posts. Over time the numbers of members wanting no email (access the discourse via the web page) and members wanting a daily digest (where emails are concatenated and posted as a single email) have become level at 24% each.

The **Operating Principles** of {act-km} have developed over time. There is a list of 'netiquette' rules posted on the {act-km} site however these are of a general nature. The more prominent sources of the community's Operating Principles are the online community itself and the 'convenors' of the group. Originally {act-km} was set up by Shawn Callahan, at the time an IBM consultant and Kate Muir, a senior public servant, as a monthly public sector knowledge management face-to-face discussion group. They still meet today and generally attract around 30 participants. This group also runs an annual conference attracting up to 150 people. The online community developed from this face-to-face group. Since the inception of the online community, its management and moderation has remained in the hands of this Canberra group. Moderation passes amongst the convenors (who deride the term 'executive') and the active moderator applies a set of values or rules to messages prior to their general release in the Yahoo! system. From time to time the convenors will discuss issues arising in the management of the group and take decisions accordingly. These decisions, and decisions concerning general moderation, are rarely made public and so are essentially invisible to those members whose method of interaction is purely online.

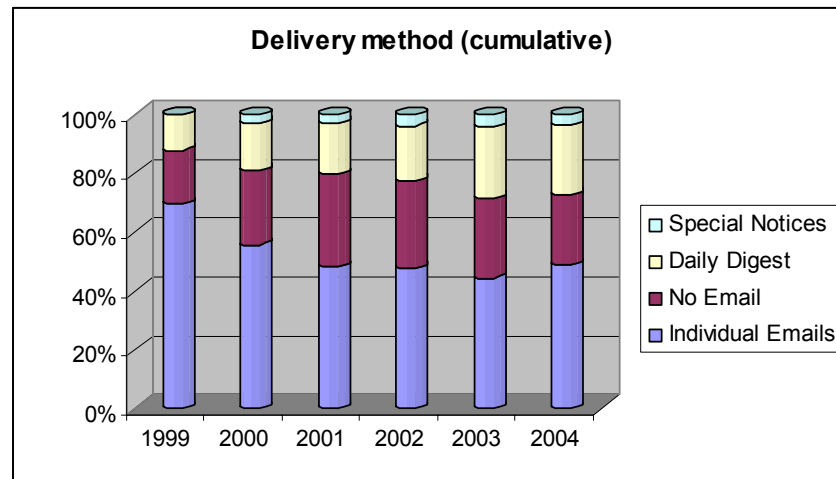
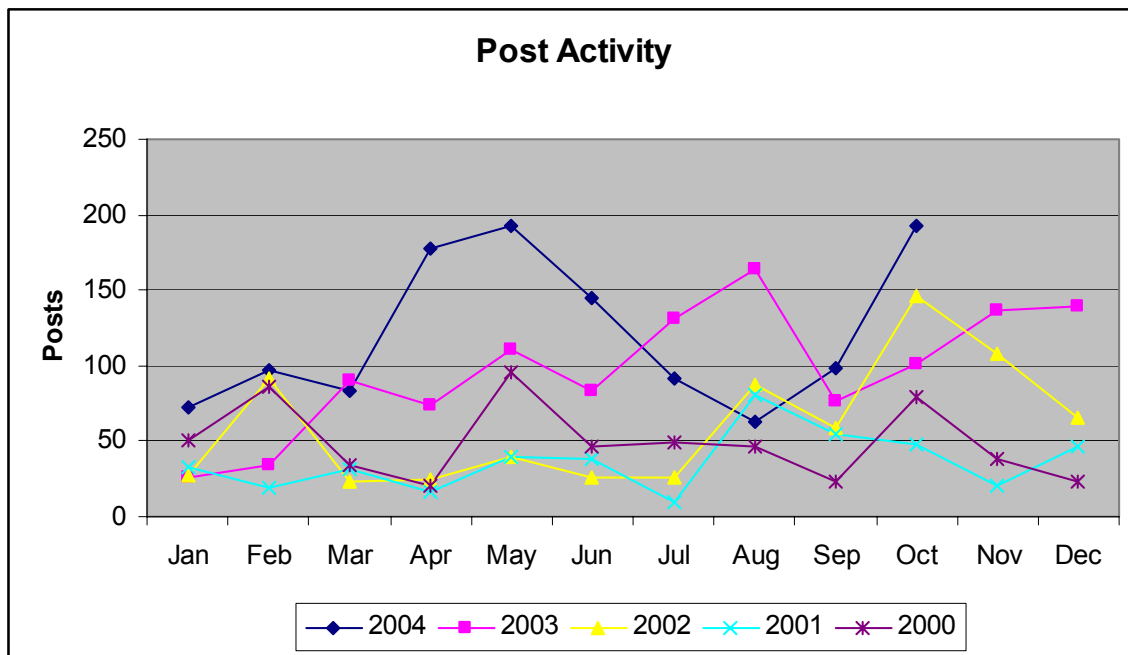


Figure 3: {act-km} delivery mechanism

Occasionally, an operating principle will be discussed amongst the group indicating an intention to self-moderate. Some operating principles discussed include the length of posts, ‘snipping’ – not including past posts in the body of replies, and advertising. For some actions the group is unable to self-moderate. Only the moderator, for example, has the power to excise members or stop posting rights.

There is no **Binal Propensity** apparent in {act-km}. There are discussions about both practical topics, the art and craft of knowledge management and the science or theory of the discipline. Sometimes, those member inclined towards the more practical aspects of knowledge management will complain about discussions because they are ‘too theoretical’ or ‘too academic’. The lack of binal propensity means that the community as a whole would probably not meet the characteristic requirements of Wenger’s definition of a community of practice. Yet there are discussions that would normally be found within such a Wengerian framework. Given that an online community is initially ‘engineered’, is it possible that generic terms such as *community of practice* and *community of interest* may not be applied to the group as a whole? Is it more accurate to consider that at times a sub-group of active members act as a community of practice while at other times other combinations of members do not act in accordance with Wengerian principles? This is probably a better explanation than the usual assumption that online communities must exhibit a binal propensity.

The following section outlines the **Activity Profile** of {act-km}. It uses devised metrics to describe the group’s behaviour. These metrics do not take the content of the discourse into consideration. The purpose of these metrics is to look for generic patterns within the activity of the group that can be compared with other groups that discuss different topics or operate for different purposes.



Wenger et al (2002) suggests that communities have natural rhythms of Figure 4:

Activity pattern for {act-km}

Frenzied activity and hibernation. There are some possible monthly posting patterns in {act-km} but these are not conclusive as shown in the activity correlation matrix although other rhythms may exist. Some suggestions have been made about spikes occurring after the annual conference in October (Callahan, 2004).

r	2004	2003	2002	2001	2000
2004	1				
2003	0.272439	1			
2002	0.31254	0.256452	1		
2001	-0.16137	0.370501	0.314671	1	
2000	0.073963	-0.17057	0.330759	0.02092	1

Table 1: Monthly Activity Pattern Correlation Matrix

The number of members posting to the group as a percentage of total membership has shown a tendency to decline over the last four years. The posts per active member, however, have increased and are tending to level off.

	Members	Messages	Posters	% of Posters	% of Lurkers	Posts per active member
2001	222	459	107	48.2%	51.8%	4.29
2002	387	1447	111	28.7%	71.3%	13.04
2003	702	1627	86	12.3%	87.7%	18.92
2004	1016	3093	168	16.5%	83.5%	18.41

Table 2: Activity Matrix 1

What it shows is that significant growth in the peripheral membership who follows the discourse of the active members. It is enlightening to see how these posting patterns break down by examining the posting behaviours of the most active members in the group.

Number of posts	2002			2003			2004		
	Posts	Cumulative	% of Total	Posts	Cumulative	% of Total	Posts	Cumulative	% of Total
Top 10	229	229	44.9%	293	293	41.7%	315	315	40.6%
Top 20	102	331	20.0%	114	407	16.2%	98	413	12.6%
Top 30	48	379	9.4%	76	483	10.8%	68	481	8.8%
Top 40	35	414	6.9%	51	534	7.3%	55	536	7.1%
Top 50	22	436	4.3%	36	570	5.1%	46	582	5.9%
Top 60	20	456	3.9%	27	597	3.8%	37	619	4.8%
Top 70	13	469	2.5%	20	617	2.8%	27	646	3.5%
Top 80	10	479	2.0%	17	634	2.4%	20	666	2.6%
Rest	31	510	6.1%	68	702	9.7%	109	775	14.1%

Table 3: Activity by Membership deciles

A correlation matrix shows consistency of the percentage spread of the posting activity across the decile groups over the 3 years of data presented. This shows an increase in activity of the top contributors as the group grows.

<i>r</i>	2002	2003	2004
2002	1		
2003	0.9915906	1	
2004	0.9585615	0.984091	1

Table 4: Activity correlation matrix 2

The spread of participation is consistent ($r=0.98$) to that found by Zhang and Storck (Zhang and Storck, 2001). See Figure 5.

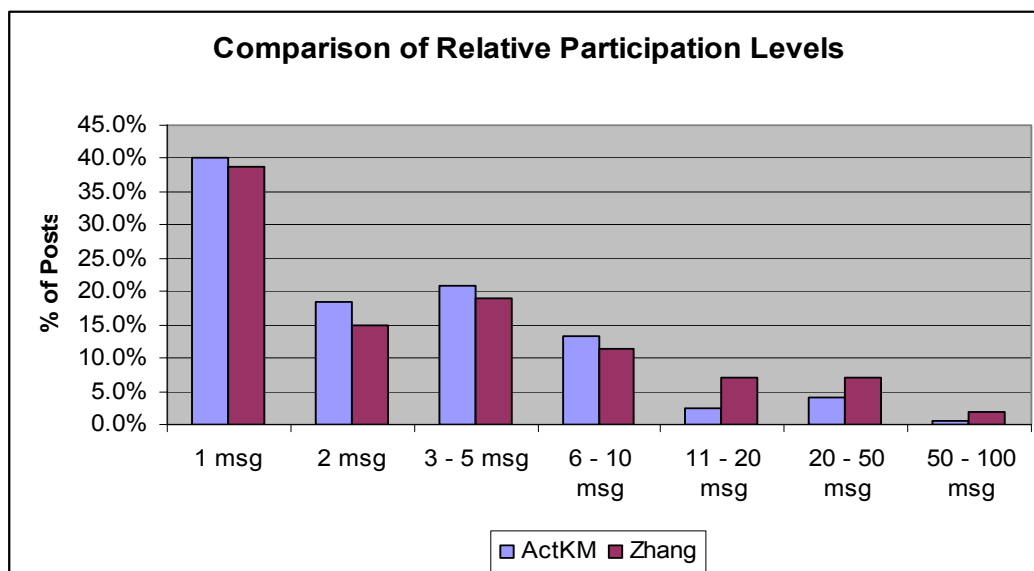


Figure 5: {act-km} vs Zhang and Storck (2001)

What these figures tell us is that the active membership seems to be responding to the membership growth by posting more frequently. This increased frequency of posting is reasonably consistent (correlation of 0.693) at every level of activity. The online community

is consists of a majority of people who watch an increasingly energetic active group of members.

The figures also show an increase in participation as the community membership grows. There is only growth in the group labelled 'The Rest' mainly represented by an increase in once-off posts by members. In fact the increase in membership size correlates with an increase in once-off posting behaviour ($r=0.93$) and with overall posting ($r=0.77$). When you consider the percentage of total posts and the activities of the top contributors in relation to the growth in membership, however, there is an overall diminishment of the relative size of the active group but an overall increase in its activity.

% of total membership	2002	2003	2004
Top 10	2.58%	1.42%	0.98%
Top 20	5.17%	2.85%	1.97%
Top 30	7.75%	4.27%	2.95%
Top 40	10.34%	5.70%	3.94%
Top 50	12.92%	7.12%	4.92%

Table 5: Percentage of posts in relation to groups of contributors

What this indicates is that, relatively speaking, more and more people are watching the 'circus': the discourse, debate, disagreements, criticisms, theoretical discussion, and practical advice that the central (active) group is discussing. It is now time to turn our attention to this core group in some detail.

The Core Group

Wasko and Teigland (2002) examined the social structure in a network of practice (NOP), building their work on theories of collective action and public goods. Using theories of collective action and provision of public goods, they specifically investigated the provision and maintenance of knowledge in a network of practice. One of their research questions was: *What is the pattern of contribution that produces and sustains the public good?* Wasko and Teigland found that the community is sustained through a *generalised exchange* between members, rather than a dense network structure where all members interact with each other, or a dyadic exchange between helper and seeker. Generalised exchange occurs when one's giving is not reciprocated by the recipient, but by a third party.

Wasko and Teigland (2002) found that there is no central core of individuals corresponding with each other, paying little regard to peripheral members. The active members (4% of total membership) posted 646 messages (50%), and 84% of these messages were to unique individuals. They also found that there is a second group of peripheral individuals that help sustain the network through less active, generalised reciprocity. The network is structured as a 'star with a critical mass surrounded by peripheral connections emanating outwards. There are no cliques; rather, the critical mass actively responds to many unique and overlapping individuals, and the periphery engages in both receiving and providing advice to others.'

The {act-km} online community differs from the community examined by Wasko and Teigland (2002). The group they looked had a binal propensity towards practice in a technical field. The phenomenon of generalised exchange also applies to {act-km} however {act-km}'s topic sits more in the social sciences and therefore responses and discussion tend to be more subjective in nature.

Both Wenger et al (2002) and Wasko and Teigland (2002) divide participation into four categories but with different interpretations of each of the groups:

	Wenger et al (2002)	Wasko and Teigland (2002)
Outsiders	Non-members with an interest in the group	People that posted seeds but never received a response
Periphery	Members that keep to the sidelines watching the interaction	People that posted 10 or less responses
Seekers		People that posted only questions
Active	Occasional participation but not as much as the core group	
Insiders		People that posted more than 10 responses
Core Group	Active participants in the community.	

Table 6: Group classifications

Wasko &Teigland (2002), however, define their groups with different criteria.

Our analysis of the {act-km} community identified a group of lurkers: members that never posted to the community's discourse at all. We also identified that the top thirty members have been responsible for 60% or more of the posts to the forum since 2002 (2002 – 74% of posts; 2003 – 69%; 2004 – 62%). The top thirty members in 2004, however is different to the top thirty members in 2001. In fact there are certain very active members in 2000 and 2001 that are no longer or only marginally active. Interestingly, Milne and Callahan (2004) identified a number of members whose comments were valued highly but their contribution levels have dropped off over the years. This led us to speculate on a type of lurker that we termed a *divine lurker*. This is a member of the group who doesn't or rarely participate yet still influences the content or the policy of the group. *Divine lurkers* can include high profile contributors, the committee of convenors and the moderator.

To consider the core group in more detail, the researchers selected a sample consisting of the top 15 contributors during the first half of 2004. During that time period each of these members contributed 10 posts or more. This is really an arbitrary cut-off point in our sample selection. It does not satisfactorily define the core group but rather we are selecting this sample group for exploratory purposes. The essence of 'coreness' cannot be measured simply by participation rates. The authors believe there are other elements that contribute to this higher order concept of 'coreness' In attempting to identify these elements we collated input measures, spread measures, outcome measures and distribution measures in our sample. Using our sample, for each highly active member we measured the total number of posts for the period; the percentage of total posts that represented; number of singleton and seed posts; number of replies the member made to others' posts; number of posts that elicit responses from others; the number of threads started; and, the span of threads to which the posts were made. (Table 7).

The participation metrics are telling and indicate some possible measures of 'coreness'. These include some combination of the number of posts generated by the members (post intensity), the number of posts that generated threads representing an overall measure of community activity, the number of responses the posts generated representing the importance of the contribution to the forum, the number of replies posted by these members indicating a willingness to extend a thread, the number of threads in which the member participated

indicating breadth of engagement and the breakdown between addressed and non-addressed posts showing the contribution style ie personal or rhetoric.

The essence of ‘coreness’ requires further attention and is the subject of future research by the team.

PARTICIPATION METRICS

Name	No. of Posts	% of total Posts	Singletons & Seed Posts	Replies	Threads started (34)	Thread-Span	Posts that elicit responses	Non-addressed Posts	Addressed Posts
Patrick	64	8.32%	4	60	2	30	36	17	47
Mark	40	5.20%	3	37	1	12	21	5	35
Georges	35	4.55%	8	27	1	14	9	22	13
Joe	35	4.55%	0	35	0	8	18	2	33
James	31	4.03%	19	12	3	12	7	24	7
Greg	31	4.03%	10	21	10	17	24	9	22
Dave	27	3.51%	4	23	2	13	15	20	7
Stuart	20	2.60%	4	16	4	10	14	6	14
John	17	2.21%	13	4	1	2	3	16	1
Laurie	15	1.95%	1	14	0	12	9	10	5
Matthew	12	1.56%	3	9	1	8	6	6	6
Cris	11	1.43%	9	2	0	2	0	9	2
Peter	10	1.30%	1	9	1	6	7	1	9
Luke	10	1.30%	3	7	0	6	3	6	4
Kate	10	1.30%	2	8	1	8	6	4	6

Table 7: Participation metrics

Conclusion

Online communities are becoming important tools for social and professional development in a variety of domains. This paper attempts to progress the research of online communities by providing a generalised framework and standard vocabulary so that research can advance in a more focused manner. It recognises online communities as a separate phenomenon and conceptually separates it from previous work in face-to-face communities. By presenting a lower order defined vocabulary of elemental concepts it provides opportunity to consider higher order concepts such as activity and ‘coreness’. Practitioners can gain value from this research because it provides clues to the underlying nature of activity in these communities and therefore opportunities to promote activity. It also opens up several opportunities to research community activity by building on the metrics provided in the paper. Further research in this topic is recommended.

Addenda

A selection of other interesting online communities terms

In performing this research the authors have come across or invented a number of other terms relevant to online communities. We include them here for completeness:

List Troll

A nomadic creature who wanders from discussion group to discussion group. The troll often lurks for a while in any given list, then latches onto a particular contributor and refuses to let go. The list troll has the peculiar ability to bog down multiple contributors simultaneously,

and to use the same message in virtually any context to do so. The list troll's grip is so strong that sometimes surgery is the only way to prise them loose. List trolls should never, ever, be fed.¹

Listjack

An invasion of trolls on a list serve. When more than 50% of posts are from trolls or people feeding the trolls, a listjack is in progress.\

Trollitis

Decreasing activity, interest and participation in a listserv, resulting from the action of trolls. Ordinary participants become bored or upset and move away, and active contributors get bogged down in personal attacks, flaming and hyper-criticism, so they find it unrewarding to post.

Metaspamaphysics

Spam masquerading as complex philosophy that common mortals often don't 'get' but which usually leads via lengthy explanations to a proprietary product or service with money attached. This technique is sometimes used as bait by trolls to get members of a list serve to feed them by responding. Less opaque postings are known as 'Adosophy'. See also Spamouflage.

Spamouflage

Spam that masquerades as genuine postings. Can usually be distinguished by the frequent reference to proprietary products or services, and liberal sprinklings of TM and ® symbols.

Announcers

These 'appetisers' have a high root post rate, low reply rate (don't reply to other people), low thread start rate (don't start any discussions), low thread distribution, low reponse elicitation rate (and of course don't get any replies), and consequently high ignore rate.

Nitpickers

These posters have a high post intensity, high reply rate, low root post rate, low thread start rate (don't start anything themselves, but love to criticise others), low thread distribution rate (concentrate efforts in few threads). The combination between high post intensity and low thread distribution is a central characteristic.

Summariser

These posters summarise the discussion so far.

Peripheral Thread

This is a thread without active participation by active or core members.

Threadworm

A threadworm is a member or group of members that deteriorates a message thread until there is nothing of value left to it.

Thread catalyst

This is someone who spurs a thread to new life

Some Techniques for extending Thread Length

There are a variety of ways that a poster can increase the number of replies and therefore extend thread length and span. These include:

¹ See http://www.hyphenologist.co.uk/killfile/anti_troll_faq.htm

- Asking a question at the end of the post.
- Addressing a question to a specific person thereby inviting their reply. If the targeted person is a core member or thought leader this also increases thread length.
- Writing on a contentious topic or making loud claims about an existing topic of interest.
- Replying aggressively to an individual thereby inviting further reply
- Writing on a topic that is novel and introducing new material or ideas within the original post.
- Pre-arranging replies with other members offline.
- Making a reference or introducing a topic about lurking or lurkers.
- Having the last word with someone who also likes to have the last word
- Being of established reputation
- Diverging with an interesting side discussion
- Specifically inviting replies to the community
- Introducing two contrary statements or arguments
- Ask for advice on practical or theoretical topics
- Set up a challenge for the community

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