

Collaboration Across Organizational Boundaries: Developing an
Information Technology Community of Practice

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by

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ABSTRACT

Rapidly increasing demand for technology support services, and often shrinking budgetary and staff resources, create enormous challenges for information technology (IT) departments in public sector higher education. To address these difficult circumstances, the researcher developed a network of IT professionals from schools in a local community college system and from a research university in the southwest into an interorganizational community of practice (CoP). This collaboration allowed members from participating institutions to share knowledge and ideas relating to shared technical problems.

This study examines the extent to which the community developed, the factors that contributed to its development and the value of such an endeavor. The researcher used a mixed methods approach to gather data and insights relative to these research questions. Data were collected through online surveys, meeting notes and transcripts, post-meeting questionnaires, semi-structured interviews with key informants, and web analytics.

The results from this research indicate that the group did coalesce into a CoP. The researcher identified two crucial roles that aided this development: community coordinator and technology steward. Furthermore, the IT professionals who participated and the leaders from their organizations reported that developing the community was a worthwhile venture. They also reported that while the technical collaboration component was very valuable, the non-technical topics and interactions were also very beneficial.

Indicators also suggest that the community made progress toward self-sustainability and is likely to continue. There is also discussion of a third leadership role that appears important for developing CoPs that span organizational boundaries, that of the *community catalyst*. Implications from this study suggest that other higher education IT organizations faced with similar circumstances may be able to follow the model presented here and also achieve positive results.

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Chapter 1

INTRODUCTION

With two recessions in the past decade, information technology (IT) departments in higher education institutions have experienced a number of budget difficulties, straining the availability of resources for continued investments in existing infrastructure and services and limiting the ability to implement new technologies (Green, 2009; “News from Other Institutions | Planning and Budget,” n.d.). In the fall of 2009, slightly more than two-thirds (67.1%) of American public universities reported cuts in their central IT budgets, and though community colleges fared somewhat better with just under two-fifths (38.0%) reporting cuts, these figures are up substantially from 16.4% and 14.1% (respectively) reporting cuts just two years earlier (Green, 2009, p. 10). Although circumstances for public universities were slightly better in 2010, with “only” three-fifths (59.8%) reporting cuts to their central IT budgets, community colleges fared worse than in 2009, with the number of schools reporting cuts increasing to almost half (46.2%) (Green, 2010, p. 11).

At the same time, due to both annual enrollment increases in higher education for each of the last 15 years (“Digest of Education Statistics,” 2009) and increased technology usage among students in higher education (Caruso & Kvavik, 2005; Kvavik, Caruso, & Morgan, 2004; Salaway, Katz, & Caruso, 2006; Salaway & Caruso, 2007, 2008; S. Smith, Salaway, & Caruso, 2009), the demand for technology services at colleges and universities has continued to rise (Green, 2009). Casey Green (2010), Director of the Campus Computing Project (in which

all of the institutions in this study participate), said, “the demand for IT resources and services continues to rise, even as the dollars supporting campus IT resources, services, and personnel are cut from institutional budgets.” (Green, 2009, p. 10) This situation has created substantial challenges for IT leaders and their staff at these institutions where they are asked to continue offering a wide range of high-quality, reliable technology services, expand access to and availability of those services, implement new technologies, and help drive innovation across the institution—all while their fiscal and human resources continue to shrink.

Technology continues to advance at a rapid pace and demand for technology support services continues to grow, but IT departments face many challenges in the midst of the unprecedented budget pressures their organizations face (Green, 2009). Stephen Laster, the Chief Information Officer (CIO) of Harvard Business School recently said, “IT is under pressure to cut its costs, and on the other hand, it is under pressure to deliver more services.... It’s a double-whammy of a hit, in the environment in which the IT department is operating” (Grush, 2010). In these difficult economic times, it is critically important for IT leaders to look for ways to improve their efficiency and effectiveness, and find opportunities to grow the skills of their staff members (Cullen, 2008).

Context

Two experiences helped generate the ideas for this research study. The first was the researcher’s experience with building a successful CoP among IT leaders and technology support staff at a university. The second was an opportunity the researcher had to connect with a network of IT professionals in a

nearby community college system. When the researcher began interacting with his colleagues in the community college system and saw the similar challenges each school faced, it raised a question about whether or not this network could be further developed into an IT CoP much like the one he helped build at the university, but with one important difference: It would span the organizational boundaries of multiple higher education institutions.

Background. One way to address technology support demands is through maximizing the efficiency of IT personnel resources. In the summer of 2007, this researcher initiated and helped develop a collaborative group consisting of leaders of various technology support units at a university. There were many such units of various sizes scattered around the university and they had operated independently of one another. Each of these teams sometimes “reinvented the wheel” to solve a problem, even if another unit at the university had already resolved the issue. Furthermore, not every team had all of the necessary resources to solve every problem, so sometimes issues were resolved on some teams, while other teams (and their customers) continued to struggle with them. The inefficiency of this duplicated effort and the ineffectiveness of uneven resource distribution were core reasons for forming the collaborative effort.

This collective now includes participants from around the university, both from central and distributed IT teams. As a group they have helped achieve a number of institutional goals which would not have been possible without their ongoing collaboration. Recently, through their combined efforts, they have been able to deliver tangible value to the organization. For example, this group (a)

saved the university a projected \$85,000 a year on employee computer purchases by consolidating recommended hardware configurations, (b) reduced demands on IT resources and streamlined support costs by standardizing much of the university on a single Windows software image for faculty and staff computers, (c) improved reporting and documentation for critical software systems, and (d) achieved considerable speed improvements and feature enhancements in the university's help desk ticketing system.

Members of this grassroots organization have also managed to sustain their interactions and productivity without any formal charge or mandate from university leadership, though it was eventually recognized and legitimized by the university's CIO and others. No one is required or compelled to participate, but it has grown from eight initial members to almost fifty, representing more than twenty distinct units across four campuses. This indicates that it continues to be beneficial to the members and the organizations of which they are a part. In recent years, the group has grown so large that it became one of the first groups at the university with standing meetings to be simultaneously video-conferenced on all four campuses to improve participation and reduce the need for substantial, expensive travel time among participants.

Wenger, McDermott, and Snyder (2002), in their articulation of a CoP identify "...five stages of community development: potential, coalescing, maturing, stewardship, and transformation" (p. 68). Each of the first four stages has different indicators among the three primary CoP constructs, domain, community, and practice, (see Table 1). The group mentioned above exhibits

characteristics of a workplace CoP in the “stewardship stage” (p. 104). This research study is designed to investigate whether a similar collaborative approach can be successful when extended beyond institutional boundaries.

Table 1

Stages of Development for Communities of Practice

	Potential	Coalescing	Maturing	Stewardship
Domain	Defining scope	Establishing value of knowledge sharing	Negotiating role in organization, relationship to other domains	Maintaining relevance, finding voice in organization
Community	Finding network, imagining value	Developing relationships/trust	Managing the boundary	Keeping tone & focus lively & engaging
Practice	Identifying common knowledge needs	Deciding what knowledge to share and how	Organizing knowledge & stewardship	Staying on the cutting edge

A Potential Community of Practice. The researcher is an IT director for one of the campuses in a large research university, which is one of the schools participating in this research. After working with a colleague at one of the community colleges in the same metropolitan area in the summer of 2009, it became apparent that both leaders and their respective institutions faced a number of common challenges. It also became clear that there was limited collaboration among leaders of the IT departments in the community college district and even less between the community colleges and the university. In an attempt to help develop these relationships and create more collaboration opportunities among their institutions, these two leaders encouraged a few select IT professionals from

their institutions to help form the beginnings of an interorganizational group. A pair of managers from two of the community colleges and one manager from the university had organized a few meetings. The fluid group of participants has included IT professionals from a number of community colleges in the area and more than one campus of the university. Initially, the group represented a loosely organized network of IT colleagues, who met just four times during the 2009-2010 academic year (July, August, November, and February). During these meetings, there were vendor and staff presentations about specific technologies and discussions among staff about various approaches being considered to address a few common technical challenges their institutions faced.

According to Wenger et al. (2002) this group exhibits the characteristics of being in the very early stages of development, an existing network of connections that has yet to fully coalesce into a CoP. With a nascent group like this at the *potential* stage (stage one) in the evolution of a CoP, leadership is vital for its success and sustainability. Developing a vision for what the community might do together is an important next step for a potential CoP. Though the authors focus primarily on describing how to cultivate CoPs *within* organizations, they note that they can also be useful when they cross organizational boundaries, so many of their insights are applicable in this interorganizational approach as well.

Following a model outlined by the American Productivity and Quality Center (2001), they suggest there are four primary types of CoPs: (a) helping communities, (b) best-practice communities, (c) knowledge-stewarding communities, and (d) innovation communities (Wenger et al., 2002, pp. 76-77).

Though there is overlap among these various types, this study focused on creating a helping community.

Innovation: Developing an Interorganizational IT Community of Practice

For this study, the researcher worked with leaders from other institutions and the participants in this group in strategic ways to help move it to the next stage of CoP development, *coalescing* (stage 2) (Wenger et al., 2002). The goal was to strengthen and grow this potential community and as a result, facilitate improved practice at each of the institutions. To help foster this development, during the 2010-2011 academic year, the researcher became a more active participant and took on leadership roles as a “community coordinator” (Wenger et al., 2002, p. 80) and “technology steward” (Wenger, White, & Smith, 2009, p. 27).

Chapter 2

REVIEW OF SUPPORTING SCHOLARSHIP

The theoretical and conceptual framework that informs the innovation is based on the community of practice ideas as articulated by Wenger and others (Lave & Wenger, 1991; Wenger, 1998a; Wenger et al., 2002; Wenger et al., 2009)

Communities of Practice

The term *community of practice* is now in widespread use in the disciplines of knowledge management, organizational learning, and education, but as Cox (2005) also points out, there is considerable variation in its use. Lave (1991) views learning as situated in social practice and explains that it should not

be viewed as a “process of socially shared cognition that results in the end in the internalization of knowledge by individuals, but as a process of becoming a member of a sustained community of practice” (p. 65).

Brown and Duguid (1991) also view learning as key to becoming a member of a particular CoP, which occurs through a process they call “learning-in-working” (p. 41). In describing that concept, they make an important distinction between canonical, abstract knowledge maintained and transmitted through formal organizational processes like documentation and training, and the noncanonical, ad hoc knowledge that practitioners actually use to solve real-world problems. They explain, “The communities that we discern are, by contrast, often noncanonical and not recognized by the organization. They are more fluid and interpenetrative than bounded, often crossing the restrictive boundaries of the organization to incorporate people from outside” (p. 49).

CoPs tend to serve one or more distinct purposes *within* an organization. As mentioned earlier, Wenger et al. (2002) describe four examples of strategic intentions for forming such intraorganizational CoPs. The existing literature seems to have less to offer about how CoPs function *across* organizations, but Wenger (1998b) notes that CoPs which span organizational boundaries may be more beneficial in “in fast-moving industries... to keep up with constant technological changes.” Powell, Koput, and Smith-Doerr (1996), in examining the biotechnology industry, also argue that “...when the knowledge base of an industry is both complex and expanding and the sources of expertise are widely dispersed, the locus of innovation will be found in networks of learning, rather

than in individual firms.” (p. 116). This suggests that interorganizational CoPs, may also prove valuable as learning networks and drivers of innovation for technology professionals as well.

Community Coordinator

A community coordinator (CC) is a member of the community who takes on a leadership role to help plan, coordinate and facilitate personal interactions, meetings and other activities whose purpose is to consistently advance the general health and organization of the CoP. Wenger et al. (2002), describe the role of a community coordinator as a critical one for the success of a CoP. In fact, they explain that, “a number of studies have shown that the most important factor in a community’s success is the vitality of its leadership” (p. 80). They list the key functions of this role as follows:

- Identify important issues in their domain.
- Plan and facilitate community events....
- Informally link community members, crossing boundaries between organizational units and brokering knowledge assets.
- Foster the development of community members.
- Manage the boundary between the community and the formal organization, such as teams and other organizational units.
- Help build the practice—including the knowledge base, lessons learned, best practices, tools and methods, and learning events.
- Assess the health of the community and evaluate its contribution to members and the organization. (p. 80)

This role is particularly important for helping a group evolve from the initial, potential stage to a coalescing community as consistent interaction becomes increasingly important in that stage. Indeed, in the coalescing stage, Wenger et al. (2002), point out the need for members to begin interacting regularly, as "...community members need to develop the habit of consulting each other for help." (p. 84). They go on to say, "Scheduling a series of regular events helps to establish a sense of familiarity,... such events are the heartbeat of the community.... They need to be frequent enough to become familiar and routine, while respecting the time availability of members." (p. 87).

As mentioned earlier, CCs in more traditional settings are often tasked with managing the boundary between the CoP and the larger organization. When communities span boundaries, there are additional issues with which a CC must contend. Cross and Prusak (2002), note the role of a "boundary spanner" (p. 9) as someone who can help people make meaningful connections to other practitioners and communities across organizational boundaries. Wenger also acknowledges the importance of "the *boundary* leadership provided by those who connect the community to other communities" (Wenger, 1998b). He does not, however, discuss the importance of a CC *within* a community when multiple organizations are involved. Nonetheless, making these connections is an integral part of developing an interorganizational CoP and increasing its value to its members and the organizations to which they belong.

Technology Steward

One way to support continued interactions among members of a community as well as preserve and make accessible the artifacts of reification is to introduce specific technologies for facilitating ongoing electronic communication and tools for storing and accessing the artifacts produced by the community. Wenger et al. (2009) identify the person who does this for the community as a technology steward (TS) and describe the function of this role as a person who helps a community “choose, configure, and use technologies to best suit its needs” (2009, p. 27). This person is distinct from an IT support resource as he or she stays engaged with the changing goals and needs of the community and is typically also a member (pp. 25, 131). This role can be distinct from that of the community coordinator and may be performed by a different person.

Helping select the appropriate technology tools for the community is an important task for the tech steward. When selecting such a tool, Wenger (2001) indicates that typically the following features are useful: (a) a home page, (b) online discussions, (c) a membership directory, (d) a digital file repository, (e) search capabilities, and (f) “community management tools, mostly for the coordinator..., including the ability to know who is participating actively, which documents are downloaded, how much traffic there is, which documents need updating, etc.” (p. 5). Wenger goes on to say that the tool chosen should also be easy to use, easily integrated with other software, and inexpensive. There are many tools that might be suitable for connecting members in CoPs, but some are what Wenger et al. (2009) call “classics” and include such things as teleconferences, email, mailing lists, discussion boards, a shared community

calendar, a member directory, and a content repository for digital artifacts that are the result of reification (pp. 60-63).

Selecting tools that meet the need of interorganizational communities creates different challenges, such as “finding resources and support... bridging organizational boundaries... and establishing responsibility to the community.” (Wenger et al., 2009, p. 31). When there is no budget allocated to specifically support such a collaboration, the selection is further restricted to existing tools within each participating organization or free options available to the community. Each of these options presents unique advantages and obstacles. One overall tip the authors provide is that the tool selection process be iterative and to “start with the simplest, least expensive solution that you think will work” (Wenger et al., 2009, p. 129).

Wenger et al. (2009), point out that technologies specific to individual organizations sometimes entail additional complexities due to differences in policies, security, or operational details (p. 30). For “communities that span organizations” they explain that selecting free tools may be “...particularly attractive,” though they come with their own challenges (pp. 117-118). The authors go on to suggest that a Google Group is one suitable choice for communities like this. Connecting practitioners digitally in this way is valuable as these types of tools are generally easy to use (Koan, 2009). Nonetheless, Wenger et al. (2009), warn that some “...experience difficulties and barriers, demonstrating that there are diverse user experiences. Don’t assume that your experience will be the same experience that your members have.” (pp. 118-119).

Once a selection is made, Wenger et al. (2009), indicates that the TS often helps with installation, configuration, and adoption of the tool(s). The TS is also in a unique position to help new members gain access, learn to use the technology tools chosen by the community, and encourage their use among participants. It is important for the TS to raise awareness of the tool(s) with the community and “make the use of tools a legitimate topic of conversation, but keep it in the context of the work of the community” (p. 141). Finally, technology stewards can monitor the use of community technology tools. One way to do this, suggested by the authors, is to use Google Analytics, which can increase “the amount and quality of data available. That data can help tech stewards assess tool usage or community activity patterns. ...[and] can help [them] ground [their] observations with objective measures.” (pp. 141-142).

Action Research

In 1946, Lewin described action research as “research which will help the practitioner” (p. 34). In his seminal work on the subject, Stringer (2007), expands on the idea of action research:

Action research is a systematic approach to investigation that enables people to find effective solutions to problems they confront in their everyday lives... [it] focuses on specific situations and localized solutions. Action research provides the means by which people... may increase the effectiveness of the work in which they are engaged. (p. 1)

This approach, in which the researcher is actively engaged in a specific local context and is seeking to “provide knowledge that will ‘make a difference’” (p.193) for the participants differs substantially from other types of research.

In the context of educational problems, classic experimental research designs like those described in Smith and Glass (1987) may not be the most effective ways to find answers to important questions. Berliner (2002) discussed the situation in this way, “Our science forces us to deal with particular problems, where local knowledge is needed. Therefore, ethnographic research is crucial, as are case studies, survey research, time series, design experiments, *action research*, and other means to collect reliable evidence...” (p. 20, emphasis added). Despite the difference in approach, however, those conducting action research, just like their colleagues following more traditional research methods, must be careful to put measures in place to guard against bias. The measures taken in this study are outlined in the next section.

Chapter 3

METHODS

In this study, the researcher examined the effects of developing an interorganizational CoP of IT professionals as a way in which technology leaders can successfully work across institutional boundaries, to help each other improve IT practice at their respective institutions despite serious and ongoing resource constraints. Using an action research approach, the researcher helped develop a group of IT professionals into a CoP. This group consisted of two subgroups, the *Leadership Team* (LT) made up of the senior IT leaders from each participating

organization (including the researcher) and the *Support Team* (ST) made up of key staff members from the participating community colleges and the university's IT department. The following research questions guided the study:

1. To what extent can an interorganizational group of IT professionals develop into a CoP?
2. What are the factors that contribute to the development of such a group into a CoP?
3. What do members perceive as the potential value of developing and participating in an interorganizational IT CoP?

Intervention

Stringer (2007), discusses the importance of planning interventions to remedy identified problems only after gaining insight from observation, and then collecting some preliminary data, analyzing it, and reflecting on it. The researcher had the opportunity to observe the potential CoP by participating himself and freeing his staff to participate in a few gatherings organized for IT professionals from neighboring institutions during the 2009-2010 academic year.

In June of 2010, the researcher began to collect the initial data necessary to help plan the intervention. He held a preliminary meeting with key individuals from two of the community colleges and from his own institution who were instrumental in forming the group of IT colleagues that met during the previous academic year. A senior IT leader from one of the colleges also attended this initial meeting to discuss the feasibility of developing a more robust community for interorganizational IT collaboration as well as the tools that might be used to

help foster its growth. The group also worked to identify possible topics that would be suitable for the emerging CoP to address. As a result of this meeting, a preliminary list of potential collaboration topics was presented to the LT for review and selection.

Through conversations with members of the LT and an online survey, the researcher helped identify the top IT priorities at each institution, strengths and areas for improvement in their departments, and the resource constraints they faced. The researcher compiled these data and from them, worked with the LT to determine a starting topic for the collaboration that was aligned with their institutional priorities. Each member of the LT also agreed to contribute staff resources from his institution to collaborate on the agreed upon topic.

Key IT staff members at each participating institution were members of the ST who met to discuss and resolve technology challenges at their institution throughout the 2010/2011 academic year. The researcher invited the ST participants to attend face-to-face meetings during the months of September, October, November, and December. Participants elected to continue meeting in January and March of 2011. The meetings were scheduled for 60 minutes, not including conversations that consistently took place after meetings ended. Meetings were either held at the university or two campuses of participating colleges.

Each meeting focused on a specific topic relevant to the participants. After the initial meeting in which the topic was selected by institutional leaders and a few core participants, the members began to identify the most meaningful topics

and subsequently established the agenda of future meetings. The first meeting centered on the deployment of Microsoft Office 2010 at each institution. This involved discussions of both how and when each institution would deploy the new application suite as well as a discussion of corresponding challenges that might arise. That first meeting also addressed potential benefits associated with the joint endeavor, as imagining the types of value that can be achieved from this sort of collaboration is a key community issue in the potential stage. Participants indicated their preference for changing topics, so the second, third, and fourth meetings focused primarily on the deployment of Windows 7 at each institution, though other technical topics such as Drupal usage at the participating schools also figured prominently in discussions. Non-technical topics and further discussions about the evolution of the community also took place. For the fifth and sixth face-to-face meetings, members again indicated a preference to shift the topic, so they centered on discussions about the deployment of Microsoft's System Center Configuration Manager (SCCM) product.

A Google Group and Site were created specifically for this CoP to use between the face-to-face meetings. This provided the opportunity to communicate using threaded discussions, post problems and/or solutions to pages on the Site, review meeting notes, and share files with the group. After the study concluded, the artifacts naturally created by the CoP (e.g. meeting notes, contact information, problems and resolutions, articles, hyperlinks, programming code, etc.) remained available for the community via the Google Group and Site so that all participants

can continue to take advantage of the resources identified and developed through this process. Table 2 lists the steps in the intervention timeline.

Table 2

Intervention Timeline

When	Activity	Content / Topic(s)	Method/Location
March/April 2010	Potential participant identification	Determination of participation interest	Phone & Email
June 2010	Participant Recruitment	Intervention description	Email
June 2010	Initial meeting with potential ST participants	Potential value of increased collaboration	Phone Conference
Late June 2010	Initial meeting with core ST participants	Potential topics for collaboration	Face-to-face / Community College
July 2010	Initial meeting with potential LT participants	Potential value of increased collaboration	Face-to-face / Local Restaurant
Late July 2010	Follow-up meeting with LT participants	Potential topics for collaboration	Video Conference
August	Creation of Google Group	Collaboration communication	Online
September 2010	First face-to-face ST CoP meeting	Office 2010	Face-to-face / University
September 2010	Creation of Google Site	Collaboration repository	Online
October 2010	Meeting with LT participants	Progress/value of collaboration	Face-to-face / Technology Conference (CA)
October 2010	Second face-to-face ST CoP meeting	Windows 7	Face-to-face / University
November 2010	Third face-to-face ST CoP meeting	Windows 7	Face-to-face / University
December 2010	Fourth face-to-face ST CoP meeting	Windows 7	Face-to-face / University
January 2011	Fifth face-to-face ST CoP meeting	SCCM Demo	Face-to-face / University
March 2011	Sixth face-to-face ST CoP meeting	SCCM	Face-to-face / Community College

Setting

The community college district has 10 campuses and 2 skill centers, and offers approximately 1,000 occupational programs (degrees and certificates), 37 academic associate degrees, and 10,000 courses. In the 2007-2008 academic year, the district served almost a quarter of a million students. In the 2006-2007 academic year (the most recent year for which data was available), they awarded over 6,000 degrees. There was considerable overlap in the technologies in use at each institution, though each school had unique, important differences with respect to hardware procurement, software licensing, virtualization usage, and level of IT centralization.

For the fall 2010 semester, when this study began, the university had undergraduate and graduate students on four different campuses in a large metropolitan area with almost 2,900 faculty serving over 70,000 students from all fifty states and over one hundred countries around the world. This university has 17 academic colleges and schools which grant bachelors, masters, and doctoral degrees. The researcher is the IT Director at one of the four campuses, which, during the same semester, had almost 12,000 students, 400 employees, and nearly 300 faculty members.

Participants

Leadership Team. The LT consisted of senior IT leaders at five community colleges and one campus of a university (the researcher). The participating schools were selected purposefully. Initially, the researcher had one IT leadership colleague who was a key contact in the community college system.

The researcher discussed other possible candidates for this project with him and together they developed a list of potential invitees, based on prior existing relationships, potential interest in collaboration, and geographic location to help ensure that face-to-face meetings would be feasible. This key contact then helped make introductions via email so that the researcher could solicit their participation. Of the leaders who were asked to participate, all five agreed to be a part of the CoP and commit their resources to its success.

Leaders had differing levels of experience in the IT industry and at their institution; they also had varying staff sizes, as seen in Table 3, below.

Table 3

Leadership Experience and Staff Size

Survey Question	N	Min.	Max.	Mean	Std. Deviation
How many years have you worked in IT?	6	0	41	18.3	13.706
How many years have you worked at your current institution?	6	3	20	11.0	6.693
How many employees report to you either directly or indirectly (excluding student workers)?	6	13	50	25.7	14.962

^aN=6

The technical resources at each participating institution also varied. One school relied heavily on virtualization through tools like Citrix, another focused resources on building their own computers rather than purchasing them, another school runs virtually its entire web presence in Drupal. Despite these differences,

all of the schools also had significant overlap in common IT *practices* such as creating and deploying software images, supporting computer classrooms, and troubleshooting hardware; and *technologies* such as Macintosh and Windows operating systems, Microsoft Office, and Blackboard.

Support Team. The ST involved members of the IT support teams from each participating institution. A varying number attended each meeting. Initial participants in this group were invited by the researcher, and self-selected to participate based on their specific skill set, interests, or role in their organization. As the community developed, some were asked or encouraged by the IT leader at their campus to become involved. Some participants, including a core group of facilitators, were part of a group of IT professionals who met a few times during the previous academic year. The members of this group were primarily engaged in providing classroom, in-office, and networking support services at their respective institutions. Participants represented a wide range of IT experience, with answers from nine respondents indicating experience in the industry ranging from 1 to 41 years, with a mean of 17.2 years. As a group, they also had diverse technical skills and responsibilities including troubleshooting, imaging systems, deploying and maintaining hardware and software, and designing customer support solutions.

Participation. Prior to the first ST meeting, smaller meetings were held with key individuals from the LT and a core group of potential participants from three of the participating schools that had an existing relationship resulting from a few meetings held the previous academic year. This behavior is indicative of the

potential stage of CoP development (Wenger et al., 2002), because the key community issue at this stage entails, “finding people who already network on the topic and helping them to imagine how increased networking and knowledge sharing could be valuable.” (p. 71)

A purposeful selection was used to choose participants and they did not necessarily consist of a representative sample of all IT staff members at their institutions in the same way that a random sample would. That was by design, however, as the goal was to foster the development of a core set of participants across these institutions who would most likely contribute to, and benefit from, collaboration with their counterparts at other institutions.

Opportunities for participation occurred from the summer of 2010 through the spring of 2011. The researcher initially contacted the senior IT leaders at each community college campus via email and phone to discuss their willingness to participate and have members of their staff participate in this research study. Those who agreed were sent a recruitment letter via email (Appendix A). In July, members of the LT were sent a link to complete an online survey (Appendix B) hosted at SurveyGizmo.com. Face-to-face meetings with the LT were arranged via email and occurred in July and October. Some leaders also chose to attend the ST meetings, sometimes with members of their staff. Two individuals from this group were asked to participate in face-to-face or telephone interviews at the end of the intervention.

Key staff members from the existing network of IT professionals at participating schools were sent the same recruitment letter, also inviting their

participation in the research. Those who agreed were invited via email to attend face-to-face participant meetings. At the beginning of each meeting, participants were asked to sign in and grant consent to participation in the research and meeting recordings. At the end of four of these meetings, attendees were also given short, paper-based, post-meeting questionnaires (Appendix C). Prior to the November meeting, participants were sent a link to complete an online survey (Appendix D) hosted at SurveyGizmo.com. A reminder was sent the following week and two weeks after that. Two individuals from this group were also asked to participate in face-to-face interviews at the end of the intervention.

Researcher and Participant Roles. The researcher is an IT Director at the university involved in this study and is also a participant in the group being studied. As Foulger (2009) points out, “Action research differs from other research methods in that the practitioner is also the researcher investigating actions for the purpose of addressing issues and solving problems, with a focus on improving practice” (p. 136). Some of the key roles and responsibilities of the researcher and participants are outlined below.

Table 4

Researcher and Participant Roles and Responsibilities

Role	Responsibilities
Researcher	Select and recruit participants, design and explain study, collect and analyze data, share findings with participants
Community Coordinator	Help schedule and organize meetings, facilitate discussions, encourage participation
Tech Steward	Create/administer Google Group/Site, create member accounts, post community content, monitor Google Analytics, advocate for tool usage
LT Participant	Attend LT meetings, contribute ideas, commit staff and other resources, participate online, respond to surveys, participate in interviews
ST Participant	Attend ST meetings, contribute ideas and technical effort, participate online, respond to surveys, participate in interviews

Data Collection

This study follows a mixed methods research design, wherein both quantitative and qualitative data were collected and analyzed (J. C. Greene, 2008; Johnson & Onwuegbuzie, 2004). A mixed methods approach was selected for four of the reasons outlined by Greene, Caracelli & Graham (1989):

Triangulation seeks convergence, corroboration or correspondence of results from the different methods. *Complementarity* seeks elaboration, enhancement, illustration or clarification of the results from one method with the results of another method. *Development* seeks to use the results from one method to help develop or inform the other method...*Expansion*

seeks to extend the breadth and range of inquiry by using different methods for different inquiry components. (p. 259) [italics added]

Following this methodology should increase the credibility of the findings.

Data for this research study was collected from a variety of sources over the course of the intervention. Each is indicated in Table 5, below.

Table 5

Data Sources Inventory

Source	Description	Data	When
Web Analytics	This data was collected from the administrative tools of a Google Group and the Google Analytics information associated with a Google Site. It was used to address RQ1 and RQ2, to what extent a CoP formed and what factors contributed to its formation.	Participants, visits, page views, time spent, most active pages	Collected throughout study
Leadership Team Survey	This instrument (Appendix B) was delivered via SurveyGizmo and invitations were sent via email. It was designed to address RQ1 and RQ2, to what extent a CoP formed and what factors contributed to its formation.	14 survey items	July
Support Team Survey	This instrument (Appendix D) was delivered via SurveyGizmo and invitations were sent via email. This instrument was designed to address RQ1 and RQ2, to what extent a CoP formed and what factors contributed to its formation.	11 survey items	November; reminders sent in November, December

Meeting Transcripts	There were four separate recordings of face-to-face meetings, professionally transcribed and subsequently coded by the researcher, using both axial and open methods. This data was used to address RQ1, RQ2, and RQ3 to what extent a CoP formed, what factors contributed to its formation, and what did members perceive as the value of forming such a community.	58,000+ words, 343 minutes of audio recording	September, October, November, December
Post-Meeting Questionnaires	There were four instruments (Appendix C) consisting of four or five items each delivered at the end of face-to-face meetings, via single-sheet paper questionnaires. These instruments were used to address RQ1, RQ2, and RQ3 to what extent a CoP formed, what factors contributed to its formation, and members' perceptions about the value of such a community.	17 survey items	October, November, December, January
Interviews	A semi-structured interview protocol (Appendix E) was used to conduct interviews with key informants from the LT and ST.	81 minutes of audio recording	March 2011
Email	Some data was included from emails sent from the researcher to participants and emails received by the researcher from members.	213 sent, 168 received	February 2010 – March 2011

Web Analytics. All participants were initially invited by the researcher to collaborate through a Google Group, created specifically for communication among members of this CoP. Shortly after the study began, Google announced changes to the basic structure and functionality of the Google Groups tool, removing the files and pages features, making it much less suitable for

collaborating in the way intended. Consequently, the researcher created a Google Site for the CoP which became the primary repository for information about and artifacts produced by community members.

Online Surveys. Members of the LT and the ST were each invited to respond to a targeted online survey. Those who agreed to complete the survey were sent a hyperlink via email to the online survey at the beginning of the research.

Meeting Transcripts. Participants were asked for consent to allow the researcher to record face-to-face meetings. All agreed. Consequently, the first four face-to-face meetings with the ST, which occurred in September, October, November, and December of 2010 were recorded using an in-room conference microphone connected to a Windows PC, running Audacity software to record the session. Recordings were stopped after participants left and were saved as mp3s. A professional transcriptionist was hired and signed a confidentiality agreement. Audio files were shared via Dropbox through a secure folder shared with the transcriptionist, who then converted the audio recordings into Word documents using F4 software, which enabled the insertion of automatic timestamps into the text indicating the corresponding time in the audio recording. This enabled easier review of the transcripts by the researcher during the coding process.

Post-Meeting Questionnaires. Immediately after four of the face-to-face ST meetings (October, November and December 2010, and January 2011), attendees were asked to complete 4 questions about the value of the meeting and the ongoing collaboration among the various participating institutions (Appendix

B). The December questionnaire also included a fifth question about whether participants wanted to continue meeting during the spring semester.

Interviews. Based on responses to the surveys and interactions observed in the face-to-face meetings, four select “key informants” were invited to participate in semi-structured interviews (Appendix E) with the researcher. These participants were chosen based on their participation level in the CoP. Leaders from the two schools with the most participation (not including the researcher’s institution) and the two members with the most participation from those schools were interviewed. The researcher contacted each person via phone or email and appointments were set for the researcher to conduct the interviews. Three interviews were conducted at a campus where two of the participants worked (the third interviewee came from another campus) and one was conducted over the phone. All participants agreed to recordings, so the researcher recorded the interviews and took notes. The interviews were designed to probe deeper into the themes that emerged from the survey data and field notes.

Data Analysis

Quantitative data. The quantifiable responses to questions on the online surveys were exported from SurveyGizmo and imported into SPSS 19. Face-to-face survey responses were compiled in Microsoft Excel and then imported into SPSS 19. SPSS 19 was then used to generate descriptive statistics that included frequencies, means, and standard deviations.

The Likert scale questions from those surveys were imported into SPSS 19 and the mean and standard deviation were calculated for each question. The open-ended questions did not yield sufficient data for analysis.

Usage data relevant to this study were tracked for the Google Site. Google Analytics allowed the researcher to determine (a) unique and return visitors, (b) when those visits occurred, (c) the total number of page views and (d) unique page views. They also allowed the researcher to determine (a) average length of time users spent on the site; (b) how often each page was viewed; and (c) which pages were viewed most often.

Google Analytics could not be used to track usage of the Google Group, but its built-in administrative tools allowed the researcher to track the number of participants in the Google Group, the number of posts by each member, and the time of those posts.

Qualitative Data. Meeting transcripts were analyzed using MAXQDA 10 to manage, sort, code, and analyze the data sets. The researcher reviewed 343 minutes of audio recordings from meetings. Meeting transcripts were analyzed with a “start list” of codes following a method suggested by Miles and Huberman (1994). Then, the data were analyzed with both open and axial coding approaches as described by Glaser and Strauss (1967). The researcher initially used an open coding approach to search for and define other themes or categories that could be reasonably constructed from the data. Finally, the data were analyzed with an axial coding approach to identify possible subcategories and any relationships among the categories. This process yielded more than 3,000 coded text segments.

Microsoft Word was used to transcribe and categorize responses in interview transcripts. The responses to the qualitative questions on the pre-survey were exported from SurveyGizmo and imported into Microsoft Excel where responses were categorized.

Credibility

Both quantitative and qualitative methods were used to collect data for this research study. This mixed-methods design allowed for triangulation of data across multiple sources. Jick (1979) describes a number of benefits this approach confers including greater confidence in findings, discovery of disconfirming evidence, and an improved ability to synthesize or select among theories. Painter and Rigsby (2007), explain that triangulation can also reduce researcher bias and increase the validity and reliability of results. Each of the methods used was chosen and designed to answer the specific research questions being investigated in this study. In addition, data and findings were reviewed by more than one “critical friend” (Miles & Huberman, 1994, p. 14) to help further reduce bias.

As Foulger (2009) explains, the term *critical friend* is only vaguely defined in the literature and is used in a number of different ways. As it is used here, it refers to three other doctoral students and members of the researcher’s dissertation committee who formed a “leader-scholar community” (Olsen & Clark, 2009). Specifically, this group of people who were external to the research context helped review the research design, data, analysis methods, and findings throughout the course of this study. Their willingness and ability to engage the researcher in a “reflective collaborative dialogue” about this action research study

was one method used to reduce the likelihood that the researcher would develop an “incomplete, self-centered picture of reality” (Foulger 2009, p. 138) concerning this intervention.

Chapter 4

FINDINGS

This chapter addresses the findings as they relate to each research question and describes the data in terms of three important constructs in CoP theory: domain, community and practice. The chapter discusses findings about the critical roles of community coordinator and technology steward. Finally, this chapter addresses the value that both leaders and participants ascribed to this collaboration.

Research Question 1: To what extent can an interorganizational group of IT professionals develop into a CoP?

Evidence suggests that during the course of this study, a network of IT professionals developed from the first stage in the lifecycle of a CoP, potential, into the second stage, coalescing. To better understand where the group started, after the second face-to-face ST meeting in October, participants were asked about their past collaboration habits. All but one respondent (86%, N=7) indicated that before this group started meeting, on average they met with other group members (not from their school) a few times per year or less often. Important indicators for a CoP that has moved into the coalescing stage include establishing the value of the knowledge being shared as the most pressing domain issue, building relationships and trust as the key community issue, and deciding

what knowledge to share and how to share it as the most important practice issue (Wenger et al., 2002). All of these characteristics can be found among the data.

Domain. Recall that in the coalescing stage the key domain issue centers on establishing the value of the knowledge being shared. Participants agreed that the knowledge sharing among community members was one of the most valuable outcomes of participation. At the end of the November meeting, one member described it as, “Very informative!” and went on to say, “The collaboration is beginning to happen.”

The majority of responses to the online survey, which was also sent in November, pointed to knowledge sharing as the most valuable aspect of the collaboration. One respondent defined the knowledge sharing function as, “The sharing of information about issues that have been encountered by other institutions as well as information on how other environments are setup.” Another said it was, “The sharing of problems & solutions common to us all. The sharing of ideas and brainstorming.” Six of the seven responses indicated the most valuable element of the collaboration related to knowledge sharing and communication.

Further evidence of the value of sharing technical knowledge was evident in meetings and the interviews with key members of the community. During this stage, communities are exploring what sorts of information they can and should share and deciding which subjects will prove most valuable for them to discuss. Members spend considerable time exchanging knowledge and ideas related to their practice as they sort this out (Wenger et al., 2002). Indeed, knowledge

sharing was a major component of participant interactions during these meetings. In fact, of just over 3,000 coded segments from the transcripts, more than 2,100 were identified as instances of knowledge sharing.

Extensive, and sometimes very technical, discussions of IT practice challenges played a central role in the development of this community. When asked about the value of the meetings in an interview, one member responded, “I do think it’s been valuable and I think today’s meeting actually was indicative of it... we had a great dialogue; it was very technical.” Indeed, the majority of the conversations during the meetings centered on the technical topics selected for each meeting and other day-to-day IT support challenges that community members faced. Wenger et al. (2002) indicate that during the coalescing stage, it is typical for core community members to try to help each other solve these sorts of common practice problems.

Below is an example of domain-specific knowledge sharing, from the November ST meeting. It is a technical exchange among participants about specific printing problems and the obscure solution a member had found.

Member 1: My number one frustration... revolved around printing. We hit some issues... and that's the one that's kind of halting our deployment.

Member 2: ...what the whole thing has come down to is that I found an event log error that seems to be showing up on all of our Windows 7 machines, both 32-bit and 64-bit... the fix is basically... you dig way down into where this MSI is located... and you create an empty file... it's just a 0-Bit file that says it's an MSI. The installer tries to call it... and the

printer comes in. We've been banging our heads on this, thinking it's driver issues. Turns out I don't even need to install the driver. The driver will come in as long as I get rid of this error.

Member 1: It would take better than 5 minutes to populate printers for building to the local printers. Now they're not coming up instantaneously, but they're coming up one right after the other.

Member 2: They actually come in the timeframe you'd expect now. I know I've seen this error in the classrooms but I don't know what effect this is going to have on the classroom delivery....

Member 3: All right. Thanks for sharing that. I'm not sure if other people have encountered that but I know we've had some printing difficulties... I think you guys [from another school] mentioned you had some difficulties...?

Solutions were not always found or presented in the meeting during which an issue was raised, but the online tools used to support the community (a Google Group and a Google Site) provided a mechanism for the community to track issues and share solutions with one another outside of the face-to-face meetings. Members who posted solutions to issues were also encouraged to include their name, so that participants could contact them if they had additional questions.

Sometimes, to find resolutions to problems, members needed to connect with other IT professionals who had the necessary knowledge. On some occasions, members connected one another to individuals in their larger network of colleagues who were either participating only peripherally or not at all, as seen

in this example about an email profile problem raised in the September ST meeting.

Member 1: I'd like to throw a little bit of a plea out there. Because we don't run Exchange for most people's email, one of the things we run into is a problem with the Outlook part of the profile. Cause we do a roaming profile for most users, and... with Exchange users,... they lose their settings... it may be a simple thing that we are just not redirecting something properly, but... if there's [*sic*] some things that you've noticed within Exchange and with the way the profiles are handled,... that could be useful to us.

Member 2: Do you know [non-participant]? He works for me. Send him a note; he'll help you.

Though many of the conversations centered on technical topics, a number of discussions that took place during the intervention focused more on organizational or political issues participants faced. One member explained how being a part of this community helped with those situations.

I know it's very valuable to us. Just as we sit and listen to what you're saying, it's reassuring and an affirmation to me because these are things I've discussed with our management team. Just last week I had a conversation talking about... change over the next several years... and I was almost laughed out of the room.... What you're telling me is you're doing it today.

These discussions about non-technical topics proved valuable to participants. One member suggested after the November meeting that perhaps for our collaboration the “value might be counsel vs. content”.

Evidence suggests that participants found value in sharing knowledge with one another, and though technical topics received the most attention, and sometimes resulted in extended, very technical conversations, members also raised other topics of interest to them and indicated that they found value in discussing non-technical subjects.

Community. Over the course of this study, evidence indicated the community was in the coalescing stage of development. Recall that in the coalescing stage, the primary community issue is building relationships and trust among members. Based on their responses to post-meeting questionnaires, participants reported a growing sense of community with other members, as indicated by the data in Table 6, below. This sense of community increased over the course of the intervention, with members rating the average value of the latter two face-to-face meetings higher than the two previous meetings.

Table 6

Perceived Sense of Community Over Time

Item	Meeting	N	Mean
How would you rate the overall sense of community among the collaboration group?	October	7	4.3
	November	10	4.4
	December	4	5.0
	January	8	4.8
Total		29	4.6

^aScale: 1 = Poor, 2 = Fair, 3 = Average, 4 = Good, 5 = Excellent

Transcripts from the meetings reflected a sense of trust and deepening relationships among participants. In the very first face-to-face ST meeting in September, some participants began to open up about frustrations with certain issues in their organizations. One member said,

From management, we get the requests for the details and stats - the tracking - and I'm really sick and tired... It's going to take me a half a day. If you got me the other tools, anybody in the department and you yourself could get this in 5 minutes... [Without them] that means I'm dropping everything else for a half a day. And it's still not going to look pretty.

By the third face-to-face ST meeting in November, members gained sufficient trust to begin discussing sensitive information. One member described a difficult political concern, which he mentioned could have serious consequences for him...

And what I'm most afraid of - since you're recording this and there's [*sic*] other people from [my school/district] it's going to get back and get me fired - but oh well. What I'm most afraid of is that we're going to end up having a whole 'nother keychain of a third-of-the-way-implemented projects [*sic*].

CoPs typically have three main levels of participation – encompassing core, active, and peripheral members (Wenger et al., 2002). Well-designed communities experience movement of members among these levels and indeed, these fluid boundaries and varying levels of participation were observed in this study.

All total, there were 28 unique participants in the six face-to-face collaboration meetings held from September through March and more than three-fifths (61%) of participants attended more than one meeting. Just under a third (32%) attended at least half of the meetings held. Furthermore, two thirds of the campus IT leaders attended at least one face-to-face with support staff. The community also experienced healthy growth, with the last meeting having twice as many participants as the first and the last two meetings being the most well-attended of the six. Furthermore, almost two-fifths (39%) of participants were newcomers in one of the last two meetings. This is to be expected in a coalescing CoP. Wenger et al. (2002) discuss the importance of making a case for membership and the value of bringing in new members with fresh insights at this stage.

Of the six schools participating in this study, no meeting had less than half of the schools represented and each school sent representatives to at least one third of the meetings. One community college and the university were represented at all six meetings and another college sent representatives to five of the six meetings.

Another finding was that this community helped members feel less isolated. This finding was a recurring theme in the data. In the fourth face-to-face meeting, held in December, when asked about whether the community should continue during the spring semester, one member said,

You have to be able to collaborate. It helps. You feel like your own island for so long and then to hear what you guys are all going through and, you know, come to different sites and see things, it makes a huge difference...

A campus IT leader echoed this sentiment and said of his staff who were participating that he wanted "...to make sure that they understand that we're not an island... we may have particular [college-specific] problems, but they're not a whole lot different from the [university] problems, or [another college's], or anybody else." Another participant described the growing interdependency and trust that had developed among members of the community like this, "We are all going to rely on each other. We're going to rely on you guys. We are going to rely on other schools."

The data show participants making connections to one another and engaging in ways that allowed members to build relationships and develop the trust and understanding, which is an indicator of a coalescing CoP.

Practice. Practice involves determining what knowledge to share and how to share it. Knowing what practice to share involved community members taking time to understand one another's work and challenges. It is also a key element in providing value to the members. As Wenger et al. (2002) discuss, topics must be relevant to the participants or the CoP will not be viewed as valuable by members or the organizations of which they are a part (pp. 84-85).

Though each meeting had a specific technical topic around which the community agreed to focus (See Table 2, above), discussions were often far-ranging and many other issues came up during each session. In the first face-to-

face meeting, one participant said, “One thing to note... and I'm sure you've noticed it, we started out talking about [Office] 2010, but look at how many other subjects got mentioned just from the sharing aspect. You know, that's what happens”.

Determining which knowledge would prove most valuable for the community to collaborate on was not straight forward. Despite the LT's assessment that the deployment of Office 2010 would be a suitable collaboration topic for the community (see Appendix F), by the second meeting it became apparent that it was not as good a fit as the leadership anticipated. Participants decided that deployment of Office 2010 was just not as relevant to the day-to-day issues they faced as the deployment of Microsoft's Windows 7 operating system would be, so the community changed course. Indeed, this happened more than once and by the end of the intervention, the community had shifted to yet another topic, Microsoft's System Center Configuration Manager (SCCM). This topic was related to both of the earlier topics, but was originally deemed to be the least valuable topic and the least suitable for interorganizational collaboration by the LT.

Participants were vocal about which subjects were relevant to them and, through dialogue, negotiated which ones the community should address and when, as is characteristic of a CoP in the coalescing stage of development. In this case, their preferences appeared early on in the intervention. When asked in the second face-to-face ST meeting in October about whether or not the community should change its focus from Office 2010 to Windows 7, one member explained

the need for a shift, “I think Windows 7 is a lot more valuable as far as what's going on currently today, because I know... we're not planning on any kind of 2010 implementation of Office probably for almost a year.” As it turned out, due to unforeseen challenges related to Windows 7, deploying Office 2010 turned out to be further away than most initially thought. One participant described the difficulties like this,

Windows 7 has stalled us. ...we narrowed it down to printing issues - and that is plural - and we haven't really resolved them yet so that has stalled Windows 7, which in turn I feel very ill-prepared for this meeting because we haven't even considered 2010 and I don't want to do two at the same time.

Since this view was widely shared among participants and Windows 7 deployment was seen as a necessary precursor to Office 2010 deployment at many schools, the community decided to re-focus on Windows 7 deployment issues.

How best to share knowledge is another important practice element for communities to work through in the coalescing stage and was a topic of discussion for this group (Wenger et al., 2002). During the face-to-face ST meetings the format of how best to share knowledge surfaced. In the fourth meeting, the researcher proposed an expert, vendor-led demonstration on Windows 7 deployment, offered by a hardware manufacturer with a strong presence at a number of the participating schools. In response, one participant said, “To be honest with you, this sounds great but coming back in those first couple of weeks I'm more interested in seeing your SCCM [installation].” This

signaled another shift in focus for the community and for the fifth and sixth ST meetings, SCCM became a central topic of discussion as a means to successfully deploy both Windows 7 images and Office 2010.

This preference for seeing technical solutions deployed as a part of actual practice in a higher education setting, rather than a more generic presentation on industry best practices came up more than once. A participant explained his preference for this sort of meeting,

It's of huge interest, especially for us, because we kind of put the cart before the horse. ...so it would be nice to see how you guys integrate Forefront [antivirus] with SCCM. Like I said, we have it in the sandbox, we've tested things.... So we are on the cusp of that, so anything you could show us in January would probably be really good.

Given this clear preference among participants, the subsequent meeting was organized as an onsite demonstration of how SCCM was being used at one of the participating institutions and that meeting had the best attendance of any until that point. This same topic was discussed in the following meeting and had even higher attendance.

Research Question 2: What are the factors that contribute to the development of such a group into a CoP?

There are two distinct leadership roles that contributed to the development of this CoP – community coordinator and technology steward. As we have seen, these roles are crucial for the success of a community of practice.

Community Coordinator. Meeting transcripts, email exchanges and interviews showed evidence that the researcher acted in the role of CC. The researcher organized and facilitated a total of ten meetings as a part of this intervention.

Planning and Facilitation. In the summer of 2010, before holding formal meetings with the ST and LT, the researcher arranged a face-to-face meeting with select members of the existing network of connected IT professionals at core schools. The researcher also held a follow-up phone conversation with two core members from that group. In addition, the researcher organized and facilitated two face-to-face meetings and a telephone conference with the LT. Finally, the researcher hosted five face-to-face meetings with the ST, which occurred monthly from September 2010 through January 2011. The last of which was a technical demonstration. After the November ST meeting, one member said, “Stay on course. We are off to a good start. Thank you for coordinating these meetings!”

Face-to-face meetings with the both ST and the LT were scheduled over the lunch hour and food was provided during each meeting to make it easier for participants to take the time to travel to another campus and attend the community meetings. One leader commented specifically on the value of meeting over lunch in an interview, “...just having those conversations, having a little social time over lunch to be able to talk about this stuff, I am in favor of that.”

Data show that the community coordinator also acted in the role of a facilitator for the community. There were 400 coded instances of this role being performed in the four ST meeting transcripts, that included passages relating to

planning, facilitating, linking members, and assessing the health of the community. By far the most common task the CC performed during meetings, however, consisted of prompting individuals to share knowledge or asking clarifying questions to help the dialogue continue. There were more than 200 coded instances of this specific type of facilitation. Though sometimes other members temporarily took on this coordination role by asking these prompting or clarifying questions, the CC asked the large majority of these questions. Indeed, as a way to initiate the dialogue and keep it flowing, in a number of sessions the CC specifically asked each school to comment on the meeting topic, the current challenges the IT staff at that school faced relative to that topic, and solutions they might have to offer the community.

Participants also had preferences regarding the format of the interactions, which is an important issue in the coalescing stage of a CoP. Despite the technical nature of this group, when the leaders were asked whether they preferred more technology mediated interactions and fewer face-to-face meetings which required travel for their employees, they chose face-to-face. One member expressed the common sentiment, “we need specific meeting times to get participation... if we do online collaboration ‘when we have time’, we never have time.”

Addressing Time Constraints. The struggle to find adequate time to participate surfaced as a theme. One participant said, “I would have to say that at the beginning we were like a circus performance keeping the plates spinning. And now things have settled down. We have enough plates broken that we don’t have to worry about it.” In a response to a question from the November online survey

about how to improve collaboration among members, one member said, “Free up my time so I can attend more often :)”. The researcher, acting as a community coordinator, did attempt to free up participants’ time to participate. After hearing that one school would not be attending the first meeting, he contacted the leader of the institution via email with this note,

I am sorry to hear that [a member of your staff] is ill and hope she gets better soon. It doesn't look like any other members of her team will be able to make it today, either. Do you know if anyone else is planning to come from [your school]?

Though no one was able to attend from that school that day, there were representatives from that school at the next three meetings in a row and professionals from that school became core members of the community. This sort of personal agency was employed throughout the study and included phone calls to key participants and email to members and leaders. The researcher sent more than 200 emails to individuals and the community as a whole throughout the course of the intervention.

The LT also looked for ways to be more efficient with respect to time. The leader of one campus suggested holding a meeting via a videoconferencing bridge at one of the colleges in their district. The thought was this format would still allow for rich interactions, but save everyone the additional overhead of travel time. Unfortunately, there were technical difficulties in connecting all of the campuses with the videoconferencing bridge, so a simple conference call was used instead.

Despite the time constraints members reported, people found ways to remain involved and their leaders continued to support their participation. When asked via the online survey in November about ways to improve collaboration, one respondent said, “Stay on track with our monthly meetings and continue to grow our relationships with each other.” This desire for continuing to meet consistently was re-affirmed later in the study. Though the ST did not meet in February due to scheduling challenges, one of the core members of the community hosted a sixth face-to-face meeting in March, and members expressed their desire to continue meeting every month so as not to “lose momentum”. At the end of that meeting, individuals from two other institutions who had not previously hosted, offered to host upcoming community meetings.

Spanning Boundaries. In an interorganizational CoP such as this one, the CC also acts in the role of boundary spanner, linking members across multiple organizations. One organization reported on previous internal efforts to reduce organizational silos, but that did not meet with success, “In the beginning, we actually tried this on our own campus, and it was a failure because people felt like they didn’t need to get together.” Based on that perception, they decided that collaboration with other campuses was a better strategy and became very engaged, core participants in this CoP. Fortunately, participants generally found the collaboration to be easy as seen in Table 7, below.

Table 7

Perceived Ease of Collaboration Over Time

Item	Meeting	N	Mean
Collaboration with other group members seems... [1 Difficult – 3 Easy]	October	7	3.0
	November	10	2.8
	December	4	3.0
	January	8	2.9
Total		29	2.9

^aScale: 1 = Difficult, 2 = Sometimes difficult, sometimes easy, 3 = Easy

The importance of the CC role was summed up well by one of the leaders in an interview after the fifth meeting.

I think... a lot of that credit and why it's been successful and I would like to see it continue... Is your organizational efforts [*sic*], and kind of nicely pushing people... and reminding appropriately, keeping things organized, coordinated. [My employee] says things... start on time, they end on time, people stay on task. The information is put out there...

Evidence of the importance of a leader performing the role of a CC is consistent with developing a group such as this one from the potential stage into the coalescing stage.

Technology Steward. The second leadership role that contributes to successfully launching and sustaining a CoP is that of the technology steward. There was evidence of the researcher performing this role in the transcripts 83 times, spanning each of the first four face-to-face ST meetings.

Technology Selection. A need for a communication channel and a place to store, organize and share information was acknowledged early on. In an email

that went to individuals in the potential community network several months before the first meeting of the intervention, one of the key participants requested that the group use technology when he wrote, “I would like us to all discuss a possible portal/blog/whatever, for us all to communicate through instead of email.” Indeed, this need for a repository to support the community is articulated in the literature and was expressed by participants over and over again. Another participant said, “No matter what content managing system you pick you can work with it. ...the important thing is that you commit to some tool. You make a selection at some point and you work with it.”

Creation and Configuration. Acting as TS for the community, the researcher created a Google Group and invited participants to join it in order to help facilitate communication between face-to-face meetings and serve as a repository for artifacts reified by the community.

Despite participants’ familiarity with Google Apps, getting people to successfully participate in and use the Google Group proved difficult. To avoid difficulties with using institution-specific Google Apps for Education domains, the Google Group for this study was created in Google’s public domain. This led to some confusion about accounts and which credentials to use when using the service. One of the members talked about the difficulty saying, “I have no Google e-mail right now. I wiped everything out because for some reason I ended up with like six e-mail accounts.” When asked via the online survey about how to make the collaboration more valuable, another respondent had a suggestion about

how to solve these difficulties, “Have everyone bring laptops to sessions (or provide them), so that issues with Group site access could be taken care of early.”

Furthermore, shortly after participants began meeting face-to-face, Google announced that it was changing the features of its Google Groups service, thus making it much less suitable for this collaboration (“Google Groups Announcements Page: Notice about Pages and Files,” n.d.). Elimination of these features basically transformed the service into an electronic mailing list and discussion board, without any way to capture or organize any artifacts that resulted from collaboration.

Due to this change, the researcher, again as TS for the community, created a Google Site as a new way to capture and organize knowledge artifacts created by the community. It was used for tracking issues and solutions for various technical topics, providing community member contact information, posting meeting notes, and facilitating file sharing. The initial site design was complete prior to the second ST face-to-face meeting, during which the researcher demonstrated the layout and proposed use of the site. After members agreed it seemed suitable, they were invited to join it. Upon receiving requests for access, the TS granted permission for community members to join and contribute to the Google Group and Site. He also made himself available to help troubleshoot any access or issues with the technology that members experienced.

Over the course of the intervention, the researcher created individual content pages for each of the main interests expressed by community members – SCCM, Windows 7, Office 2010, Drupal, and Project Management. The site also

had a page that contained contact information for members, one for community news, an area for sharing files, a to-do list for the community, and a place for posting meeting notes. There were also links to a Google Calendar that the researcher created for scheduling community events and to the initial Google Group so it could continue to be used as a discussion board, and to manage email communication and membership for the Google Site. Information about technical topics discussed in face-to-face meetings was posted for all six participating institutions and two-thirds of the participating schools contributed issues and solutions to the site. The information on the site continued to grow throughout the study.

Usage and Value. Participants did use the technology tools to collaborate and share knowledge. In between meetings, participants were asked to post any outstanding issues they were having on the pages dedicated to that topic. One advantage of moving to a Google Site was the ability to link the Site to a Google Analytics account. The researcher created such a linkage so that comprehensive usage data could be collected. The Google Site was shared with 27 email addresses (one of which was the Google Group address) and had 21 unique visitors. There were 40 visits between November 3rd and December 15th; almost half of those (47.5%) were return visits. The visitors to the site generated 231 page views, of which 160 were unique. On average, users spent 7 minutes and 34 seconds on the site. The main entry page received the most views (38 views/24.4%) with the Windows 7 page receiving the second most (32

views/13.85%). The meeting notes page was third (18 views/7.79%) and the Office 2010 page was fourth (10 views/4.33%).

Data also indicated that members used the Google Site and found it valuable. After posting a Windows 7 problem he was encountering on the appropriate page prior to the meeting, one participant asked for help with it,

One more thing - one issue that I put up there - if anybody else has a solution then this is something that we're researching as well, is on 7 right now when you hit the restart button there's no confirmation of restart. Once you hit it, it's gone.... and historically people had the option to confirm or whatever before they start losing everything. So that was one piece of feedback we got from a faculty member. So if anybody knows of a way to...

Another participant explained the value of this sort of shared knowledge repository for the technicians at his institution,

I think... that we all have our own issue bin... on our own campus. What I'm hoping for and have set one of my goals is that... I have people read this and say look this is what other people are going through. Is your question in here?

When asked how he might explain the value to his supervisor, one of the other members described the value of the Google Site and of having access to the posted meeting notes that he could share with others from his campus, "I would use the site and I would explain it and the value we've gotten out of it. Plus even the notes we take home every month when we come out here." In March, the

facilitator of the sixth meeting (not the researcher) conducted a demonstration of the Google Site, reaffirmed its importance for the community as a way to share knowledge and support our ongoing collaboration and asked first time attendees to join the Site.

Research Question 3: What do members perceive as the potential value of developing and participating in an interorganizational IT CoP?

The potential value of developing an interorganizational IT CoP is considered from two perspectives, (1) the perceptions of the participants themselves and the extent to which they find value in the collaborative efforts of such a community, and (2) the perspective of the leaders who support the overall efforts of the community by allowing their employees sufficient time to participate.

Participant Perceptions. Based on their responses to post-meeting questionnaires, participants consistently reported finding value in developing and participating in this CoP. When asked about the value of the face-to-face LT meetings, specifically, participants said they were valuable as indicated by the data in Table 8, below.

Table 8

Perceived Value of Meetings Over Time

Item	Meeting	N	Mean
How would you rate the overall value of this meeting?	October	7	4.3
	November	10	4.4
	December	4	5.0
	January	8	4.8
Total		29	4.6

^aScale: 1 = Poor, 2 = Fair, 3 = Average, 4 = Good, 5 = Excellent

Furthermore, perception of their value steadily increased over the course of the intervention, with members rating the average value of the latter two face-to-face meetings higher than the first two.

Results from the online survey also confirmed that members found the developing community worthwhile. One participant said he most valued, “Communication with other institutions. Knowing what others are going through and finding out possible solutions that have been derived [*sic*]”. Another member said the most valuable thing about our collaboration was, “The sharing of problems & solutions common to us all. The sharing of ideas and brainstorming.” When asked about how to improve the collaboration, one respondent said, “... so far, I like our direction.” Another said “This has been very valuable to us, hard to see any weaknesses.”

The data show that participants valued the knowledge sharing and collaboration, believed the time and effort involved was worthwhile, and believed the community should continue. One participant described the benefit of sharing knowledge about IT practice with colleagues by saying, “...our issue bin is now for all the schools and we go from there and that is such an asset. That's information and information is everything nowadays.” During the December face-to-face ST meeting, one member summed it up, “The value is in the... tool... What we can save here by sharing, discussing, learning – might take us back and when we bump into something, the solution's already there.” When asked how participants would justify ongoing participation to a supervisor in that same

meeting, one respondent said, “Yeah, it would be very easy to explain. That the value is not necessarily in a cost savings, it's in a knowledge base. It really is.”

Key informants were also interviewed to gather a more in depth view of their thoughts about the value of building and participating in such a community. Participants and leaders were unified in describing participation in the community as valuable and worthwhile. When asked about this specifically, one interviewee had this to say,

I do think it's been valuable, I think today's meeting was indicative of it.... We had a great dialogue. It was very technical... I'll use that printer example... you're not all alone in this... so when you can find somebody that comes to the table and says I'm seeing this... that helps you personally, I think, as an IT person. You've been struggling; you know somebody else is struggling; now maybe you can work together. That's why I think it's beneficial.

This question of value also came up during the face-to-face ST meetings and one member described the benefit of meeting with colleagues to discuss issues, “You're not alone basically. You know there are other people with the same problems and with more problems than you even have and you feel better.” Another participant said,

This might sound silly but one piece of information that makes me feel really good... is you said you had to go to an instructor's classroom during his classes... We're like you guys... the fact that you guys have had issues

that have called you out to the classroom makes me feel like OK, things happen.

In an interview, another member described the value like this, “I don’t think we could put a dollar amount on the value of it. That’s how valuable it is. It’s not only valuable, it’s necessary. It’s even more than necessary; it is going to be the key to progress...”

Although members clearly found value in the collaboration, it was not without a cost in terms of time away from other duties, exacerbated by fairly long distances to travel between campuses for face-to-face meetings. When asked about whether or not the value gained was worth the amount of effort required to participate, one community member said this,

I would say two things about that. I would say, yes, there is enough value, because the value comes from what we contribute, more than what we take away. Because if we are all contributing, then we all know it is like a potluck. We all come with something, and there is something everyone is going to benefit from – that they [*sic*] are going to enjoy. And on the other side, we have to learn on our campuses that sometimes, on the layers below us, we have to delegate, because it gives some of those folks a chance to shine. And even if they don’t do well, it’s a chance to take them aside and say this is what you need to do next time, and they’ll improve.

Another respondent said, “Overall, I would have to say yes, because we are starting to implement things... I noticed that many of us... are all talking the same language now, so that is an overall value, for me.”

When asked about whether or not the group should continue meeting in the spring semester on the post-meeting questionnaire in December, every respondent said yes. When asked about whether or not the group should continue to meet in an interview, one person said, “it would be a huge mistake if we stopped”. Another individual answered, “Yes. It’s an information-sharing collaboration. All of those things help to make us more of an IT community, even though we are all different schools... We’re going the same direction. We all have the same goals...”

Leadership Perceptions. Prior to the first face-to-face meeting, leaders from each organization were asked about the possible benefits of further developing this group, to determine whether or not they supported the overall goals of growing into a CoP. All of the leaders agreed or strongly agreed that collaboration could expose their staff members to new ideas, help them improve existing skills and develop new ones, solve common and unusual problems, and all except one respondent (who disagreed), agreed or strongly agreed with the idea that increased collaboration could help his staff improve processes. Knowing what other institutions are struggling with and exploring different ways people solve problems that many organizations face, emerged as important themes in discussions about the value of this collaboration.

The chancellor of the community college district from which schools participated in this research, recognized the collaborative efforts of one member of this group in this way, “Your efforts... demonstrate the spirit of collaboration and teamwork that we honor [in this district] -- working collaboratively and

innovatively to bring us together... helping us serve the educational needs of our students while using public resources effectively and efficiently.” Another administrator, to whom one of the participating leaders in this study reported, when asked if the collaboration seemed valuable and worthwhile from his perspective replied,

Oh god, yes! ...this is terribly important... It's not straight ROI, it is a return on strategy... where we start forming these partnerships... you don't know what's going to come out of it, so you just gotta see what the collaboration brings, so it's not a direct return, but I would say it's definitely very positive.

Key informants from the LT were also interviewed to get a deeper understanding of their sense of the value of the collaboration among the various participating institutions. When asked about whether he found this approach valuable, one leader had this to say,

Oh yeah, absolutely! Because of that collaboration [*sic*]. First and foremost, my guys know people at other colleges.... I have been trying multiple things to ensure that my guys know that there is somebody at all the other colleges that do the same job and probably have similar issues, and so it has brought them out. An added benefit is that people solve problems in different ways and we get to see how other people have come at that.... Knowing there are people with like problems out there is very good too. I like that a lot.

After the meeting in March he went on to say, “I appreciate everything you’ve done... This was fabulous... the discussion was good... Thanks again.” One of his colleagues from another school had this to say about the overall value of this collaboration,

Yeah, I think it’s been valuable on a number of levels.... getting some of my techs, both the ones that participated and when they come back and share with the other techs... [that] other people out there are struggling with some of the same things and here are some tips I got, or even if it’s they tried that thing we were going to try and it just didn’t work, so let’s not waste our time on that. So it’s been real [*sic*] helpful from a technical knowledge standpoint, you know to get those tips or successes being shared and also to avoid going into the failures. The other thing that it has helped with is that there are different ways, not just the technology part of it, but different ways in which people communicate or operate or even document or share things... Learning to work together and share that knowledge and get to know people has been real [*sic*] helpful.

Responses like these demonstrate the perceived value of meeting with others and discussing common problems, failures, and solutions.

When asked about whether the benefits outweighed the ‘overhead’ costs of participation, specifically, one of the leaders responded by saying, “Oh, absolutely. I encourage them to do those kinds of things... Go take a road-trip and go see how these people do things... I think we get our time back ten-fold, with visits like that.” When asked about whether the group should continue, he

said, “Yes... We are always looking for new resources, and this is one of them.” His colleague from another school had this to say, “I think it is a good thing... We can take this experience and see the value in it and see the value in sharing information and helping each other... if somebody can keep it going that would be great.” The leaders clearly expressed their belief in the value of our collaborative efforts, and importantly, also affirmed that the value derived from the community was worth committing the resources and effort necessary for their institutions to participate.

The data from this study indicate that this group of IT professionals, developed through the innovation as a CoP, moving from the potential stage to the coalescing stage. The evidence also points to the importance of certain community roles that were present during the development of the community, namely those of community coordinator and technology steward. Finally, the support staff and leaders at the participating institutions universally expressed their belief that this sort of collaboration was both valuable and worth the effort.

Chapter 5

DISCUSSION

The data in this study indicated that a network of IT professionals from different institutions of higher education transformed into a CoP that spanned their diverse organizations. The development of such a community allowed IT professionals to benefit from the varied experiences and expertise of their colleagues in other higher education institutions. It also provided a way for them to collaborate in the face of widespread and ongoing challenges of increasing

demand for technology support services and decreasing resources available to meet that demand.

As this community coalesced, participants spent time sorting out the most important topics to discuss and these did not necessarily align with what the leadership had identified as the most suitable issue for collaboration. This sort of flexibility among participants and leaders, however, was critical for the success of such a community. The development of this community was primarily intended as a way to discuss purely technical issues, and was designed to be a “Helping Community” (APQC International Benchmarking Clearinghouse, 2001), primarily focused on ways for members “to help each other solve everyday work problems in their [*sic*] discipline,” (Wenger et al., 2002, p. 73). Technology challenges were clearly the topic of many interactions, but it became clear very early that members also wanted to discuss political issues, organizational challenges, staffing concerns, and other topics related to their work or workplace. They also wanted to socialize with their peers. One response to an online survey question about the most valuable component of the collaboration summed it up in a single word – “fellowship”, and indeed, that proved to be an important benefit members reported gaining from participation. Strengthening an existing network of colleagues into a CoP provided a mechanism for members to collaborate on all types of concerns, including important, but non-technical issues. For sustained participation, members must continue to find the topics being discussed relevant to their practice and valuable enough that the effort of collaboration remains worthwhile.

Building relationships and trust among members was also crucial in helping a network of individuals coalesce into a community. Having face-to-face meetings on a regular schedule helped the participants in this study understand the work and environment of other members. This consistent level of participation is important for building relationships and trust as members “develop the habit of consulting each other for help” (Wenger et al., 2002, p. 84).

It was also apparent that trust was developed by tackling difficult practice issues. It was important that members felt free to discuss their most challenging technical or political issues without fear of ridicule or recrimination. Expert troubleshooters feel uncomfortable admitting they cannot solve a particular problem, but participants often repeated how valuable it was to be a part of a community that demonstrated they were not alone in facing these daunting challenges. The sense of solidarity they felt with others who were also struggling seemed to be a relief to members and turned out to be one of the most important benefits of building such a community.

This study was designed to address the increasing demands placed on IT departments that face static, or often shrinking, resources to deal with those demands. That very circumstance, however, also created difficulties for a solution such as this. The same staff who would be involved in trying to collaborate as a way to address that challenge, have little time available to do so. In fact, no participants other than staff members from the researcher’s own department were able to attend every single meeting. Participants were enthusiastic about the idea of collaborating more closely and reported that they

found value in the meetings from the outset. That sense of value also increased as the community evolved. That did not make it any easier to find the time to get away from their day-to-day responsibilities on their own campuses, however. Nonetheless, as members find increasing value in the community, it becomes easier to justify that the time they are taking away from their busy jobs is worth it.

It was important for the community coordinator to acknowledge these time constraints, however, and design accordingly. Having meetings over the lunch hour and providing food proved to be one design element in this study that allowed some members to multi-task and participate during lunch without neglecting duties on their own campuses. Having a way to communicate in between meetings and a repository for community artifacts also helps, which is where the technology steward role becomes important. Though the technology tools were not used as heavily in this study as originally anticipated, participants indicated they were valuable. For example, posting meeting minutes online not only allowed members to share information with colleagues when they returned to campus, but it also enabled participants who missed a meeting to remain up-to-speed when they returned. In the end, the community must be structured in a way that allows for the flexibility participants need, and coordinators and leaders must accommodate these changing circumstances. Members must be able to come and go as their work permits, but need ways to remain connected to the community, even if they can't attend every meeting.

Though developing this sort of community involves challenges and requires effort, evidence from this intervention shows that not only do participants

find considerable value in being members of such a community, but leaders also believe there is value in this type of collaboration and find it to be worth the time and effort it requires of their employees. Though individuals have time constraints related to their specific responsibilities, leaders often have even broader concerns about the resource constraints at their institutions. Nonetheless, the leaders in this study let staff come to meetings and they continued supporting this collaborative effort, which indicated that they believed it to be worthwhile, despite the significant resource constraints they faced.

Developing a successful CoP takes time. Over the course of this intervention, the group moved from potential to coalescing. They are just now starting to move into the maturing stage. For a CoP such as this one to succeed in the long-term, it requires both support and flexibility from the leadership of each organization involved, so that members of the community are allowed to make time for participation and establish topics for collaboration that are meaningful and relevant. If the topics are not connected to the daily challenges members face, in an all-volunteer model like this one, members will stop participating. One positive sign for the sustainability of this community is that the last meeting reported on in this study was not hosted or planned by the researcher, but rather, a core participant stepped up to host. During that meeting, members from two other institutions offered to host for the first time.

Toward a Model of Developing an IT CoP

Much of the literature about communities of practice focuses on the theory about why they are effective or observations about the function they serve or

results various communities have achieved, but little actually describes the process of how to create, develop and foster success in such a community, particularly one that spans multiple organizations. This study attempts to narrow that gap by providing guidance as to how a CoP can be built among higher education IT organizations, along with a discussion of some of the difficulties one might face in doing so.

This study offers a model for developing an interorganizational CoP among IT professionals. Here are recommended considerations for developing one, based on the research conducted for this study,

- Solicit support and input from leaders at other institutions
- Plan meetings and select initial topic(s) of shared interest
- Identify participants from each institution and invite them to join
- Establish community coordinator(s) and tech steward(s)
- Foster relationship building and trust among members
- Revise topics as community interests become more clear or change
- Monitor leaders and participants to ensure community continues to provide value
- Adjust meetings, communication methods, and technology tools as needs change

Over time, with additional research in this area, this model can be further developed and refined.

Limitations

This study was situated in a specific context. The community consisted of IT professionals working in public-sector higher education institutions, located in the same geographic region. Participants were also selected purposefully for this study. These factors assured that members shared a domain of common practice, but the model developed here may not be replicable in other contexts.

This intervention aimed to address a problem of shrinking resources in the face of increasing demand, but that very problem also complicated the solution. Specifically, lack of time was a limitation and may have affected the study due to the difficulty in finding the time it takes to coordinate and sustain a CoP, and member time constraints that limited their participation. Though concerns about time commitments can be somewhat offset by the design of the community, they cannot be completely eliminated.

Another limitation was related to the primary problem of increased demand and scarce resources in that no budget was allocated for this project. This meant that the group was limited to using free software tools or those already available from one of the participating institutions to support the community. It also meant that the costs of food and travel for meetings were not reimbursed. Finally, employees received no additional compensation for work done for the community; it was all done in addition to their daily responsibilities.

Technology changes rapidly and can have a significant impact on a community like this, especially if a tool they are using suddenly vanishes or changes significantly, as happened with Google Groups during this study. Fortunately, the announcement of the change provided some notice before the

feature set changed and it came early enough in the intervention that migrating to another tool was relatively simple. Nonetheless, the reduction in functionality did occur before the intervention was complete and if members had been more invested in that particular tool, the change would likely have been more disruptive to the community.

Implications

As both private and public institutions of higher education struggle with difficult budget situations across the United States, operating in conditions where resources are incredibly scarce has become the norm. In technology, where the industry continues to expand and change rapidly, challenges are further magnified by staff cuts and shrinking budgets. By developing and documenting a model for building a CoP among the IT professionals at the institutions in this study, others may be able to foster similar communities with partner institutions and achieve positive results.

One possible way for organizations to continue to succeed despite these difficulties is through collaboration with other institutions. Leaders of IT organizations often have little influence over the budgetary allocations they receive and even less with respect to the pace of innovation in the technology industry, the adoption of new technologies by students, faculty and staff or the requirement to support legacy technologies when there isn't money to upgrade. Nonetheless, they can choose to pool their scarce human capital intelligently, which may provide one way to address the increasing pressure on IT organizations in public institutions of higher education. The leaders in this study

clearly found this collaborative approach to be worthwhile, and leaders at other institutions may as well.

Indicators suggest that this community is moving toward the mature stage of a CoP and will continue to deliver value to the participating institutions and ultimately become self-sustaining. While this research focused on developing a network of interorganizational IT professionals into a CoP, it would be beneficial to do a longitudinal study to examine the long term challenges and value of sustaining this model. It might also be worthwhile to undertake studies of multiple communities that span institutional boundaries, as they have or present different struggles but offer unique benefits when compared to CoPs built within single organizations.

Finally, there would be value in studying more mature interorganizational CoPs and how they add value to their organizations. It would be worthwhile to study how they become self-sustaining and how leadership is shared or transitioned from one leader to the next. Furthermore, a deeper understanding of how the roles described in this study evolve in the maturing stage and what other important roles might emerge would be of interest. It would also be valuable to develop a better understanding of how mature interorganizational CoPs select and transition among topics and how they measure their contributions to each organization. Lastly, it would be useful to explore whether these communities can make enough progress on day-to-day problem solving that they can eventually shift their focus and start focusing on innovating together.

Reflections on Changes to the Innovation

Though this study was successful with six participating schools, starting with a smaller group in the beginning might offer some advantages. Launching the CoP with fewer schools would allow for easier coordination. In addition, such an approach might help foster the development of a more focused core group of participants initially, around which a larger CoP could then be further developed by inviting additional institutions to participate.

Another helpful modification would be to establish a second set of standing, regularly-scheduled meetings with the leaders of each participating institution. That would allow for organization around *two* distinct CoPs: one developed among the LT, and another developed among the ST. More fully developing the former group as a separate CoP and more clearly articulating the relationship and reciprocity between these two communities, while treating each as a separate, though related, entity might provide a beneficial approach for future studies.

Such a modification would likely necessitate another leadership role, that of a *boundary broker*. In some senses, this shares elements in common with Wenger's (1998) description of brokering in that it is likely to be "complex" and would involve "translation, coordination, and alignment between perspectives," but is also different from his conception in important ways (p. 109). He describes brokering as something that occurs when a member takes a particular practice outside of a CoP or as the act of transferring knowledge across multiple CoPs *inside* an organization. In the sense used here, however, the boundary broker

would serve as a connection point between the leadership and support team CoPs, both of which exist *outside* of any particular organization.

Reflections on Leadership

Two distinct roles, those of the CC and the TS, were critical for the success of this study. The researcher performed both roles, but there was also another related, but distinct, role he performed that is not clearly defined in the current CoP literature that could perhaps be called a *community catalyst*, to borrow a term from Frank & Smith (1999). Without an individual stepping up and taking a leadership role to actually work toward forming a CoP, it would be hard to imagine a community coming together in this way. Though CoPs like this one, that span organizational boundaries, certainly have an organic element to their development and evolution, they are unlikely to form spontaneously without some individual or set of individuals acting as a catalyst.

Given that, it is worth considering the possible motivations for someone to assume this role. The researcher had previous experience with developing a successful CoP in his own organization and his research interests prompted him to explore whether it could also be done across organizations and if so, whether the value would outweigh the costs of participation. In other contexts, however, it would be important for a leader to envision the value of such an endeavor in advance, decide the circumstances were likely to make developing such a community worth the effort, and then try to launch an interorganizational CoP or ask someone in his or her organization to attempt it following the model outlined above.

The position of community catalyst does not currently exist in most institutions. This role could be performed by the community coordinator, but may also be distinct from it. Regardless, such a role is critically important in building a CoP that spans organizations. Someone must take on the initial responsibility of developing a vision for an interorganizational CoP, articulating that vision and a strategy for implementing it, and then taking that concept to parties who may be interested due to an alignment of interests and a willingness to work together on those common issues.

Certainly, such a role is not without challenges. One way to think of it is to contrast it with that of a more traditional IT project manager. In each case, the person has little or no direct authority over participants, but there are more differences than similarities. Project managers typically begin with a charge, executive sponsorship, budget, deadlines, and often even an assigned roster of team members. A community catalyst on the other hand, has none of these. He or she has a vision rather than a charge, has to develop leadership buy-in rather than receiving sponsorship, may have no budget, will typically be accountable for timelines the CoP agrees upon, and will have to recruit would-be participants by articulating a compelling vision of the value such an endeavor can offer.

Furthermore, a project manager is typically held accountable to an organizational leadership structure for delivering an objective. The objective is often given to his or her team, rather than developed by it and is one that typically comes with an assigned timeline and strict budgetary constraints. In an interorganizational CoP such as the one developed in this study, however, the

community catalyst may be volunteering his or her time and will typically help develop the initial objectives, timeline and funding priorities (if there is any budget available) with the leaders of other institutions and participants, collaboratively. Over time, these tasks would transition to a more traditional community coordinator, but initially bootstrapping such a community into existence takes additional effort.

If institutions of higher education seek to adopt this model as a way of confronting skyrocketing demand for services in a climate of ever-diminishing resources, they might consider creating such a position, formally, to help drive this type of innovation. Someone hired to be a community catalyst could then adopt, and no doubt refine, the model offered in this study as a way to begin building an interorganizational CoP among institutions in a particular region. After the first such CoP is formed, he or she could pass the leadership to one or more competent community coordinators and begin building another.

Conclusion

Technology has become an integral part of the educational experience. Nevertheless, in the face of diminishing resources and ever-increasing demand for services, the IT professionals who support that technology face constant pressure to do more with less. Fortunately, they don't have to face that challenge alone. Interorganizational communities of practice can transform and improve the way IT departments do business. IT leaders may not be able to control the pace of technology innovation or institutional budget allocations, but they can decide how to address those challenges. If they have the foresight and flexibility to encourage

and support the IT professionals who work for them to move beyond institutional boundaries, they can find new resources and solutions to their problems.

Collaborating more closely with colleagues from other organizations is a strategy for success in these difficult times.

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APPENDIX A
PARTICIPANT RECRUITMENT LETTER

Date: July, 22, 2010

Dear colleague,

I am a doctoral student under the direction of Professor Kathleen Puckett in the College of Teacher Education and Leadership at Arizona State University. I am conducting a research study to investigate, develop and document an effective model for interorganizational collaboration among IT organizations in higher education.

I would like to invite you to participate, which will involve completing surveys online. Each survey will take approximately 10-15 minutes to fill out. It may also include interviews, which are not expected to exceed 45 minutes.

Your participation in this study is voluntary. You can skip questions if you wish. If you choose not to participate or to withdraw from the study at any time, there will be no penalty. You must be 18 or older to participate in this study.

Your responses to the online surveys will be used to help Arizona State University and schools in the community college district improve IT practice. In addition, the results of this study may help to inform others in higher education or other sectors about the effectiveness of interorganizational IT collaboration. There are no foreseeable risks or discomforts involved with your participation.

All information will be kept confidential. Participants will be assigned a number that will be used for data analysis and reporting. Identities of participants will not be disclosed. In the case where data from individuals, rather than aggregate data are presented, each participant will be assigned a pseudonym. The results of this study may be used in reports, presentations, or publications but your name will not be used.

If you have any questions concerning the research study, please contact the research team: Kathleen Puckett, (602) 543-6300, Kathleen.Puckett@asu.edu or Mark Koan, (602) 543-8283, Mark.Koan@asu.edu. If you have any questions about your rights as a subject/participant in this research, or if you feel you have been placed at risk, you can contact the Chair of the Human Subjects Institutional Review Board, through the ASU Office of Research Integrity and Assurance, at (480) 965-6788. Please let me know if you wish to be part of the study. A reply to this email will be considered your consent to participate.

Sincerely,

R. Mark Koan

APPENDIX B

LEADERSHIP TEAM ONLINE SURVEY QUESTIONS

Demographic data

1. Where do you work?

2. What is your title?

3. How many years have you worked in IT?

4. How many years have you worked at your current institution?

5. How many employees report to you either directly or indirectly (excluding student workers)?

Questions

6. Please rank the proposed projects below based on your assessment of their value to your organization [from least valuable (1) to most valuable (5)].

	1	2	3	4	5
Windows 7	()	()	()	()	()
Office 2010	()	()	()	()	()
Blackboard 9	()	()	()	()	()
Drupal	()	()	()	()	()
Microsoft System Center Configuration Manager	()	()	()	()	()
Citrix	()	()	()	()	()
Active Directory	()	()	()	()	()
OS X Integration with Active Directory	()	()	()	()	()

7. Please rank the proposed projects below based on your assessment of their suitability for our collaboration [from least suitable (1) to most suitable (5)].

	1	2	3	4	5
Windows 7	()	()	()	()	()
Office 2010	()	()	()	()	()
Blackboard 9	()	()	()	()	()
Drupal	()	()	()	()	()
Microsoft System Center Configuration Manager	()	()	()	()	()
Citrix	()	()	()	()	()
Active Directory	()	()	()	()	()
OS X Integration with Active Directory	()	()	()	()	()

8. Please rate your IT organization's usage of the following tools [from least used (1) to most used (5)].

	1	2	3	4	5
Email	()	()	()	()	()
Wikis	()	()	()	()	()
Blogs	()	()	()	()	()
Discussion Boards/Forums	()	()	()	()	()
Electronic Mailing Lists	()	()	()	()	()
Text Chat / IM	()	()	()	()	()
Voice Chat	()	()	()	()	()
Video Chat	()	()	()	()	()
Social Networking Sites	()	()	()	()	()
Google Apps	()	()	()	()	()
Microsoft SharePoint	()	()	()	()	()

9. Please rate your staff's skills in the following areas [from least skilled (1) to most skilled (5)].

	1	2	3	4	5
Troubleshooting	()	()	()	()	()
Communication	()	()	()	()	()
Project Management	()	()	()	()	()
Documentation	()	()	()	()	()
Scripting	()	()	()	()	()
Research	()	()	()	()	()
Networking	()	()	()	()	()
Training	()	()	()	()	()
Testing/Quality Assurance	()	()	()	()	()

10. To what extent do you agree with the following statements?

	Strongly disagree	Disagree	Agree	Strongly agree
Increased collaboration with other IT organizations could help my staff solve common problems	()	()	()	()
Increased collaboration with other IT organizations could help my staff solve unusual problems	()	()	()	()
Increased collaboration with other IT organizations could help my staff improve existing skills	()	()	()	()
Increased collaboration with other IT organizations could help my staff develop new skills	()	()	()	()
Increased collaboration with other IT organizations could help my staff improve processes	()	()	()	()

Increased collaboration with other IT organizations could expose my staff to new ideas	()	()	()	()
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11. To what extent do you agree with the following statements?

	Strongly disagree	Disagree	Agree	Strongly agree
My staff members collaborate well within their teams	()	()	()	()
My staff members collaborate well within our IT department	()	()	()	()
My staff members collaborate well across the institution	()	()	()	()
My staff members collaborate well outside the institution	()	()	()	()

12. Please describe how you view your role(s) and responsibilities in our collaborative effort.

13. What shall we call ourselves?

[choices omitted to preserve anonymity]

14. Is there anything else you would like to add?

Thank you for taking this survey. Your responses are very important for this research!

APPENDIX C
POST-MEETING QUESTIONNAIRES

October 20th, 2010

How would you rate the overall sense of community among [this] Collaboration Group?

1. Poor
2. Fair
3. Average
4. Good
5. Excellent

Collaboration with other group members seems...

1. Difficult
2. Sometimes easy and sometimes difficult
3. Easy

Before this group started meeting, on average, I collaborated with other group members (not from your school)...

1. A few times per year or less often
2. A few times per semester
3. A few times per month
4. A few times per week or more often

How would you rate the overall value of this meeting?

1. Poor
2. Fair
3. Average
4. Good
5. Excellent

November 17th, 2010

How would you rate the overall sense of community among [this] Collaboration Group?

1. Poor
2. Fair
3. Average
4. Good
5. Excellent

Collaboration with other group members seems...

1. Difficult
2. Sometimes easy and sometimes difficult
3. Easy

How would you rate the overall value of this meeting?

1. Poor
2. Fair
3. Average
4. Good
5. Excellent

What should we do to improve our collaboration?

December 15th, 2010

How would you rate the overall sense of community among [this] Collaboration Group?

1. Poor
2. Fair
3. Average
4. Good
5. Excellent

Collaboration with other group members seems...

1. Difficult
2. Sometimes easy and sometimes difficult
3. Easy

How would you rate the overall value of this meeting?

1. Poor
2. Fair
3. Average
4. Good
5. Excellent

What has been most valuable about our collaboration?

Should we continue in the spring semester?

1. No
2. Yes

January 12th, 2011

How would you rate the overall sense of community among [this] Collaboration Group?

1. Poor
2. Fair
3. Average
4. Good
5. Excellent

Collaboration with other group members seems...

1. Difficult
2. Sometimes easy and sometimes difficult
3. Easy

How would you rate the overall value of this meeting?

1. Poor
2. Fair
3. Average
4. Good
5. Excellent

What should we do this spring to make our collaboration more valuable to you?

APPENDIX D

SUPPORT TEAM ONLINE SURVEY QUESTIONS

Demographic data

1. Please provide your email address.

Your email address will not be shared and is only being requested in case the researcher has a follow-up question for clarification. *All responses will remain confidential and data gathered will only be reported anonymously.*

2. How many years have you worked in Information Technology?

3. What is your title?

4. Please briefly describe your role/responsibilities in your IT department.

Questions

5. What have you found most valuable about our collaboration so far?

6. What could we do to make our collaboration more valuable to you?

7. Please rate your usage of the following tools [from least used (1) to most used (5)].

	1	2	3	4	5
Email	()	()	()	()	()
Wikis	()	()	()	()	()
Blogs	()	()	()	()	()
Discussion Boards/Forums	()	()	()	()	()
Electronic Mailing Lists	()	()	()	()	()
Text Chat / IM	()	()	()	()	()
Voice Chat	()	()	()	()	()
Video Chat	()	()	()	()	()
Social Networking Sites	()	()	()	()	()
Google Apps	()	()	()	()	()
Microsoft SharePoint	()	()	()	()	()

8. What are your suggestions for helping our group stay connected between meetings?

9. Have you visited the group's Google Site?

- () Yes
- () No

10. For the question above:

If you answered "Yes", what about the site worked and what could we do to make it better?

If you answered "No", please explain why and what could be done to increase your interest in visiting the site.

11. Is there anything else you would like to add?

Thank you for taking this survey. Your responses will be very helpful for this research!

APPENDIX E
SEMI-STRUCTURED INTERVIEW PROTOCOL

Overview

I would like to understand your thoughts about our collaboration efforts thus far. In particular, I would like to get a deeper understanding of the impact you think this has had or may have on your IT organization and institution. Would you be willing to help me with that? Do you mind if I record this conversation?

Questions

1. How have you or your organization participated in this collaboration?
2. Do you think the IT collaboration among our institutions has been valuable? Why or why not?
3. Has it been worth the effort you or your staff members have contributed? Why or why not?
4. Do you think we should continue? Why or why not?
5. Would you recommend this type of collaboration to your other colleagues? Why or why not?
6. Is there anything else you would like to add?

Closing

Thank you for participating and helping me understand your perceptions of our collaboration better! All responses included in reports about this research will be anonymous.

APPENDIX F

INITIAL COLLABORATION TOPIC SELECTION DATA

Table F1

Reported Staff Use of Technology Tools by Leaders

Item	Leaders			
	Min.	Max.	Mean	Std. Deviation
Email	5	5	5	0
Google Apps	2	5	3.83	1.169
Text Chat / IM	2	5	3.67	1.211
Electronic Mailing Lists	1	5	3.33	1.966
Microsoft SharePoint	1	5	3	1.414
Social Networking Sites	2	5	3	1.095
Wikis	2	4	2.5	0.837
Video Chat	1	5	2.33	1.506
Blogs	1	4	2.17	1.329
Voice Chat	1	5	2.17	1.602
Discussion Boards/Forums	1	3	1.67	0.816

^aN=6

Table F2

Reported Use of Technology Tools by Support Staff


Item	Support Staff			
	Min.	Max.	Mean	Std. Deviation
Email	5	5	5	0
Google Apps	1	5	3.67	1.414
Wikis	1	5	3.22	1.202
Microsoft SharePoint	1	4	2.89	0.928
Electronic Mailing Lists	1	5	2.67	1.658
Discussion Boards/Forums	1	5	2.67	1.323
Text Chat / IM	1	5	2.44	1.59
Blogs	1	5	2.44	1.333
Voice Chat	1	4	2.11	1.364
Video Chat	1	4	1.78	1.093
Social Networking Sites	1	3	1.56	0.726

^aN=9

APPENDIX G
DEFINITION OF TERMS

- Community of Practice (CoP): “...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 et al., 2002, p. 4)
- Domain: A shared area of interest that unites CoP members.
- Community: People pursuing their interest in a specific domain by engaging in joint activities and discussions, helping each other, and sharing information. (<http://www.ewenger.com/theory/index.htm>)
- Practice: The shared repertoire of resources: experiences, stories, tools, ways of addressing recurring problems—that CoP members develop (<http://www.ewenger.com/theory/index.htm>)
- Community Coordinator: A member of the community who takes on a leadership role to help plan, coordinate and facilitate personal interactions, meetings and other activities whose purpose is to consistently advance the general health and organization of the CoP. (Wenger et al., 2002)
- Technology (Tech) Steward: A member of a community helps it “choose, configure, and use technologies to best suit its needs” (Wenger et al., 2009, p. 24)
- Reification: A way by which a community can transform the experience of the participants into artifacts. (Wenger et al., 2009, p. 57)
- Boundary spanner: Typically, a member of the community who helps connect it to other communities, or as used here, one who connects multiple organizations in the same community

APPENDIX H
IRB APPROVAL LETTER



Office of Research Integrity and Assurance

To: Kathleen Puckett
FAB

From: Mark Roosa, Chair 
Soc Beh IRB

Date: 04/13/2010

Committee Action: Exemption Granted

IRB Action Date: 04/13/2010

IRB Protocol #: 1003005010

Study Title: Effective IT Collaboration

The above-referenced protocol is considered exempt after review by the Institutional Review Board pursuant to Federal regulations, 45 CFR Part 46.101(b)(1) (2) .

This part of the federal regulations requires that the information be recorded by investigators in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects. It is necessary that the information obtained not be such that if disclosed outside the research, it could reasonably place the subjects at risk of criminal or civil liability, or be damaging to the subjects' financial standing, employability, or reputation.

You should retain a copy of this letter for your records.