

Online Support for Intentional, Teacher *Community of Practice*

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**ABSTRACT**

The term *Community of Practice* (*CoP*) is often used rather loosely to describe many types of instructional settings that support more *constructivist* or social learning settings. This study differentiates CoP from other learning communities with greater discipline in defining CoP, as characterized by sustained self-organization for example. Such a CoP sits quite apart from the typical intent of instructional settings. The literature on intentional CoP suggests that the greatest challenges are a sense of interdependence among CoP members, the authenticity of the practice or purpose, and a trajectory for the CoP's future. The purpose of this case study was to attend to these issues with an online initiative to nurture CoP among practicing teachers in a reading-specialist, graduate program. For the course under study, learners engaged only in cooperative projects with the support of a community worksite (Sakai). Throughout the term, the worksite was promoted as a community place independent of the course and program, a place where they could continue to share indefinitely; and they were encouraged to think of what formal and informal activities the system could support, and how. The study explored how participants responded verbally and behaviorally to the community worksite and the other technologies employed to better support their group work and sharing of knowledge in general. The group's technical skills, competing cultures and practices, and the level of authenticity were all significant challenges. The study's findings challenge the application of this *learning theory* at the course level of academics, and they inform future design of online support for intentional CoP.

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## CHAPTER ONE: INTRODUCTION

### Community of Practice

Community of Practice (CoP) is a theory of learning that attends to social justice (Bruner, 1996; Hargreaves, 2003; Lave, 1996). Societies are duty bound to educate their citizens, for which identity is a central issue; Dewey (1963) refers to it as the “old question of individual freedom and social control” (p. 52). The U.S. is founded on basic principles of protecting individual liberties (or identities). At the same time, education as an enculturation of social identity is important for ensuring that citizens share the same basic abilities or tools, for a degree of equal opportunity with the practice of being a U.S. citizen. Though described as contradictory at times, these issues are mutually accountable. Recognizing and validating individual identities, based on diverse cultures and histories, allows for greater participant engagement in the enculturation process, while successful enculturation increases an individual’s identity as a viable citizen with the ability to direct his or her future in a specific culture. According to Dewey, in order to negotiate this fundamental paradox of complementary and contradicting social and individual identities, education should be centered on learners’ experiences and needs, the continuity of learners’ current situations. This notion is at the heart of CoP.

There are certainly exceptions, but U.S. educational systems have generally had difficulty handling the duality of social and individual identities. Racial, ethnic, geographic, and economic divides and disparities between groups’ academic success in the U.S. are testament (Bruner, 1996; Hargreaves, 2003; Lave, 1996). Hargreaves claims the standards movement in education today exemplifies a transmission model of learning that contributes to these disparities. Lave observes the “imperative to explore ways of understanding learning that do not naturalize and underwrite division of social inequality in our society” (p. 149): “Theories that reduce learning to individual mental capacity/activity [cognitive theory]… blame marginalized people for being marginalized”

(p. 149). Lave holds that learning is a social collective, rather than individual, psychological phenomenon.

According to Lave (1996), CoP theory breaks down “distinctions between learning and doing, between social identity and knowledge” (p. 153). CoP theory is based on Lave and Wenger’s (1991) observations and analysis of apprenticeship cultures and their learning processes. According to Wenger (1998), “learning - whatever form it takes – changes who we are by changing our ability to participate, to belong, to negotiate meaning. And this ability is configured socially with respect to practices, communities, and economies of meaning where it shapes our identities” (p. 226). In Wenger’s CoP framework, social identity is negotiation of community competency, or *convergence*, and individual identity is the negotiation of experience, or *divergence*. A CoP is a *container* of competence which grows “out of a convergent interplay of competence and experience that involves *mutual engagement* [among members]” (Wenger, 2003, p. 80). CoP theory assumes that learning is fundamentally social. According to Trentin (2001), real knowledge is integrated in the doing, the social relations, and the knowledge and expertise of the community and its members; knowledge is inseparable from practice. Trentin argues that learning is directly tied to CoP membership, and relations to the CoP; the potential for learning lies in empowering members with the ability to contribute to the CoP. Lave (1996) has concluded that “the ‘informal’ practices through which learning occurs in apprenticeship are so powerful and robust that this raises questions about the efficacy of standard ‘formal’ education practices in schools” (p. 150).

An illustration of the individual and social identity paradox is the important CoP issue of *ownership* of knowledge. When Etienne Wenger (1998) asked his colleague, Jean Lave, when she coined the term *community of practice*, she replied that she thought Wenger had. Wenger uses this anecdote at the start of his book to explain how communities give birth to knowledge and how “Dissecting a creation in order to assign individual credit can easily become counterproductive” (p.

xiii). The story calls attention to how knowledge is often treated as proprietary, hierarchical, concrete, discrete, and fixed in time and space. The notions of situated learning and community of practice are opposed to this epistemology. Rather, CoP theory considers knowledge to be public, with a social accountability; it is fluid and negotiable, in recognition of both individual and social identities as well as situational differences. However, as the literature review reveals, social accountability is arguably the greatest challenge for intentional CoP.

### **Teacher Preparation**

Some teacher educators have remarked in response to my research that the CoP approach encourages preservice teachers to “steal” work from their peers. This traditional academic perspective is diametrically opposed to CoP theory, which supports more open expectations of teacher preparation and practice, which should serve the common good, the shared, collective purpose of educating our youth, equally. It is a social justice. Teachers using others’ work to serve this cause is a just practice. Indeed, teacher learning community is a main proposition of the National Board for Professional Teaching Standards (*Five Core Propositions*). Yet researchers (Riel & Becker, 2000; Schlager & Fusco, 2004) have found that teaching is actually a private practice. This was confirmed by a pilot study (Powell & Evans, 2006) of a preservice teacher cohort, which demonstrated a number of impediments to CoP, suggesting that the privatization of teacher practice may start with teacher preparation.

Teachers “cannot work and learn entirely alone or in separate training courses after school” (Hargreaves, 2003, p. 25). Rather, “It is vital that teachers engage in action, inquiry, and problem solving together in collegial teams or professional learning communities” (p. 25). Hargreaves continues: “Sharing ideas and expertise, providing moral support when dealing with new and difficult challenges, discussing complex individual cases together—this is the essence of strong collegiality and the basis of effective professional communities” (p. 109). According to Hawkes and

Romiszowski (2001), “Newer visions of professional development emphasize critical reflection on teaching practice through collaboration and collegial dialogue” (p. 290). Research demonstrates that with these strategies, “teachers are better able to make and sustain improved instructional practices with greater consistency” (p. 290). John Bray (2002) found that collaborative inquiry in teacher CoP resulted in:

- Invigoration of individual teachers for renewed efforts at self-improvement
- Creation of a network of teacher interaction where isolation previously existed
- Change in teachers’ classroom behavior
- Both structural and cultural change in the school itself

Darling-Hammond (1996) found that teachers who have “access to teacher networks, enriched professional roles, and collegial work feel more efficacious in gaining the knowledge they need to meet the needs of their students and more positive about staying in the profession.” She claims “Policymakers increasingly realize that regulations cannot transform schools” (p. 4). Teachers, rather, are “the key agent of change” (Hargreaves, 2003, p. 160). However, Darling-Hammond stresses that teachers are under prepared; “districts spend less than one half of 1 percent of their resources on staff development” (1996, p. 5). Schrum (1999) found that traditional staff development approaches rarely make a difference. According to Schlager and Fusco (2004), traditional forms of teacher training actually “pull professionals away from their practice, focusing on information about a practice rather than on how to put that knowledge into practice” (p. 120). These forms of teacher training are criticized for being far removed from the complexity of teachers’ realities, the contexts of their work.

There is clearly an imperative for new teacher preparation and professional development strategies and for teachers to take more control of them through CoP (Stuckey, Hedberg, & Lockyer, 2001). Two action strategies recommended by the U.S. Department of Education in the *Before It’s Too Late* report (2000) are particularly relevant:

1. Building-level and district-level Inquiry Groups can provide venues for teachers to engage in common study to enrich their subject knowledge and teaching skills
2. A dedicated Internet Portal must be available to teachers so they can make use of and contribute to an ever-expanding knowledge base (p. 8)

Darling-Hammond (1996) calls for greater contact with best practices, knowledge artifact, and knowledgeable colleagues. Researchers acknowledge the current favor of learning theory that is more social and situative, such as CoP (Barab & Duffy, 2000; Koschmann, 1996). Though greater involvement among teachers in knowledge creation and transformation is desired, researchers (Moore & Barab, 2002; Schlager & Fusco, 2004) acknowledge that the current climate of teacher practice in the U.S. works against such a culture. It is indeed a dramatic identity shift from student to teacher, particularly if teachers are prepared in the traditional academic atmosphere, where knowledge is competitively *hoarded*, and then expect them to enter the profession with open arms. Likewise, for an academic CoP, it is a dramatic identity shift for a professor to accept a learner's role: "Instructors are encouraged to step down from their stages (pedestals), and to act as coaches and co-participants who can display ignorance as well as knowledge. Social relationships may be multivalent, as when students are supposed to collaborate, but are also graded individually, and thus competitively" (Kling & Courtright, 2004, p. 101).

### **Purpose of Study and Research Questions**

This study started with the general question of how to improve instructional design and technology for teacher education programs. It was determined that CoP theory informs methodology that addresses several problems in the field of teacher education. The literature review on intentional CoP that follows found two predominant themes. One, establishing the necessary *interdependence* for a CoP to thrive can be quite challenging, and the best approach appears to be for CoP members to publish their knowledge and ensure accessibility to this knowledge. Two, members need *authentic* reasons to both publish and access this knowledge, some margin of control

and ownership in the purpose, process, and product of the CoP. As Wenger (1998) points out, people in the *real world* do not set out to have communities of practice; rather, according to Jonassen (2005), they are driven by solving authentic problems.

The purpose of this study is to introduce community support technologies in support of a teacher cohort, a budding CoP, and explore what activities emerge for use of the technology in cooperatively solving problems associated with a course project - the design and development of a literacy support website. Further, the study is intended to investigate how these activities/technologies affect individual CoP participation and contribution, and the nature of the CoP overall. The study utilizes a mixed-methods, case study approach to address the following research questions:

### **The Activities**

1. What activities emerge for the use of technology?
2. How do they come about?
3. Which are more supportive of CoP? The least? Why?

### **The Participants**

4. What changes occur with individual's perceptions of their community participation?
5. What changes occur in observed individual community oriented behaviors?

### **The CoP**

6. How do online activities contribute to overall changes in community practice?
7. What concerns do participants have about the future of their CoP? Why?

The next chapter provides a review of research on community of practice. A good bit of space is devoted to defining CoP, as it is often a loosely used term. There is a significant difference between a CoP and general learning community. This study is concerned with intentional CoP, as opposed to the more natural CoP that develops in the *wild*. Intention implies design; hence, the emphasis in the literature review is on how interventions have designed and developed strategies for building and supporting CoP, and the problems this entails. Chapter Three discusses the

methodology of this study, predominantly a qualitative exploration of a particular case. It describes in detail the participants of the study and the technology employed. Principles of validity and reliability are given considerable attention. Chapter Four outlines the results of the study, organized by the three main CoP elements and data from each data type that supports each CoP element. Chapter Five discusses the results in relation to the research questions and each of the three main elements of CoP and concludes with consideration of the ramifications of the study and future research.

## CHAPTER TWO: LITERATURE REVIEW

The purpose of this literature inquiry and the study is twofold: one, to advance CoP theory; two, to advance instructional design in support of CoP. Researchers on school learning and instructional design and technology (IDT) continue to rely more on socio-cultural, situated learning theories, in a move away from strictly cognitive and psychological learning theories (Palloff & Pratt, 1999; Scardamalia & Bereiter, 1996; Wasko & Faraj, 2000). Situated learning theories are still in development, and there is a diverse collection of opinions and understandings of their processes (Driscoll, 2000). One framework that holds considerable promise is that of communities of practice, or CoP (Lave & Wenger, 1991; Wenger, 1998, 2003; Wenger, McDermott, & Snyder, 2002). CoP theory offers valuable clues for structuring learning environments to better support social and authentic learning processes (Wenger, 1998).

Competition among schools and school systems continues to intensify (Breuleux, Laferriere, & Bracewell, 1998; Jonassen, Peck, & Wilson, 1999): “The hidden curriculum has been to prepare obedient, conformist, and competitive individuals” (Breuleux, et al., , p. 1171) via the traditional, transmission paradigm of learning, tightly bound by fixed standards (Engestrom, Engestrom, & Suntio, 2002; Hargreaves, 2003). Yet, according to Jonassen et al. (1999), human learning involves community and true-life experiences lacking in the classroom:

In the real world, when people need to learn something, they usually do not remove themselves from their normal situations and force themselves into sterile rooms to listen to lectures on formal principles about what they are doing. Rather, they tend to form work groups (practice communities), assign roles, teach and support each other, and develop identities that are defined by the roles they play in support of the group.... In other words, learning results naturally from becoming a participating member of a community of practice. (p. 177)

Community of practice is a “set of relations among persons, activity, and the world” (Lave & Wenger, 1991, p. 98) “created over time by the sustained pursuit of a shared enterprise” (Wenger, 1998, p. 45). Instructional design and technology (IDT) is “best practices in the creation, use, and management of technologies for effective teaching and learning in a wide range of settings,” including activities and other processes of learning and instruction (AECT). According to its traditions in behavioral psychology, instructional designers are primarily interested in *individual* learners’ behaviors based on constructions of functional relationships and the discrimination and generality processes of these relationships (Burton, Moore, & Magliaro, 1996). However, it is communication that an individual has within the social-cultural environment, CoP, that allows negotiation of these relationships (Lave, 1996; Vygotsky, 1978).

Traditional approaches of IDT are in many ways incompatible with CoP (Goodyear, 2000; Koschmann, 1996). Yet, there has been a paradigm shift in IDT, away from the behaviorist and psychological toward more social and cultural perspectives, from the transmission model of computer assisted instruction to Computer Supported Collaborative Learning (CSCL): situated activity and communal practice; a cooperative pursuit of knowledge rather than competitive; the instructor’s role transitions from authority and chief source of information to facilitator and resource guide (Koschmann). Goodyear argues for a holistic perspective of lifelong learning for education, a shift from the creation of “tasks-in-objects” to “environments-for-activities”, in support of “real-world” learning, not idealized teacher-directed learning activities (p.3). He argues against many of the “core ideas, theories and methods in the field of instructional technology..., which were heavily shaped by assumptions of a compliant learner” (p. 6). Dede (1999) stresses the need for a reconceptualization of “information technology in knowledge mobilization” with a shift from the transfer and assimilation of information to the creation, sharing, and mastery of knowledge, through the process of knowledge networking in communities of practice.

This literature review starts with examining the theoretical underpinnings of CoP and why it is important in education. The treatment of CoP in the literature is quite inconsistent, so this review attempts to define CoP more concretely. The second section of this chapter discusses design for CoP based on empirical findings. The assumed target audience for applications of CoP theory is students in higher education, particularly advanced undergraduates, graduate students, and distance education students, students who are more likely to be cognitively and epistemologically ready for CoP precepts (Ravert & Evans, 2003). More specifically, as indicated in the introduction, CoP applications for supporting teacher education and professional development are of great interest, hence the preponderance of research and literature dealing with this audience.

### **What is Community of Practice?**

Wenger (1998) explains that “We all belong to communities of practice. At home, at work, at school, in our hobbies... communities of practice are everywhere” (p. 6), and they change over time. Lave (1996; Lave & Wenger, 1991) holds that communities of practice are very context dependent and not unequivocally definable. However, the terms community or CoP should not be used as catch phrases for any instructional intervention, in which case they lose their meaning (Barab, Kling, & Gray, 2004). CoP “is not just another term used to convey a sense of professional kinship or shared interest” (Schlager & Fusco, 2004, p. 22). Wenger (1998) defines CoP as a mid-level category of analysis, not specific to one event, or so broad as a city or corporation (see Wenger’s list of CoP indicators, Appendix A). Riel and Polin (2004) stress the shared purpose of CoP, which they characterize as having “a shift in power relationships, a respect for practitioner knowledge, and an emphasis on group learning through intentional activity, collective reflection, and participatory decision-making” (Riel & Polin, 2004, p. 16). Other researchers reinforce certain characteristics of CoP: they are self-organizing (Trentin, 2001), they are sustained and interdependent (Barab, MaKinster, & Scheckler, 2004, p. 55), they share experiences, practices, and

values (Trentin, 2001; Pawlowski, Robey, & Raven, 2000; Wang, Sierra, & Folger, 2003). A synthesis of CoP definitions: *A CoP is a self-organized, interdependent, sustained, social network that shares authentic purpose, knowledge, resources, and activity.*

Learning is social and cannot be reduced from situated practice (Lave, 1996; Lave & Wenger, 1991). Stein (1998) claims situated learning is “to place thought and action in a specific place and time” (p. 1), in everyday actions and social processes. Stein holds that learning occurs less in response to instructor presentation of content and more in response to the experience of that content. This content is mediated and transformed by numerous factors, which are “defined relative to actional contexts, not to self contained structures” (Hanks, 1991, p. 15). Hanks claims learning is situated in “social coparticipation”; cognitive processes and conceptual structures are less important than the social engagements of the learning situation: “learning is a way of being in the social world, not a way of coming to know about it” (p. 24). Brown, Collins, and Duguid (1989) call learning a process of enculturation: “Situations might be said to co-produce knowledge through activity” (p. 32).

Lave and Wenger (1991) argue that with learning viewed as situated activity, the “central defining characteristic” is the process of “legitimate peripheral participation” (LPP) (p. 29): learning occurs through participation in “communities of practitioners,” and “the mastery of knowledge and skill requires newcomers to move toward full participation in the sociocultural practices of a community” (p.29). The researchers came to the conclusion by a close examination of actual apprenticeship cultures: Yucatec midwives, Vai and Gola tailors in Liberia, naval quartermasters, and meat cutters. The terms of LPP are connected. By *peripheral*, Lave and Wenger mean the modes of access to fuller participation, a swimmer dipping his toe in the water for example. *Legitimate* describes the nature of this involvement and belonging, the authenticity and “relations of power” (p. 36), not someone pushing the swimmer in or locking him out of the pool: “Hegemony

over resources for learning and alienation from full participation are inherent in the shaping of the legitimacy and peripherality of participation in its historical relations” (p. 42). Lave and Wenger emphasize that LPP is not a pedagogical strategy; rather, it is an analytical viewpoint.

LPP occurs no matter the context for learning, “or whether there is any intentional educational form at all” (Lave & Wenger, 1991, p. 40). “Learning can take place where there is teaching,” but LPP “does not take intentional instruction to be the source or cause of learning” (p. 41). It makes problematic the relationship between what is learned and what is taught. In some respects, intentional CoP is about designing for serendipitous learning. Lave (1996) boldly claims “there is no kind of learning that can be distinguished theoretically by its ‘de-contextualization,’ as rhetoric pertaining to schooling and school practices so often insists” (p.155). She says teaching should be a “cross-context, facilitative effort to make high quality educational resources truly available for communities of learners” (p. 158). With CoP, learning and learner needs take center stage over teaching or instruction. CoP members and the context in which they are engaged mutually constitute each other, constructing “identities in practice in a social ontological, historically situated, perspective on learning” (p. 157). Lave claims “Knowing is a relation among communities of practice, participation in practice, and the generation of identities as part of becoming part of ongoing practice” (p. 157).

#### *Theoretical Backdrop -Vygotsky*

A number of researchers cite the influence of Vygotsky and Cultural Historical Activity Theory on situated learning theory and CoP (Driscoll, 2000; Hung & Nichani, 2002; John-Steiner & Mahn, 1996; Lave & Wenger, 1991). Vygotsky challenged the notion that mental development must precede learning, suggesting that what people “can do with the assistance of others might be in some sense even more indicative of their mental development than what they can do alone”

(Vygotsky, 1978, p. 85). Vygotsky termed this notion the *Zone of Proximal Development* (ZPD): “the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers” (Vygotsky, 1978, p. 86). ‘Good learning’ then “is that which is in advance of development” (p. 89); it “presupposes a specific social nature” (p. 88). Vygotsky demonstrates ZPD and the process of internalization by citing Piaget’s observation of how language initially arises as a means of communication with people to check and confirm thoughts, before they are actually organized as internal mental functions. An essential feature of learning, according to Vygotsky, is that it “awakens a variety of internal processes” that operate only through “interacting with people” and “cooperation with peers” (p. 90).

Vygotsky’s (1978) theory suggests that learning requires authentic social and cultural contexts, authentic work and activities. Learning is mediated through signs, or a common language of shared meanings and understandings which are internalized through a scaffolding process of interaction. Vygotsky observed that learners’ needs are often disregarded. For example, he claimed the teaching of writing is based on “artificial training.” It is taught as a mechanical discipline, ignoring the “particular system of symbols and signs whose mastery heralds a critical turning point in the entire cultural development of the child” (p. 106). Vygotsky stresses that writing should be meaningful; it should meet “an intrinsic need” and should be “incorporated into a task that is necessary and relevant for life” (p. 118).

Hung and Nichani (2002) reinforce Vygotsky’s propositions of the ZPD and genetic law of development, where social interaction, mediated by language, genetically underlies all higher forms of human behavior. They argue research should attend to the “dialectical relationship” between learner and social environment. Hung (2001) stresses that learning is bound to historical contexts where the evolution of learning and knowledge is often implicit and socially distributed. Hung

presents seven principles of Vygotskian thought that are quite relevant to CoP (Appendix B). John-Steiner and Mahn (1996) reinforce Vygotskian themes, stressing that mediation is the key to “how human mental functioning is tied to cultural, institutional, and historical settings.” (p.4). The authors stress the semiotic and cognitive pluralism in learning, between social and individual processes; they conclude that “learning is distributed, interactive, contextual and the result of the learners’ participation in a community of practice” (p. 18).

#### *Individual or Social Knowledge - Interdependence*

A central differentiation among learning theories in general, and of LPP in CoP in particular, is the relationship of the individual to the social (Lave & Wenger, 1991). Lave and Wenger discuss common interpretations of Vygotsky’s influential concept of ZPD, where there is a small circle of socialness that provides for the “individualistic acquisition of the cultural given” (p. 48). These interpretations are associated with common criticisms of LPP and apprenticeship, the “connotations of parochialism, particularity, and the limitations of a given time and task” (Lave & Wenger, 1991, p. 33), that apprenticeship is often assumed to merely reproduce existing practices, rather than support knowledge development (see Kuutti & Arvonen, 1992; Paavola, Lipponen, & Hakkarainen, 2004; Pea, 1996). Lave and Wenger argue, however, that general knowledge is “gained” and “has power only in specific circumstances” (p. 33); Lave (1996) argues that apprentices learn many complex lessons, both local and global.

Lave and Wenger (1991) take a more ‘collectivist’ perspective on ZPD, indicating socio-cultural practice transformation, emphasizing the “interdependency of agent and world, activity, meaning, cognition, learning, and knowing” (p. 50). Meaning is socially negotiated among people and activity: “objective forms and systems of activity, on the one hand, and agents’ subjective and intersubjective understandings of them, on the other, mutually constitute both the world and its experienced forms” (p. 51). The researchers acknowledge that centering analysis of learning on

social practice and participation “seems to eclipse the person. In reality, however, participation in social practice – subjective as well as objective – suggests a very explicit focus on the person, but as person-in-the-world, as member of a sociocultural community” (p. 52). Sustained learning embodies the relations of individual identities to structural characteristics of CoP, which raises questions about:

Organization of space into places of activity and the circulation of knowledgeable skill; about the structure of access of learners, to ongoing activity and the transparency of technology, social relations, and forms of activity; about the segmentation, distribution, and coordination of participation and the legitimacy of partial, increasing, changing participation within a community; about its characteristic conflicts, interests, common meanings, and intersecting interpretations and the motivation of all participants vis a vis their changing participation and identities. (p. 56)

#### *Wenger's Framework*

According to Wenger (1998), “Practice is, first and foremost, a process by which we can experience the world and our engagement with it as meaningful” (p. 51). People process meaning with the negotiation of the duality of *participation* and *reification* (see Appendix C). Wenger (2003) speaks to the necessity of *convergence* on core practices, “competencies to anchor the process” (p. 84); there needs to be a certain degree of alignment among CoP members through *reification*. Yet he also stresses the need for “active boundary processes” where *divergence* through *participation* or *experience* contributes to innovation: “Shared practice by its very nature creates boundaries” (p. 84). It is the overcoming of these boundaries when learning occurs: “Deep expertise depends on a convergence between experience and competence, but innovative learning requires their divergence” (p. 85). For clarity, the following table provides some guidance on these terms and processes, with interpretive headings:

<u>Shared knowledge</u>		<u>New knowledge</u>
convergence	↔	divergence
reification	↔	participation
competencies	↔	experience

Wenger outlines three important characteristics of these boundary processes:

- Coordination- Are connections supported through necessary intersections?
- Transparency- Are meanings accessible?
- Negotiability- Are meanings flexible or a strict reflection of power? (p. 86)

He observes that bridges between boundaries can be supported by paying attention to the community brokers or leaders, those more involved in introducing elements of different practices.

Also important are shared boundary objects, such as common artifacts and processes (see Appendix C). Always primary in designing for these bridges is the up-front consideration of closedness and openness of the system, structure vs. negotiability, as further outlined in the Designing for CoP section below.

Wenger (1998) associates community with practice because “It yields a more tractable characterization” of practice, over terms such as culture or activity. Wenger outlines three interdependent dimensions of the relationship between community and practice (Appendix D):

- Joint enterprise - members are bound together by their collectively developed understanding of their community’s purpose, to which they hold each other accountable
- Mutual Engagement – or Mutuality - members build their community through mutual engagement. They interact with one another, establishing norms and relationships of mutuality that reflect these interactions.
- Repertoire - communities of practice produce a shared repertoire of communal resources- language, routines, sensibilities, artifact, tools, stories, and styles. (p. 73)

Other theorists use different terms, but they define the same basic CoP elements of Wenger's framework (see Preece, 2001; Stein, 1998; Stuckey, et al., 2001). The emphasis Wenger (1998) and these others put on the interdependence of these elements cannot be overstated. For example, differentiating between member participation as *joint enterprise* or as *mutual engagement* can be quite troublesome; accountability appears to be a significant issue in both dimensions. From an analytical perspective, Rogers (2000) finds that the interdependence of the dimensions does cause "fuzziness."

The formation of CoP is "the negotiation of identities" (Wenger, 1998, p. 149). Wenger claims that identity is key to knowing, the key to negotiating participation and reification. Identity is a way of being part of a whole through mutual engagement. A healthy social identity has these crucial qualities: "local connectedness, global expansiveness, and social effectiveness" (Wenger, 2003, p. 93). These are negotiated through three modes of belonging: engagement, imagination, and alignment (Wenger, 1998, see Appendix D). Wenger (2003) stresses the importance of a "home base" as a place where local members can connect comfortably, informally; it serves as a CoP foundation. He claims that subgroups may be necessary in a larger CoP, to enhance connectedness and effectiveness. He also stresses the importance of trajectories, or awareness of CoP history and imagination for its future; the CoP must be open to others' ideas, in and outside the CoP, and open to various levels of membership and participation. A lack of trajectory of global expansiveness, however, is one significant limitation of many of the studies presented here.

### *Levels of Analysis*

CoP theory does receive a diverse collection of interpretations and applications (Driscoll, 2000). The research uses the terms *CoP* and *learning community* quite loosely, in many respects interchangeably. A primary level of analysis on which researchers (Henri & Pudelko, 2003; Lave, 1996; Wenger, 1998; Wenger, et al., 2002) agree is that a CoP must have continuity. Henri and

Pudelko (2003) explain “The learners’ community is not perennial because its members are not engaged in a durable way” (481). It exists at the whim of education programs, lacking “continuous character of the activity which characterizes the community of practice” (p. 481) (see Appendix E for Henri & Pudelko’s framework of learning communities and CoP). Yet this simple principle is overlooked by researchers who attempt CoP interventions within time delimited courses or institutional settings, without any trajectory for further participation or production of and access to artifact beyond this limitation.

A second level of analysis is spatial, the size of the community and where it exists. Hodkinson and Hodkinson (2004) claim CoP can be examined based on larger organizational structures and purposes, or more localized patterns of social interaction. Schlager and Fusco (2004) appear to take the more global or systems perspective that communities of practice self-evolve beyond formal organizational structures, spanning multiple organizations. Both Lave (1996) and Wenger (1998) frame CoP as more local. For the more global view, Wenger describes constellations, or groups of communities of practice (see Appendix A for his indicators). For example, a school could be considered a constellation of individual, departmental CoPs (Hodkinson & Hodkinson). Computer network technologies and online environments may complicate the spatial level of analysis. They certainly allow for a more dispersed CoP. Though mediated by network technologies, the essential CoP elements remain the same. The technology employed is part of the CoP’s repertoire (Wenger, 1998). Technology offers a powerful means of “perennialising practices judged desirable, to integrate new members and to maintain the common know-how essential to efficient professional practice” (Henri & Pudelko, 2003, p. 483).

The level of analysis that appears most important is the nature of the practice, the purpose and activity of the CoP. Riel and Polin (2004) categorize three distinct (local), but overlapping forms of learning with community, based mainly on purpose: task-based, practice-based (CoP), and

knowledge-based. Their task based learning community and knowledge-building learning communities align with Henri and Pudelko's (2003) goal oriented community of interest and learners' community respectively (Appendix E). Riel and Polin's (2004) learning communities intersect to make up a Learning Organization, which aligns with Wenger's (1998) constellations. Though not considered a CoP, an academic course still shares CoP elements as a component of the departmental CoP. For example, course processes and product could be made continuously accessible for the benefit of the departmental CoP, meeting Wenger's (1998) requirement of "global expansiveness." Indeed, according to Henri and Pudelko (2003), reification in learners' communities is more significant than traditional education settings because work is published to a larger audience.

Finally, Barab and Duffy (2000) argue that there are two dominant approaches of situated learning theory, practice fields and practice communities (CoP). Practice fields exist in schools or instructional settings (Henri and Pudelko's (2003) learners' communities) where learning and grades are the predominant practice, not participation as a "contributing member of the community who uses and values the content being taught" (p. 34). According to Barab and Duffy, most CoP efforts in education do not adhere to 3 main requisites: 1) common cultural and historical heritage, 2) interdependent system, and 3) a reproduction cycle. They are short lived, culture is not authentic or doesn't have time to develop, and, in tune with Wenger (1998), members and their product do not have trajectories that stretch beyond their immediate structures. What Barab and Duffy question is authenticity of purpose, which has implications "both in terms of how individuals come to participate and assign meaning to the activity, as well as in terms of the identities that emerge" (p. 49). In other words, "someone external cannot simply impose a pre-designed community onto a group, but rather community is something that must evolve from within a group around their particular needs and for purposes that they value as meaningful" (Barab, Kling, et al., 2004, p. 5).

### *Summary*

The rather lengthy treatment of theory in the foregoing is warranted, as many of the studies discussed in the following design section are generally thrifty on CoP theory, which may explain why many of the interventions in these studies do seem to treat the term CoP as a catch phrase for professional kinship or shared interest (Barab, Kling, et al., 2004; Schlager & Fusco, 2004). Few seem to capitalize on lessons learned in previous CoP studies, let alone the actual principles of CoP theory, those established by Wenger (1998) for example. Few studies attend to elements such as boundary or identity at all; some indirectly examine Wenger's three main elements of joint enterprise, mutuality, and repertoire, typically with different terms such as *purpose*, *community*, and *artifact*, respectively. Nonetheless, though researchers rarely make the connections, many of their results resonate with all of the CoP principles presented here.

A CoP is sustained over time, and the size and placement of a CoP vary greatly depending on context and technology support. A shared and social purpose, *joint enterprise*, is a crucial ingredient of CoP, where members are truly engaged in authentic activity. *Joint enterprise* can have a great deal of impact on the spatial and temporal alignments of CoP. A narrower purpose is characterized by task-based or goal oriented learning communities (Henri & Pudelko, 2003; Riel & Polin, 2004; Trentin, 2001), though these may certainly contribute to CoP. Most instructional interventions *have* a joint enterprise; to contribute to CoP or be considered CoP, however, they need a trajectory of global expensiveness, a focus on the *shared* and *social* descriptors of purpose as contribution to something bigger than individual or course limited perspectives. A greater degree of *mutuality* is a major discriminator of CoP from other forms of learning community. As Scardamalia (Fishman, et al., 1997) puts it, "A hallmark of student engagement in educational networks [CoP] is the production of knowledge of value to others, not simply demonstrations of personal

achievement” (p. 16). See Appendix F for an illustration of how the levels of CoP and Wenger’s (1998) dimensions fit together.

Barab et al. (Barab, MaKinster, et al., 2004) point to the common, “intentional” CoP linked to a course or other instructional intervention, not sustained beyond an academic term, not focused on authentic, “real-world” practice, and not characterized by interdependence (Barab & Duffy, 2000; Riel & Polin, 2004; Wenger, 1998). Design for CoP, the subject of this inquiry, obviously implies some intention. Indeed the purpose here is to examine how intentional learning communities (Henri & Pudelko, 2003) can be better supported in their contribution to CoP, or even in transition to the more sustained and cooperative CoP, for which establishing mutuality seems the greatest hurdle.

In the literature, sometimes the terms *learning community* or *learners’ community* are intended to fit Henri and Pudelko’s (2003) definition of the term. Other times the term is shorthand for a true CoP, as defined above, whose purpose is learning. Often, the term CoP is used inappropriately in the research, when what is really being addressed is learners’ community. In some cases researchers use entirely different terms, such as inquiry based learning or knowledge management, nonetheless in line with CoP theory. Regardless of the terms used by the researchers’, Henri and Pudelko’s terms will be used (Appendix E), based on the research descriptions of the communities.

### **Designing for CoP**

The purpose of this section is to explore design frameworks for CoP. First is a discussion of general design issues, then a selection of empirical research is reviewed. According to the literature, *mutual engagement* encompasses the predominant problems that appear to be associated with intentional CoP, so this section has greater focus on this CoP element.

## *Design Dualities*

Instruction creates a context for learning to occur, claims Wenger (1998); it does not cause learning: “What matters is the interaction of the planned and the emergent – that is, the ability of teaching and learning to interact so as to become structuring resources for each other” (p. 266). Wenger defines design as “a systematic, planned, and reflexive colonization of time and space in the service of an undertaking” (p. 228). However, CoP is about “learning as a living experience of negotiating meaning - not about form” (p. 229). Design is often distant from students’ motivations and intentions, their lives outside school: “The more we move toward the design of learning environments,” claims Engestrom et al.(2002) “the more completely the students’ lives disappear”(p. 224). It is this incongruence that seems to be at the heart of the problems associated with intentional CoP, and the focus of this investigation. Wenger (1998) claims we can not design CoP, we can only design *for* CoP.

Design is a “boundary object that functions as a communication artifact around which communities of practice can negotiate their contribution, their position, and their alignment” (Wenger, 1998, p. 232). There are four problematic dualities:

- Meaning - participation/reification
- Time - designed/emergent
- Space - local/global
- Power – identification/negotiability

These dimensions define a ‘space’ to approach design problems. “Decoupling “locality and globality from issues of authority,” for example, “can suggest new solutions by which connections between localities can bypass hierarchical channels” (p. 236), thus facilitating access.

In their case study of the Inquiry Learning Forum (ILF), an online CoP for teachers, Barab et al. (Barab, MaKinster, et al., 2004) exemplify Wenger’s (1998) design dualities. Regarding participation/reification, Barab et al. (2004) draw parallels to the constructivist dilemma of

producing knowledge artifact and keeping the artifact from stifling transformative knowledge (Brown, et al., 1989; Kuutti & Arvonen, 1992). For example, Barab et al. (2004) cite the reluctance of teachers in the ILF to engage in critical discussion on teacher artifact online, but face-to-face dialogue is typically more open to critical reflection. Regarding the local/global duality, “The challenge is to find a means of sharing these local particulars in ways that can have global significance. Conversely, an additional challenge is to communicate a global reform agenda in a manner that will have a local relevance and value” (p. 70). Regarding the designed/emergent, Barab et al. describe incongruence between university education reformers designing for prolonged engagement and the more immediate “needs of teachers who frequently simply want a place to acquire lesson ideas” (p. 65). Regarding identification/negotiability, Barab et al. note how the ILF participant profiles (*identity*) limit the ILF’s ability to get teachers to critique other teachers, negotiability, because they lack anonymity. Their solution of small, more intimate groups, Inquiry Circles, raises concerns of fragmentation, as they may become the only focus of certain members.

Schwen and Hara (2004) reviewed several case studies of failures in forming CoP and offer several cautions that echo Wenger’s (1998) dualities. They and others (John-Steiner & Mahn, 1996) reinforce Lave and Wenger’s (1991) caution that because the contexts of practice and content can differ so much from one setting to another, generic design strategies are likely insufficient. Schwen and Hara (2004) warn against the treatment of knowledge as fixed, the “arrogance of intentionality that subverts the social foundation” (p. 165). They stress the importance of iterative strategies such as social technical design, rapid prototyping, or user-centered design: “The issue of intention is central to goal setting and evaluation. Participatory decision-making is the only ethical stance possible in this social theory context” (p. 169). Unfortunately, the principle of including learners in the design process, let alone evaluation, is often overlooked in the research. In the design of

learning environments for CoP, Goodyear (2000) proposes reflexivity, allowing that “our tasks-as-set will be modified, rather than pretending that tasks and activities are mirror images” (p. 6).

Schwen and Hara’s (2004) comments point to a similarity between all of Wenger’s (1998) design dualities, that of flexibility for negotiability. It is power relations that determine legitimacy of activity and participation, negotiability in community and practice (Lave & Wenger, 1991). A closer look at real communities shows a clear tension between “formal lines of authority and official views of job roles and workflow, on the one hand, and the actual flow of work activity and information, on the other” (Carroll, 2001, p. 309). This is a common theme in knowledge management literature, the notions of explicit and tacit knowledge, where the more important tacit knowledge is typically subverted in formal, organizational channels (Hargreaves, 2003; Kimble, Hildreth, & Wright, 2001; Sachs, 1995). Yet in civic affairs, including education, Carroll (2001) suggests that the actual work of tacit knowledge predominates and is much more complex. Schools only focus on visible parts of knowledge, formal and demonstrable skills; informal or tacit knowledge, often most required, is ignored (Hung, 2001; Scardamalia & Bereiter, 1996).

Other researchers (Bannon & Kuutti, 1996; Suchman, 1983) support this assessment, that design should stem from actual practice and somehow capture the more tacit processes of teaching and learning. Carroll (2001) explains how this is done through participatory design, where the community is the incubator of methods and techniques. Bannon and Kuutti (1996) underline the need for social negotiation, the story-telling and serendipitous talk, and the contextual and fluid nature of community knowledge (see also Bruner, 1996). In other words, designers of learning management systems must examine and support practical action (Suchman, 1983).

In her studies on creating intentional CoP, Liberman (1996) finds that in contrast to traditional organizations, communities of practice have the flexibility to organize activities first, then develop the structures to support those activities. Flexibility encourages growth of new forms

of social activities, a move from prescription and compliance to problem posing, sharing, and solving; flexibility allows for discussions on action and consequence and encourages continuous inquiry. Liberman finds that successful CoPs organize work so that members can be active participants and help shape the agenda. There is a need for leaders/facilitators to broker links between members, but these leaders look for opportunities to create more leaders. Communities of practice have in common the ways in which they bring people together and organize their work: agendas are challenging rather than prescriptive, work is more collaborative than individualistic, and leadership more facilitative than directive (Lieberman, 1996).

Palloff and Pratt (1999) stress the key to successful CoP is trust and security, that participants feel safe in participating, a recurrent theme in the literature. With online support, community is now based less on place and more on shared needs and interests (see also Rheingold, 1998). Therefore, Palloff and Pratt (1999) argue for the “conscious community” (p. 23) that directly negotiates goals and processes, norms and activities. This point is reinforced throughout the theoretical literature and stressed here because it is hardly acknowledged in the empirical research, which lacks description of negotiated goals, processes, and product. In many cases, the purpose does remain lost (Scardamalia & Bereiter, 1996). Palloff and Pratt’s (1999) model requires close attention to learner needs and allowing the CoP learning system to adapt to those learner needs. Of course, the researchers recognize the parameters of academic settings and stress the involvement of the instructor as a facilitator, but more responsibility is placed on the learner.

A challenge to design for CoP is that its currency is “collegiality, reciprocity, expertise, contributions to the practice, and negotiating a learning agenda, not affiliation to an institution, assigned authority, or commitment to a predefined deliverable” (Wenger, 2003, p. 97). Therefore, in designing for CoP, this means:

- Giving primacy to the kind of informal learning processes characteristic of communities of practice and designing organizational structures and processes in the service of the informal
- Emphasizing meaningfulness of participation in the organization, the possibility of building interesting identities, and community membership as primary relationship
- Organizing for complexity, working to link the various communities that constitute the learning systems in which the organization operates, offering channels, shared discourses, processes, and technology platforms by which local forms of knowledgeability can have global connections and effects. (from p. 97)

### *Design Guidelines*

Cautions aside regarding design *of CoP* and the sufficiency of generic design strategies, instructional designers and instructors do need some guidance. The failings in some of the following studies bare this out. A number of researchers provide guidelines for initiating and supporting CoP (Jonassen, et al., 1999; Kim, 1998; Palloff & Pratt, 1999, 2002; Schlager & Fusco, 2004; Wenger, 1998). Their recipes have been synthesized into a table of CoP design principles and strategies, Appendix H. Combined with the above theory, the recipes support critical interpretation of the empirical research presented here, the findings of which are also integrated into this table, based on the design principles and strategies they warrant.

Echoing Wenger (1998), particularly the boundary principles of transparency, coordination, and negotiability, Jonassen et al. (1999, p. 111) propose six “facilitating features” of fostering CoP, based on their notion of “scaffolding conversations.” They argue that “not all students can engage in cogent and coherent discourse” because they “have rarely been asked to contribute their opinions about topics. They have been too busy memorizing what the teachers tell them” (p. 83). Scaffolding relates to Vygotsky’s (1978) ZPD where some support is provided. Amy Jo Kim (1998) has nine principles for “social scaffolding” of CoP, claiming nothing is more important to CoP than purpose. Wenger (2003) suggests the following elements in designing for CoP: “events, leadership,

connectivity, membership, projects, and artifacts” (p. 81) (see Wenger (1998, p. 237) for a more thorough list of ingredients). Schlager and Fusco (2004) offer eight guideposts for socio-technical infrastructures of CoP. The parallels are remarkable between all of these recipes.

Yet much of the research seems to proceed without full consideration of CoP elements and strategies that have been established in the literature. As noted, perhaps CoP theory has yet to establish a firm footing (Driscoll, 2000). Though most of the researchers do cite some common references, Vygotsky (1978) and Lave and Wenger (Lave & Wenger, 1991; Wenger, 1998), there is little cross-referencing of empirical work, which is rather surprising due to the significant shortage of studies on technology support for intentional CoP.

### *Empirical Research*

Presented here is a diverse selection of literature, including workplace settings and interventions that were clearly focused on learners’ community rather than CoP. Most are qualitative studies, often with little description of systematic methodology or reliability and validity. Several studies are more informative in how they neglected CoP design principles rather than their actual findings on specific interventions examined. Wenger’s (1998) three main interdependent elements of joint enterprise, mutuality, and repertoire, are not addressed in any systematic fashion, though mutuality is clearly the predominant theme regarding difficulties in establishing CoP.

First, joint enterprise is addressed, the foundation of shared purpose, without which mutuality is impossible. Then the discussion turns to the general problem of mutuality, the avoidance of the problem via anonymity and motivational strategies, and the importance of reinforcing indirect reciprocity and mutual benefit. Then there is a brief presentation of specific strategies to better address mutuality, concentrating on access and the balance of structures vs. flexibility for negotiated processes and product. Finally, repertoire is addressed, as it relates to mutuality, namely technology support for communicative interaction and exchange of artifact.

### *Joint Enterprise- Purpose*

*Joint Enterprise* encompasses the purpose of the CoP. Why do community members participate and contribute? What activities or practices instill active membership? These are arguably the most fundamental questions in determining CoP and its success (Kim, 1998; Riel & Polin, 2004; Scardamalia & Bereiter, 1996; Selinger, 1998). As CoP theory indicates (Wenger, 1998) the learner audience should have a stake in the purpose, which is negotiated for a sense of ownership (Selinger, 1998). Thus there is greater chance that activity is authentic and participation legitimate (Lave & Wenger, 1991; Barab & Duffy, 2000). According to Jonassen (2005) such meaningful learning occurs in the solving of personally relevant problems; indeed, he claims “the only legitimate goal of education is problem solving” (p. 2).

A number of studies indirectly underline this point of the importance of purpose. Not only do they miss the need to actively involve the learners in negotiating purpose, several seem to neglect purpose altogether. In Parr’s (1999) study on teacher development and technology integration, with a focus on “social resources of practice,” teachers felt and researchers observed little change. Parr contributes the lack of success to traditional pedagogical beliefs and the lack of identification with a collaborative culture. However, Parr appears to have provided very little intervention or structure to help build a collaborative culture or commitment to social resources. Activities were lacking in support of concrete purpose. *Bridges* have to be built to cross the boundaries (Wenger, 1998). Moore and Barab (2002) claim their first year with the ILF was a failure due to its focus on usability and overlooking needed support for long-term engagement, the purpose, despite the fact that they utilized “participant advisory board” of expert teachers. Technology is often a distraction in CoP studies. Stephens and Hartman (2004) document a failure to promote CoP with math teachers, focusing on technology integration. The project consisted of a two week summer institute, 6 follow-up monthly meetings focused on a particular technology and

content area, and an online forum, in which there were only five posts for the entire first year!

Several teachers mentioned not knowing what to write about or wishing they had something on which to focus - purpose.

Derry et al. (Derry, Seymour, Steinkuehler, Lee, & Seigel, 2004) used a very structured Problem Based Learning (PBL) strategy in a case study of teacher education, the structure of which seems overly restrictive and not aligned with authentic activity. For example, the researchers' PBL method takes four weeks for teachers to design one lesson; how real-world is this for future teachers? One point of significant difference in purpose is with the faculty expecting students to have a deep understanding of pedagogical concepts and their application; but many students want "rapid career entry, efficient credentialing, and specific instructional methods and materials" (p. 263). Derry et al. found other challenges, such as learners' fear of the unfamiliar, and the level of status between participants, but the misalignment of purpose seems the most crucial in their study.

When concrete *joint enterprise* exists in the studies, CoP has much greater success.

McAndrew et al. (McAndrew, Clow, Taylor, & Aczel, 2004) designed and evaluated technology support for university staff development and CoP. Subjects were actually asked how they prefer to disseminate their work electronically, not only for a needs assessment for the system, but also to move participants from a knowledge "hoarding" culture to one of sharing (this was the only study to indicate such inclusion of the learner). The subjects valued most the ability to easily search for material and people with the needed knowledge, to avoid 'reinventing the wheel'. The researchers' system simply met this need; it provides a "straightforward means by which any member of the organization could publish materials and respond to material published by others" (p. 742).

Harris and Higgison (2003) illustrate concrete purpose with their case study of OTiS, Online Tutoring Skills, which sought to capture and record the expertise of over 100 participants in a three-week, online tutoring e-workshop. A panel of experts reviewed case studies submitted by

participants, which launched a participant discussion forum dialogue. Panel members also presented keynote papers with synchronous and asynchronous discussions, which, according to the researchers, gave the workshop focus and pace. The key outcome of the workshop, a *purpose*, was an e-book which synthesizes the experience. The researchers found that many participants were surprised at the extent of commitment they made, and that the nature of their involvement was more intensive and interactive than a face-to-face event. Note that though OTiS is really a knowledge-building community (Riel & Polin, 2004) or learners' community (Henri & Pudelko, 2003), the e-book contribution to CoP within which OTiS operates gives it CoP characteristics. High quality materials are collected as a result of expert review; and there is "a permanent record that can be used as a development tool, a resource, or a source of ideas and inspiration" (p. 245).

Kolikant and Pollack (2004) sought to enhance CoP among computer science teachers, who participated in professional development modules and then designed their own activities, which were uploaded to the web where other teachers could access them and provide feedback. The teachers then came up with practical rules for lesson design which were uploaded for the benefit of the entire computer science teaching community. Community involvement was encouraged by discussions on authentic, burning issues, such as guidance and assessment of students' projects, which resulted in redesigning the computer science rubric, presented to the Ministry of Education with arguments for why it should replace the current rubric. The teachers responded positively to the modules, expressing that they learned most from the discussions and exchange of ideas. Where the teachers initially expected to satisfy individual needs of being exposed to further materials, in the end they expressed themselves as part of the community of computer science teachers, changing their self-perceptions from simply knowledge consumers to more collaborative knowledge producers. Teachers have increased their contributions to the relevant journal and conference, which the teachers actually organized and carried out.

### *Mutual Engagement*

Wenger's (1998) element of mutual engagement and its associated issue of identity sum up the predominant theme of the studies presented in this section. There is a clear frustration in CoP interventions in getting participants to interact, particularly at a self-organized, interdependent level expected of CoP. Grunberg and Armellini (2004) found in their analysis of teacher email exchange that two thirds of the contributions were unsolicited. However, 81.5% of all the exchange was private, between individuals. McAndrew et al. (2004) found that in two years of their staff development CoP, 40% of 7000 potential users were participating in their system, voluntarily. However, only 10% of all users contributed to discussions or used the cooperative workspaces. Contributions were individual, static. After a training program on the workspaces, and integration of several other websites that met faculty needs, further structure, there was a significant increase in cooperative activity in the workspaces and a positive response by users.

In a case study of technology supported CoP among preservice teachers during their internship, Pearson (1999) found a predominance of private information exchange. Participants struggled with the style of posts and sensitivity to criticisms; "a public audience did not develop...the risks outweighed the benefits" (p. 235) Pearson observes the participants had no preparation for making their ideas so public; in a course, one writes for the lecturer, but in this CoP, there were peers, actual teachers, and university staff. Pearson recommends more structure and activities that stress inquiry, rather than repeated practice and passive roles. It is unclear why Pearson and many other researchers do not present any evidence of sharing CoP goals and selling its mutual benefit to participants. In Stephens and Hartman's (2004) study with math teachers, a very telling point the researchers make is that participants' postings addressed the instructor. Perhaps these researchers needed to articulate a social purpose much more carefully.

In Pearson's study (1999), of 13 conferences created by teachers, only 3 received much attention, and it was the only anonymous conference thread that received a greater proportion of the messages. In their design and experience of the ILF, Barab et al.(Barab, MaKinster, et al., 2004) suspect the lack of anonymity limited teachers' critique of other teachers. In their case study of a successful online teacher professional development school, Breuleux et al. (1998) indicate system wide anonymity, the only study to do so. There are clear considerations for anonymity for temporary learning communities; such as enabling "equitable participation of disadvantaged groups," as Hoadley argues (Fishman, et al., 1997). However, Pearson (1999) notes that though anonymity might relieve some anxieties, anonymous conferences only allowed the trainee teachers in his study to avoid the problems they had with the network. Indeed, anonymity seems to subvert a crucial aspect of joint enterprise and mutual engagement, accountability (Wenger, 1998), and a crucial aspect of CoP in general, access (Lave & Wenger, 1991). How is interdependence of mutuality established if one does not know who it is on whom one can depend ?

Motivation for participation is certainly a dominant theme in the literature. Moore and Barab (2002) utilized professional development credits. Bray (2002) had significant success with teacher CoP, which he partly attributes to administrative support for release time and off-site meeting space, and later recognition that CoP satisfied state and regional expectations for professional development. Stephens and Hartman (2004) point to a lack of institutionalized obligation such as grades as a shortcoming in getting their participants to further interact. However, in their case studies of 5 corporate sites and two scientific laboratories, Olson and Olson (2000) have found that in settings that reward competitive practices, as with grades in academic settings, little collaboration and sharing takes place. In course settings, they suggest aligning the incentive structure with the aim of CoP- much greater percentage of the grade based on participation.

Rather than avoid the problem of participation and mutuality via anonymity or address it with other motivation schemes, it seems imperative to prepare participants for a public audience and attend to motivation for participation from the perspective of legitimate, mutual benefit to participants. Even with a well established purpose, activities need to be designed that further facilitate interactions and mutuality, identification with the CoP. Researchers seem to neglect the need of addressing socialization and reasons for participation, the “conscious community” (Palloff & Pratt, 1999). Wenger (1998) describes the importance of the community broker in facilitating connections between CoP constituents. Bonk et al. (Bonk, Hansen, Grabner-Hagen, Lazar, & Mirabelli, 1998) advise that teacher educators need to model questioning behavior and can assign roles to students to promote this behavior, i.e. “devil’s advocates, protestors, idea generators, debaters, summarizers, critics, optimists” (p. 309). However, it appears few studies use these strategies in their design, mainly acknowledging those brokers that occur by accident. Little attention is given to ensuring proactive members, particularly researchers or instructors themselves who actively participate, informally, and promote the CoP.

Wasko and Faraj (2000) surveyed participants in usenet groups and analyzed their contributions; they found that users “reflect a strong desire to have access to a community of practice” (p. 167); active participants helping others “is the right thing to do” (p. 168). However, the behavior isn’t selfless; giving to the community in return for help was the most cited reason for participation. Direct reciprocity is not expected from the same individual; rather, the researchers found it is a generalized expectation of reciprocity, based on future contribution by all members. Therefore, an expectation of future interaction and the technology to maintain it, a trajectory (Wenger, 1998), seems very important. Wasko and Faraj (2000) observe that “the greatest difficulty to developing these communities [CoP] is convincing members that knowledge should be treated and valued as a public good rather than a private good” (p. 170). They recommend greater

acknowledgment and status of members who are actively engaged. McConnell (2002) examined identity in three online courses and how it influences community. One group “exhibited extreme anxiety and division” while the other two groups worked harmoniously and spoke directly to the need for good collaborative effort. McConnell describes them as dutiful and inclusive. Though competition and disagreement did exist, the positive groups were supported by routines of negotiation and reciprocity, a positive reinforcing of collaborative success.

Hammond (1999) compiled the results of three case studies of course learning communities, including interviews of active participants of discussion forums. He uncovered some misconceptions of the committed or “virtuoso” learner. Communicative learners were “not especially competent with the technology, [and] did not necessarily have a particular interest in writing” (p. 360) or confidence in public speaking. Nor did they have any more free time or access. Rather, “their participation emerged from a willingness to take risks and a personal sense of responsibility to the group” (p. 360). Communicative participants have a community “work-ethic” (p. 361). They tried to maintain the group with their messages, even if they had nothing particular to say, to signal presence or motivate. They sent many types of messages, and their writing was “characterized by an informality appropriate to the groups they joined” (p. 363). It was felt informality, distance from professional identities, caused greater clarity.

*Some Strategies.* As Lave and Wenger (1991) stress, establishing mutuality among members is impossible without access to members and their artifact. Indeed, they suggest that CoP is all about access, which is crucial both technically and temporally (Wegerif 1998), particularly to authentic activity already in place. According to Lave and Wenger (1991), “To become a full member of a CoP requires access to a wide range of ongoing activity, old-timers, and other members of the community; and to information, resources, and opportunities for participation” (p.

101). Wenger's (1998) boundary processes of coordination, transparency, and negotiability directly address access.

The research suggests numerous strategies to support CoP, particularly mutual engagement; some have been directly tested, but most often they are suggested as a result of general negative findings in the studies. Hammond (1999) acknowledges the confidence and technical competence thresholds to cross before many forum learners can take part: "On the one hand, the forum may be there to support more open, learner directed activity in which participation is voluntary. On the other hand, without support and direction, levels of participation can be disappointing" (p. 365). This observation sums up the dilemma recognized in many studies of intentional CoP and is reminiscent of Wenger's (1998) design dualities, which present two dueling factors, providing the necessary structure, yet allowing for it to be negotiated. For example, one factor Derry et al. (2004) discovered in their PBL method is the "conversational confusion, produced by motivated excitement" (p. 273). They suggest more structure, such as turn taking strategies. Another important factor was poorly trained tutors and social conflict of dominance, which would clearly interfere with negotiability.

Hammond (1999) notes many strategies that were used to stimulate discussion in his studies: face-to-face meetings for technical help, direct discussion of participation issues, on-line debate, sub-groups, mentoring or more formal peer support, more and different tasks, and more consistent integration of online work. These are important strategies, most of them structural, regularly cited in the more successful studies. Breuleux et al. (1998) found that two important structural elements were clarity and centrality of expectations to participate, and the specification of complementary roles and responsibilities, such as to report from other discussions. Harris and Higgison (2003) had a timeframe of specific events to encourage participation in OTiS. Discussion was kick started by

initial content, produced by participants already invested in the activity. For example, all case study authors hosted hour long chat sessions which provided for immediate engagement.

Moore and Barab (2002) advanced mutual engagement in the ILF by adding structural elements: online discussions, collaborative workspaces, and expanding face to face interactions. One method that improved interaction was participants asking direct questions for readers' thoughts on their contributions; this provides an entry point to discussion on something specific, indicating openness to critical reflection. Smith et al. (M. C. Smith, Diaz, & Strbich, 2003) enhanced discussion in an online course by "asking probing questions, prompting for clarification, and occasionally summarizing divergent points of view – or asking students to do so" (p. 5); they acted as community brokers (Wenger, 1998). Surprisingly few studies of course-based learning communities discuss these steps of modeling the process. Smith et al. (2003) also employed a discussion post labeling system (response, comment, query clarify, FYI) and smaller groups to reduce response load. Though there was some cost to having to label a contribution, users found the benefit outweighed the cost, and the researchers observed the strategy to function as a metacognitive tool to keep learners aware of their contributions. Smaller groups also helped keep the discussions more manageable and active.

Negotiability receives less attention in the literature. Some structural elements contribute to negotiability, such as Moore and Barab's (2002) contributor's questions technique. Learners can take turns (Smith et al., 2003) with structured leadership and other roles suggested by Bonk et al. (1998). Initial discussion board structures can be open to learner management (Smith et al., 2003). One of Hammond's (1999) recommendations stands out in the literature, direct discussion and negotiation of participation issues. Harris and Higgison (2003) observed a significant motivating influence of synchronous chat, which they saw as vital in establishing shared terms and clarifying misunderstandings. Duemer et al. (2002) found in their case studies of synchronous group work that

mentors who behaved as authority figures were detrimental to interactive behavior; these authoritative mentors posed questions, made judgment statements about the responses, and paced the discussions. Deadlines also interfered with their participants establishing community. In their PBL approach, Derry et al. (2004) found that “structural asymmetries in group composition tend to create comparable asymmetries in group interaction, such that in-group members dominate conversation and tend to share and impose common knowledge and belief systems” (p. 263).

In Wegerif’s (1998) case study of a course based learning community, he found many learners had a “threshold experience” where they felt either part of the in-group or excluded, often due to technical difficulties or time constraints- access. The main discussion conflict was with the style of postings: even though the tutors used a casual and spoken style, including deliberate misspellings by one tutor, participants often posted longer, carefully worded responses that hindered the process of discussion and negotiability. Wegerif suggests building community with lighter, more concrete activity at the start and then more abstract and challenging exercises later (scaffolding); support crossing the threshold from lurker to full contributor by “providing teaching opportunities” (p. 47). One student specifically contributed her strengthened engagement with CoP to a leadership opportunity where she was able to take ownership of the task.

Finally, a number of researchers have indicated the importance of physical presence and social dialogue in reinforcing mutuality. Olson and Olson (2000) found in their studies that more tightly collaborative work is quite difficult to do remotely and that strongly coupled work was inevitably reorganized to fit geography, to allow for physical meetings and communication. Smith et al. (2003) found that a few face-to-face meetings during their online course were indispensable for supporting interactivity and building greater cohesion among groups. Selinger’s (1998) students commented that face to face contact with a subset of the larger community, a tutoring group, extended comfort to the rest of the group. Learners used the conferences to bounce ideas off each

other, the immediacy of which seemed critical to community. Kimble et al. (2001) examined the IT support management team in the research department of a large international company, with a core of four members in the UK and a core of four members in the U.S. Within and between the cores, the few physical meetings each year were found to be crucial for establishing strong working relationships. One commented that more could be accomplished in one face-to-face meeting than could be accomplished in several e-meetings. The personal relationships reinforced in physical meetings were found to be crucial to sustain participation in e-media communication. The relations strengthened unity and common purpose.

### *Repertoire*

Of course, copresence, the same physical location, is not always possible. When it is, time is often limited and devoted to activities less conducive to mutual engagement, i.e. the typical content delivery of the traditional academic course. Again, CoP theory stresses the need for access (Lave & Wenger, 1991), which, as argued, has significant impact on mutuality. Access also speaks to Wenger's (1998) dimension of repertoire, the availability of a number of shared resources. Like joint enterprise, repertoire seems less conducive to generalizations on design for CoP, particularly with regard to more context specific "language and reference points" (Moore & Barab, 2002). This section will limit its focus to technologies used to support CoP processes, communication and sharing of artifact, processes required for mutual engagement in any CoP. Support technologies do not get enough attention in the CoP literature. Duemer et al. (2002) note how online supported learning community is a solution to the typically overburdened curriculums. Though often cited, this is an observation that bears repeating here; technology stretches the boundaries of the physical classroom and offers much more flexibility and opportunity for interaction and learning. Network technology is an amplifier of communication and activity (Trentin, 2001); and it can serve as a bridge between students' school and non-school experiences (Jonassen, et al., 1999). Most

importantly, technology offers a means to “make practice explicit” and perennialize it (Henri & Pudelko, 2003, p. 483).

The success of CoP, however, “does not depend on the specific technology, but on the individual participants, the roles these participants play on and off the screen, and the social interactions between them” (Fishman, et al., 1997p. 11). Email and file exchange are still the predominant tools used (Breuleux, et al., 1998), and most successful communities are still using “embarrassingly simpler” technologies such as discussion forums or mailing lists (Benassi & Corso, 2005). Pea (1996) reinforces the point that “It is specific kinds of activities taking advantage of the affordances of the technology that will be likely to pay off” (p. 178). Yet even those who purportedly understand this principle still rely on technology for building community rather than employing purposeful community building activity (Palloff & Pratt, 1999). This is a weakness in several CoP studies discussed in the *Joint Enterprise* section. At the same time, however, Dennison (2000) refers to an old saying, ‘If all you have is a hammer, everything starts looking like a nail.’ In other words, knowledge of advanced technologies and their possibilities can provide design insights and enhance opportunities to further support CoP.

Online environments, if they even have functional communication tools in place, often lack the necessary immediacy and shared context, thus inhibiting communication and collaboration (Harvey & Charnitski, 1998). Advanced technologies can have a significant influence on the quality of communicative activities, overcoming such barriers (Henri & Pudelko, 2003; Walker, 2003). Henri and Pudelko (2003) stress that “the existence of a community establishes itself during the social process of appropriation of the resources that support its activity” (p. 477). In fact, there are “opportunities where systems could more powerfully support transformative communications than do face-to-face interactions” (Pea, 1996, p. 178). Wenger, McDermott, and Snyder (2002) list some “online facilities” for CoP (see Appendix G), all of which should be integrated in a suite of tools,

such as a portal or learning management system (Jonassen, Hernandez-Serrano, & Choi, 2000). Of course, the need for technology readiness goes without saying and is stressed in many a study (Olson & Olson, 2000).

As indicated, though recognized as important for mutuality and CoP success, copresence is not always possible. However, synchronous, or same-time channels can potentially enhance the connections between members and their negotiability. Most of the CoP studies utilize only asynchronous, or anytime, discussion forums. Shotsberger (2000) argues that there is a qualitative difference between these channels. Asynchronous communication, he argues, is often de-contextualized, more formal and structured, and not conducive to just-in-time support or community building. The shared space of synchronous communication, on the other hand, “appears to enhance both the responsiveness and the familiarity of the dialogue” (p. 56).

Bonk et al. (Bonk, et al., 1998) compared synchronous and asynchronous discussion among preservice teachers in two educational psychology courses, one using a synchronous channel, the other asynchronous, which received greater peer commenting and feedback and sense of community. The researchers note contextual differences between the study groups, which they acknowledge are just as influential as the technology, or more so. Nonetheless, they compare the groups based solely on the technology anyway, and even call for more studies to do the same. Later research (Branon & Essex, 2001; Nardi, Whittaker, & Bradner, 2000; Nicholson, 2002; Sherer, Shea, & Kristensen, 2003; Shotsberger, 2000) involve more valuable investigations on which tool, synchronous vs. asynchronous, is best for specific activities.

Shearer & Rose (1998), for example, performed a case study on a four-course certificate program in Noise Control Engineering that used both synchronous and asynchronous channels. Participants had the liberty to choose the tools they felt best fitted their needs and the activity. Little dialogue took place in the discussion board, but the chat tools were very active for collaborative

projects. Nardi, Whittaker, and Bradner (2000) document empirical studies on the importance of informal communication for effective collaboration, which they call *outeraction*, social communication which may lead to interaction, or greater information exchange. They performed an ethnographic study on the use of Instant Messaging (IM) across multiple workplace settings. The researchers found that IM is useful to negotiate communication availability, handle intermittent episodes of communication, and maintain a sense of connection with others. Compared to email, IM was thought to be “more immersive and to give more of a sense of a shared space and context” (p. 84). The researchers speak of awareness moments; as some subjects put it, “you know where other people are, so you feel like you’re not the only one working on a weekend...someone else is somewhere else doing something while you’re doing something...you’re in this world together” (p. 85). The researchers conclude that even when no direct information exchange occurs, people want to maintain a connection with others outside task oriented activities. It is through these processes that information exchange is made possible, through more organized, online collaborative activities.

Spring and Vathanophas (2003) claim that “Engagement without prior intention underlies why being physically collocated is essential for working together” (p. 106). In physical environments such as hallways and common gathering areas, there are natural opportunities for connectedness, or *outeraction*, to take place (Nicholson, 2002). Nicholson suggests that IM can serve as a ‘virtual hallway’ to “reproduce the role of these common spaces” (p.364), for communication and discussions that may not belong in course discussion forums. In his study of IM use among 30 students in an asynchronous web-based distance course, Nicholson’s findings reinforce those of Nardi et al. (2000), that IM ‘enhanced bonds,’ ‘contributed to a sense of support, community and access,’ and made students ‘feel less isolated’ (Nicholson, 2002, p. 369). Also, students appreciated a communication channel not monitored by the instructor. Based on a survey of preservice teachers’ who used both asynchronous and synchronous channels of a professional

development tool, Shotsberger (2000) found two major advantages of the synchronous communication: “just-in-time support for implementation of learning, and development of learner community” (p. 54). He argues against research assumptions regarding the superiority of asynchronous communication. He asks where is the humanity, the collective brainstorming. He finds “that a group of teachers chatting together [online] can accomplish in one hour what it takes a week to accomplish using an asynchronous discussion board” (p. 54).

In an online survey of international distance educators regarding both synchronous and asynchronous types of CMC, Branen and Essex (2001) have found that there are distinct advantages and disadvantages and patterns of use for both. Synchronous communication better facilitates virtual office hours, community building, team brainstorming and decision making, and support for technical issues. Asynchronous communication, on the other hand, provides for more critical discussion, communications with temporally diverse students, and extended discussions where all students are more equally capable of participating. There are disadvantages of course: synchronous CMC requires participants to be available at the same time, does not work well with larger groups, reduces the time available for reflection, and can inhibit users with language or technical skill difficulties; asynchronous communication delays feedback, slows the process, and limits the feeling of being socially connected. Each communication channel’s weaknesses and strengths balances out the other’s. Both appear important for supporting CoP, the synchronous channel for mutuality and the asynchronous channel for providing accessibility and increased modes for LPP.

Another technology issue strongly related to access and mutuality is *awareness*, a term that describes the electronic information available to make one aware of what is going on in a computer generated environment, substituting for lost signal from a physical environment. Examples of awareness are whether a learner gets notified of a response to a discussion post, or whether a chat tool has IM-like functions that indicate a person is available to chat. Smith and Fiore (2001) observe

“The tools used to connect to social cyberspace leave us blind to a range of information that is readily visible in face-to-face interaction” (p. 136). They describe a tree metaphor where all that is typically available is the leaves. The intricate array of branches that lead to these leaves is left out. Nothing is known about the number of users or how they are associated. The researchers liken this problem to that of the command line vs. a graphical user interface, the difference between having to know your choices beforehand or having access to a number of items from which to choose. According to Dourish and Belotti (1992), “Awareness is fundamental to coordination of activities and sharing of information, which, in turn, are critical to successful collaboration” (p.112).

Spring and Vathanophas (2003) operationalized awareness based on activity, availability, and disposition or commitment. These were measured on specific criteria of data collected by the server, presented to the participants via icons, i.e. fuzzy/sharpness to represent activity, a slide bar to represent availability. The researchers find that the availability of awareness info does have an impact on the level of user activity and communication, and may, by extension, have an impact on product quality. Smith and Fiore (2001) studied newsgroups where, though it is common to get a digest and even be able to sort listings by date, subject, author, and length, “the whole picture remains elusive” (p. 137). The researchers performed a usability study on a visualization tool for the structure of message threads and temporal activity of authors. Users found the thread tree very informative and useful, particularly the visualization of branching threads. These studies give examples of some advanced tools becoming available. At the very least, learners should be aware of who is available in the CoP portal, such that the valuable spontaneous synchronous chat can even take place. Learners should also have some notification of new artifact such as replies to discussion postings or new resources offered by CoP members. These elements contribute to access.

Finally, some researchers share specific findings regarding the role of artifact. All activity contains artifacts, which “have a mediating role,” and “through a process of internalization of

external activity, artifact affect the kinds of mental processes people develop” (Hung & Nichani, 2002, p. 174). Selinger (1998) examined the voluntary use of a CoP system among pre-service teachers. Students downloaded resources produced by peers. Because the resources were electronic, they were more easily revisable and students were more prone to critique them; these resources were accessible, and they were the central catalyst for mutuality. Kimble et al. (2001) found that a shared planning document in their corporate setting became a central focus of activity in a number of meetings and stimulated a great deal of collaboration. Other shared documents were used to cross boundaries and connect various groups within and between disbursed workgroups. Harris and Higgison (2003) relied heavily on shared artifact in OTiS with the peer reviewed and indexed case studies. They were submitted with an online template, thus providing for consistent formats that allow for easier comparisons and reuse by other audiences - *access*. The peer-review panel’s comments on these case studies launched the participant dialogue, captured in discussion board postings. Participants also recommended resources (web links) and wrote an e-book which synthesized the experience.

Pawlowski et al. (Pawlowski, Robey, & Raven, 2000) identified areas of boundary object brokering by information technology professionals, for the online system itself and artifact shared by all the communities. These activities adhered specifically to Wenger’s (1998) boundary dimensions of coordination and transparency. In their telelearning professional development school, Breuleux et al. (1998) focused on “making the discourse on learning and knowledge about learning more public to sustain a knowledge-based society” (p. 1171). Among their findings is the important role of discussion facilitators modeling “transitional objects”: symbolic objects produced in physical settings and then put online.

### *A Note on CoP Research Methods*

Koschmann (1996) observes that the research approach in the emerging field of computer supported cooperative learning is more about process rather than outcome; the research is typically more qualitative. It is concerned with questions of how learning is reflected in language, how various social factors connect to learning, and how technology is actually used in collaborative settings. Studies are descriptive of observational data; they focus on the learners and their talk, the artifacts that support and are produced by the learner. Jonassen et al.(2000) recognize the advantage of current technologies being able to report their use, yet for CoP, they claim qualitative methods are much more important for evaluation and research.

Communities of practice are problematic when it comes to evaluation and research. By what measures or standards do instructional designers and technologists go by when CoP can not be designed? A presupposition of fixed objectives runs counter to the basic principles of CoP, which, theoretically, is created by its members: purpose and activities are dynamic. Obviously, intentional CoP requires at least some minimal structure, but it must respond to situational and member needs and changes. Research has not adequately addressed this significant dilemma between structure and function of instructional design *for* CoP. In many cases, instructor or researcher intentions have not allowed for emergence of community purpose, process, and product.

One approach is to start out with some basic online tools and activities, then include participants in the process of developing them for serving their needs. Various qualitative methods are used to capture the resulting process and product, which are analyzed for how they compare to what was initially expected or what has been previously established in the research.

A framework offered by Preece (2001) for evaluating web-supported communities examines sociability, for which Preece defines three key factors: purpose, people, and policies. Note the parallels to Wenger's (1998) elements of joint enterprise, mutuality, and repertoire. Preece suggests

quantitative measurements for these factors, such as number of messages per member and over time, to measure engagement people have in the community; or the “amount of on-topic discussion” might be measured for quality and degree of focus. She suggests user ratings as well, but she notes how difficult the human factor of trust is to rate and how these measurements need to be combined with ethnographic and other analysis to best determine the success of CoP.

Quantification of the community with Preece’s method could demonstrate a huge success, with social exchange beyond researchers’ imagination, yet still would remain the question of what has been accomplished, if anything. Indeed, it has been argued that change in practice is a process, not an event, and can take considerable time, even 3-5 years (Hall & Hord, 1987; Horsley & Horsley, 1998). Thus, more qualitative methods of data collection and analysis are clearly necessary, particularly at early stages, to capture what is working, or not, and adjust accordingly.

Harris and Niven (2002) discuss the evaluation of the system that supported OTiS, discussed in detail above. They cite both Wenger and Preece for their evaluation criteria: examining membership, access to the community, volume of discussion, and number of contributions per member, all of which they claim are rather superficial. Instead, the researchers claim that to better determine value, an evaluation should examine the quality or impact of contributing. Is purpose served? What is the impact on learning, on change? For example, Harris and Niven based their qualitative analysis on Wenger’s (1998) three key elements (see their evaluation table, Appendix I) and found that though there was significant close consultation with community members in the development of the system, there has been little negotiation of the environment since in establishing joint enterprise. However, mutual engagement and a shared repertoire remain strong.

Rogers (2000) used the non-equivalent pattern matching case study method (Yin, 1994) to match multiple dependent variables to Wenger’s (1998) three main CoP elements (see Rogers’ table, appendix I). Rogers explains that an essential characteristic of joint enterprise is that the

product, through community interaction, becomes different than the original, in apparent agreement with Harris and Niven's (2002) concern. Rogers demonstrates how his subject group expanded on his original content and intent by going into much more depth on the history of the topic. Mutual accountability was supported by the fact that all participants' inquiries were answered by their peers. Regarding shared repertoire, Rogers presents how the audience used common acronyms to share meaning, and these meanings were at times negotiated, thus transforming knowledge. Rogers (2000) and Harris and Niven (2002) describe similar qualitative approaches and evidence with studies using Wenger's (1998) elements as primary categories and his defining elements as sub-categories. Wenger's matrix of design dualities (see Appendix J) offers a useful analysis tool to account for how emerging activities potentially support CoP, and thus inform future IDT for CoP.

Clearly, evaluation of success is context specific for CoP. As discussed in the literature review, a base line determiner that a learning community has contributed to CoP or transitioned to CoP is whether its product remains accessible and meaningful to a larger audience or there is a CoP that continues beyond the program. And has it changed? Based on the literature, in a semester's time, the CoP may never get beyond early stages of simply adapting to tools and processes. Indeed, in several studies, there seemed to be a lack of attention to this all important period. Palloff and Pratt (2002) stress the importance of orienting students to the instructional/learning environment, that faculty must be sensitive to student understanding of the mechanics/technology of the system.

### *Summary*

A CoP is "not intrinsically beneficial or harmful" (Wenger, 1998, p. 85). Wenger warns against romanticizing CoP, that mandated CoP can have negative consequences. CoP can also be prone to "surface friendliness and interactional congeniality" - "contrived collegiality" (Hargreaves, 2003, p. 139). Nonetheless, CoP is a "force to be reckoned with"- it holds "the key to real transformation – the kind that has real effects on peoples' lives" (Wenger, 1998, p. 85). Lave (1996)

and Wenger (1998) claim people learn by changing participation in changing communities of practice, that “there is no activity that is not situated” (Lave & Wenger, 1991, p. 33), and that “agent, activity, and the world mutually constitute each other” (p. 33).

The first half of this inquiry examined CoP theory more closely, defined as a *self-organized, interdependent, sustained, social network that shares authentic purpose, knowledge, resources, and activity*. However, the subject of much of the research literature is learners’ communities (Henri & Pudelko, 2003), particularly in academic settings, which most often do not meet any component of this CoP definition. Many of the groups studied have no global trajectory (Wenger, 1998); they rarely contribute in a sustained, accessible way to CoP at large, such as the academic department (Hodkinson & Hodkinson, 2004). This inquiry has addressed the concern of IDT for CoP, to support the contribution to CoP of constituent components, learners’ or task communities (Henri & Pudelko, 2003; Riel & Polin, 2004) or practice fields (Barab & Duffy, 2000), or their transformation to CoP themselves.

The research suggests that each of Wenger’s (1998) three dimensions (*joint enterprise, mutual engagement, and repertoire*) is elemental to CoP. Treating each in depth was beyond the scope of this inquiry, and research indicates mutual engagement, or interdependence, is the most troublesome factor for intentional CoP. How does IDT support learners’ identification with CoP, identification with a shared, social purpose, a conscious community? There are design strategies discussed here that promote mutuality and CoP (Appendix H), but ideally, design for CoP should be flexible and allow for community to adapt the design and take ownership (Engestrom, et al., 2002; Lieberman, 1996; Palloff & Pratt, 1999; Riel & Polin, 2004; Trentin, 2001). Yet Riel (1996) warns that it is too much “openness, on many networks, that leads to failure” (p. 189). Structures or scaffolds are clearly necessary, but the degree to which they are enforced or pulled away is a difficult balance, highly context dependent. Regardless, a CoP goal primary to this study is to

lighten the control of structures, in the aim of moving learners from “hierarchical to collegial interaction patterns, structured to conversational discourse, and passive to active participation” (Schlager & Fusco, p. 139). Wenger’s (1998) design dualities address these processes, the interaction between pre-determined structures for CoP and flexibility for negotiating them. Affects of these dualities permeate the literature. As Wenger (1998) makes clear, they deal with the learning processes themselves, the negotiation of meaning through participation vs. reification, convergence vs. divergence: “Communities of Practice grow out of a convergent interplay of competence and experience that involves mutual engagement” (Wenger, 2003, p. 80).

Wenger’s (1998) trajectory of global expansiveness certainly contributes to mutuality by making knowledge processes and artifact accessible both within a particular group, local connectedness, and to a larger field. This is an area where many of the studies struggled, establishing a public audience and purpose. The Dynamics of an online CoP are “Ensuring access to information, fostering a culture of sharing, [and] enabling exchange of information, support and resources through technology (Marshall & Rossett, 2000, p. 22) Without these communication channels, access is considerably reduced and CoP is to some extent handicapped. Many course and community management systems available today incorporate the necessary advanced tools, both synchronous and asynchronous channels with awareness features. But there needs to be purposeful use of these tools. Ideally, learners work cooperatively on authentic, problem-solving projects published to the CoP portal (Jonassen, et al., 1999). Related artifacts have sustained accessibility to support the future of the CoP. In an academic department, for example, courses, learners, and instructors should have a continuous presence to all members of the department via a departmental portal which contains course sites, student and faculty personal sites, and sundry administrative resources. This portal would include all the tools recommended by Jonassen et al. (1999) and Wenger et al. (2002) (Appendix G).

IDT *for* CoP must consider how the system will support interaction. Specific strategies were discussed for supporting mutuality within CoP, among them attention to community brokers, leadership/teaching opportunity, trajectory of indirect reciprocity, informal exchange, smaller groups, physical meetings, negotiation of participation expectations, peer feedback mechanisms, and a labeling system for discussion forum contributions. Several of these strategies are utilized to some extent in this study, but still a major issue in the literature is how to motivate commitment to CoP. Identification with CoP is a very tacit process (Wenger, 1998) and can not be designed (Schwen & Hara, 2004). Schwen and Hara find little empirical exploration of this important factor of social learning. They reinforce a recurrent theme in the literature of building trust in the environment, with plenty of opportunity for sharing story, metaphor, and mental models. Bruner (1996) and Hargreaves (2003) observe that CoP requires a high degree of emotional intelligence among its members, who have to *care* about the public good.

Though CoP is characterized in the literature “by warmth, cooperation, and mutual support,” there is often a strong difference in the reality of what is observed empirically (Kling & Courtright, 2004, p. 98). Henri and Pudelko (2003) observe that researchers’ disappointment with CoP “often comes from their implicit or explicit expectations” which may be “concerned by aspects of the activity of the community that it does not or cannot have” (p. 485). The interventions have not met authentic learner needs and purpose, a primary principle of IDT and CoP. Many suggest including learners in the IDT and CoP process through participant and iterative design (Carroll, 2001; Schwen & Hara, 2004; Suchman, 1983), a promising strategy for CoP that few seem to employ. CoP can not be designed; what is important is the interaction of the designed and the emergent, the crisscrossing of the design boundary object (Wenger, 1998). However, as Johnson (2001) discovered in his literature review, nobody has “directly compared the designed effects of virtual communities versus the emergent effects of communities of practice” (p. 56). Emergence is often stifled.

Consider the more specific example of a preservice teacher cohort, of clear interest in this literature review. Standards (NBPTS) require participation in CoP, yet privatization of teacher practice is a common theme in the literature (Grunberg & Armellini, 2004; Riel & Becker, 2000; Schlager & Fusco, 2004). Also, electronic professional development portfolios is a central focus of many teacher preparation programs (NBPTS). Yet they are typically treated as private collections shared only with faculty and administrators. How can these standards be aligned with each other and with the actual needs of preservice teachers? Teachers no doubt need greater contact with best practices, knowledge artifact, and knowledgeable colleagues (Darling-Hammond, 1996), all of which can be made available in a departmental, CoP portal, which includes all the fundamentals of the program but goes far beyond that, including, for example, teachers' portfolios as public representation of individual contribution to and identity with the CoP.

The portal also supports communication about teacher artifacts and practices. Teacher education appears to center on private, self-centered, critical reflection, but researchers note that reflection should be “opportunities for teachers to collaborate with peers to make sense of the teaching and learning process”; it should be a “social-professional activity in which teachers adapt knowledge to specific situations” (Hawkes & Romiszowski, 2001, p. 287). Mutual engagement would be encouraged if the ubiquitous requirement for individual reflections in teacher education were channeled in discussion forum and chat dialogue where responses are more immediate and have greater chance of fulfilling teachers’ authentic needs during their practicum and course experiences. As Riel (1996) reinforces, it is the interaction among learners cooperatively reflecting on practice or activity that is central to the sense of community that develops.

### **This Study**

Such a portal as described in the summary above was unfortunately beyond the scope of this study. Rather, this study focused on one course for the intentional support of CoP. Two important

issues that emerge from the literature for intentional CoP are access to contributors' knowledge artifact and allowing for emergent, authentic practices- purpose for participation based on learner needs. Based on the literature, attention to these factors is required for establishing the necessary level of mutuality to maintain the synergy of the CoP and give learners ownership of CoP process and product. In support of enhancing interdependence of members of a CoP, Wenger (1998) stresses access to knowledge and three important processes: coordination, transparency, and negotiability. Technology amplifies Wenger's processes (Trentin, 2001). In most cases, online elements are assumed in the CoP research, and they are assumed in applications of CoP theory (Wenger, 1998). The dynamics of a CoP have been described as "Ensuring access to information, fostering a culture of sharing, enabling exchange of information, support and resources through technology, and prioritizing exactly what knowledge is to be managed" (Marshall & Rossett, 2000, p. 22). Riel and Polin (2004) suggest the use of online knowledge management systems as a repository for knowledge artifact, with the ability to link objects together for personal use, a collaborative or shared workspace, and the ability to push information to others (p. 45). Unfortunately, few studies directly attend to purpose, *authentic* reasons for CoP members to participate in these dynamics.

This study differs from previous research on three major points, as informed by said research. One, the technology employed was quite flexible, and participants were encouraged to determine what tools to use and how to use them to meet their needs. Participants were not required, for example, to write two posts to the discussion board every week. Two, the purposes for using the technology emerged, or not, from authentic needs in the completion of a cooperative course project, and for the general support of their CoP however they saw fit. The project needs and activities for meeting them were not handed to the participants; rather, they were to be negotiated *by* participants. Finally, this study took initial steps to ensure a trajectory (Wenger, 1998) for the CoP. Hargreaves

(2003) criticizes attempts at institutionalizing CoP, as the support is inevitably withdrawn and the CoP gradually atrophies. This, in essence, is Wenger's (1998) point: with no future, there is no CoP.

In this case, the technology support was not withdrawn, and the moral support was largely put in the hands of the participants. From the beginning it was stressed to participants that the technology was theirs and would be utilized for the remainder of their program, two years, and open to use beyond graduation, and that they could invite other educators outside the program to join. Further, the study followed "the design principles for fostering, sustaining, and scaling a CoP in which the value of sharing one's practice and engaging in the dialogue outweighs the 'costs' of participation" (Barab, MaKinster, et al., 2004, p. 56). User costs were kept to a minimum by placing few demands on participants for specific contributions. Use was to be *truly* need driven. This decision proved dramatically important for the results.

This study used a mixed methods approach to examine a particular CoP case, a graduate, literacy studies cohort of practicing teachers taking a Literacies and Technology course. The study applied community-support technology to support the cohort in completing collective projects to initiate interactions among the participants: group book reports (PowerPoint), personal bio pages, and the design and development of a website to support the local clients served by the teacher cohort. The study explored what activities emerged for the use of the technology in cooperatively solving problems associated with the group projects, and in support of the group's CoP in general, and how these activities affected mutuality among the group and the CoP overall. The following research questions were the focus of this study:

### **The Activities**

1. What activities emerge for the use of technology?
2. How do they come about?
3. Which are more supportive of CoP? The least? Why?

## The Participants

4. What changes occur with individual's perceptions of their community participation?
5. What changes occur in observed individual community oriented behaviors?

## The CoP

6. How do online activities contribute to overall changes in community practice?
7. What concerns do participants have about the future of their CoP? Why?

For interpreting the research questions, it is important to emphasize the dual purpose for the participants, to complete some group projects, but also develop their CoP in general, particularly a greater sense of mutuality. Though the later was not explicitly stated on the syllabus, it was a repeated mantra from the researcher in particular as well as the instructor. The emergent activities in question one relate to both purposes. For the group projects, the participants were not directed to specific activities toward their accomplishment. For example, for the group book reports, the groups and books were assigned. That was it. The participants were to negotiate activities and use of technologies in support of the group projects. The same is true for the larger course project of developing the website. The expectation was that with the constant encouragement from the instructor and researcher, the participant interactions and emergent activities with the technology involved in the group projects would evolve or transfer to more voluntary activities and contributions to the CoP, which were of much greater concern from the study's perspective. This is apparent in question three. And with questions four and five regarding "community participation" and "community oriented behavior," again, though these aspects as they relate to the course projects are certainly of interest, it is with the CoP frameset in general in which the study has the greatest interest. For example, "community oriented behavior" of most interest would be any activity within the community support system that is not necessarily specific to a course task. This is again

apparent with questions six and seven, the focus on community and practice in general, less so in relation to the course projects specifically.

## CHAPTER THREE: METHODS

This study accepts the pragmatic view that a “false dichotomy” exists between qualitative and quantitative approaches and that “researchers should make the most efficient use of both paradigms in understanding social phenomena” (Creswell, 1994, p. 176). According to Creswell, a mixed-methods approach that uses multiple methods of data collection is sensible for neutralizing researcher bias. This study utilized Creswell’s *dominant less-dominant* mixed methods design model, the dominant approach being qualitative. Creswell cites four main qualitative research designs (see p. 11-12): ethnographies, grounded theory, case studies, and phenomenological studies. All are relevant to CoP research and this study in particular. However, the overriding paradigm was that of a case study, to explore the processes and product of a specific graduate cohort of educators in its utilization of introduced technologies meant to support CoP.

Yin (1994) argues that “case studies are the preferred strategy when ‘how’ and ‘why’ questions are being posed, when the investigator has little control over events, and when the focus is on a contemporary phenomenon within some real-life context” (p. 1). Further, a case study “arises out of the desire to understand complex social phenomena” (p. 3), when “the boundaries between phenomenon and context are not clearly evident” (p. 13). Yin’s characterization of the case study method describes the context of this study, a purpose of which was to develop or test theory, which Yin claims is essential in case study design.

This chapter proceeds with a description of the participants, their purpose, and materials that started them off on this purpose. A discussion of data sources follows, with a chronological presentation of the procedure. An explanation of analysis and procedures for protecting reliability and validity concludes this section.

## Participants

The study participants were a cohort of practicing teachers and school administrators taking a class that was a component of a reading specialist Master of Arts in Education degree program at a large state university. A few of the participants were taking the course simply for professional development. Also a participant was the program advisor and instructor for the course under study. One reason they were selected for this study is that the cohort makes up the entire program; it was a CoP, or one in the making. The participants had taken the same classes together for a year and a half and would for another two and a half years. Also, as employed elementary educators in the local area, the participants were viewed as more likely to maintain professional ties beyond the program. The cohort was of a manageable size for the limits of this study, where all nine members of the class could be included. Three of them were new the semester of the study, two of whom were not actually enrolled in the program; they were taking the course simply for professional development (it was interesting to see how these new members were assimilated into the group). This program is not necessarily considered representative of reading specialist programs or educational departments, but the participants seemed representative of elementary educators in general. All participants were women between the ages of 23 and 57. They included elementary teachers, some practicing reading specialists, and administrators:

<b>Pseudonym</b>	<b>Age</b>	<b>Position/role</b>	<b>Years of Experience</b>
Sheila*	57	Principal: preschool-5 <sup>th</sup> grade	30
Ann *	35	2 <sup>nd</sup> grade teacher	14
Rose	27	1 <sup>st</sup> grade teacher	6
Stella**	38	Reading recovery teacher	15
Helen	57	Elementary English Coordinator	35
Kayla	24	2 <sup>nd</sup> grade teacher	4
Amber	23	2 <sup>nd</sup> grade teacher (coordinator)	3
Sally	31	3 <sup>rd</sup> grade teacher	8

Jane	51	4 <sup>th</sup> grade teacher	11
Instructor		Associate Professor/Elementary Program Leader	30

\* new to the group but not enrolled in the program  
 \*\*new to the group and enrolled in the program

With the exception of the instructor, all participants indicated that they use a networked computer less than an hour a day on average. Several described professional and social exchange independent of the program community. At the time of the study, Sally and Rose worked at the same school and were pretty close. Sheila, Helen, Amber and Jane also worked at the same school, different from Sally and Rose, and they had regular contact. Ann had some contact with Amber and Sheila. These sub-communities are very important and have significant impact on this CoP. However, exploring them was considered beyond the scope of this study.

The cohort had relied heavily on course meetings, taking one course per semester that met one time a week for three hours at an urban higher education center. During the study, a concern was raised that the program might not be able to continue utilizing the center, as a course needed to have at least 10 students enrolled to warrant its use; this would be of considerable inconvenience to most of the participants, as all but one lived in the surrounding city. Therefore, there might be a stronger need to utilize networked computer technology in the future.

Before this course under study, *Literacies and Technology*, there had been little utilization of communication technologies among the cohort, except for limited email and listserv communication for coordination. Also, the program had experienced very little cooperative work. For the first time in their program of study, the class met in a computer lab for this course. Though they had used a course management system, Blackboard, the Professor described its use as minimal. This was to be the first term the course would be more fully supported by an online community environment, Sakai.

The instructor was a primary participant in the study. All data collection procedures described included her. She has more than 30 years experience in elementary education and the field of literacy and is the Elementary Program Leader of the university. As a subject matter expert, she was unique among the other participants in that she was interviewed at the start of the semester to support the questionnaires in describing a baseline of the CoP. She also submitted memos on her observations and interpretations of class activities. As the leader of the group, she was expected to have significant impact on the tasks and activities of the cohort. She was curious about this group as a CoP, with and without technology support, and she was mindful of CoP principles, though she previously would not have articulated them as such. She was supportive of the main purpose of the study; it is her teaching style to be a co-participant and allow learners a great deal of independence. She did not micro-manage student work, but she was directive when necessary. Though she uses a networked computer a great deal, eight hours a day on the average, she admitted that her technology knowledge is quite limited. Before the study, she was not familiar with the process of developing a webpage for example, nor was she that familiar with routine skills involved with course management or community support systems. However, she did not seem to have much trouble when she took the time to perform necessary tasks, and she did have enough confidence to commit to teaching the *Literacies and Technology* course, though her plan all along appeared to have been to take advantage of someone like me, the key investigator. I functioned as a participant observer in the study. My role was to be limited, to serve as a technology consultant and assist in the use of the community support system and the design and development of the website project. Within the limits of this role, throughout the course I did attempt to promote the idea of CoP and the use of the community support system. My role is further discussed in the final, researcher effect section of this Methods chapter.

The foundation of any CoP is purpose. The purpose of this cohort was professional development as reading specialists, or advanced credentialing. More specific to the *Literacies and Technology* course, their purpose, or the University's, was to advance technology skills through the creation of a literacy resource website that would support fellow professionals and/or the clientele they serve, students and their parents. Significant coordination and cooperation was expected to create this website. The purpose of this study was to examine the group's utilization of the online community support worksite to support emergent activities that addressed this goal. Further, an aim of the study was to develop among the group a shared purpose of a conscious, continuous professional CoP for the region. This goal was made explicit to the participants with the *trajectory* (Wenger, 1998) that the worksite would continue to be used to support the program community, its classes, and would be available post graduation and perhaps even for other local reading specialists.

### **Materials - Technologies and Course**

Sakai functioned as the online community workspace. According to the Sakai website (Sakai), "Sakai is an online collaboration and learning environment for education. Many users of Sakai deploy it to support teaching and learning, ad hoc group collaboration, support for portfolios and research collaboration." Sakai is open-source and offers some fairly accessible, flexible tools. At my suggestion, the participants unanimously agreed to name the Sakai site *The Open Book*, not that there was a great deal of discussion on the name, or even interest at that point. In fact, the name was not really used that much, but it was referenced within the data. An institutional nameplate for Sakai was also used by participants to refer to the system; in all cases, including quotes, all references to the system were changed to *Sakai*, for clarity and to protect identities.

There were several limitations of the Sakai system. For example, the discussion forum did not have the function for users to send notification of additions. Further, the discussion forum had some usability problems that hindered its use. For example, the homepage digest, which displays

the latest additions in various areas, did not offer links directly to the material, and finding and responding to the right thread or discussion posting could be difficult due to a lack of awareness indicators in the system. For example, there was only a tiny green arrow to indicate where one was located in a thread, and the system lacked a clear outline of the hierarchy of topics and messages. Another issue was with the chat tool, which lacked IM like functionality to support spontaneous interactions. Chat sessions generally needed to be scheduled if they were to occur outside class.

There were some other minor flaws with the system, but all systems have their quirks. Sakai did offer a user-friendly shared folder space to which all members could upload, author, and revise content of various file types. This tool was considered to be the most important, and Sakai was chosen primarily for its facility. The University was already testing Sakai as an alternative to Blackboard, so technical support was readily available. Since Sakai already had significant momentum among University stakeholders, it appeared it would have some longevity, important for ongoing support of the CoP. Though there were arguably systems with more advanced tools, such as Moodle (another open-source learning management system), given the limited technology skills of the study group, and needs of the CoP as it was, a limited selection of tools was found to be more appropriate initially.

An important reminder is that based on the literature review, technology itself is not so much a factor in the success of online support for CoP, particularly with such a novice group. Rather, the nature of the CoP, its needs and use of technology are of primary concern. Thus, a minimal structure and selection of tools were set up initially in the Sakai site. See Appendix K for a screen shot and list of tools in their initial, minimal configuration: Schedule, Discussions, Modules (later abandoned), Announcements, Chat Room, Email Archive, Resources, and Help. There were other links or placeholders for links that the community would customize. Note that all tools typical for course management were removed, such as Assignments or Grade Book; the focus was on

community. All participants had permission to submit content to any of the Sakai tools. As participants negotiated their activities and tool needs, I was available to provide support in reconfiguring initial tools or adding new ones, such as a new discussion topic in the forum. As skills progressed among the participants, it was intended that they would be able to do some, if not all of these configurations themselves. An email list is created by default for any Sakai worksite. It was utilized for group communication with a central record of all correspondence in the Sakai Email Archive tool. The Announcements and Resources tools have the option for participants to have an email sent to the email list to notify peers of their new contribution, an important awareness feature. Sakai has awareness boxes both on the home page and independently within the Chat Room, each indicating users currently present.

The course was scheduled with three cooperative projects. First participants were assigned into three groups by the instructor to do group book reports, to be presented via PowerPoint presentations. The participants received some basic instruction on the use of PowerPoint with a PowerPoint presentation that reflexively modeled good instructional PowerPoint slide presentations. The book reports took the first month, during which the participants received training on how to use Sakai. The second project was for the participants to utilize the Nvu web development program to develop simple biographical web pages to begin learning web development skills and also represent them individually as part of the CoP. Each page contained some personal information and a photograph and was hosted on individual University file server accounts. The participants linked to their webpage from within their personal, though public, Sakai folder, which they created within the People/Portfolios folder of the Resources tool. For the third and most important project, the rest of the term was devoted to the whole-class, cooperative design and development of a resource website for teachers, parents, or the children they teach (their choice). Additionally, there were two

individual assignments on the syllabus that participants completed near the end of the term:

#### Evaluation of Literacy Software and a Plan for Integration of Technology.

For the strategies of the course and implementation of Sakai, to support the CoP intent, the literature was taken to heart: “the arrogance of intentionality that subverts the social foundation” (Schwen and Hara, 2004, p. 165); “The more we move toward the design of learning environments, the more completely the students’ lives disappear” (Engestrom et al., 2002, p. 224); the flexibility to organize activities first, then develop the structures to support those activities (Lieberman, 1996); participatory design, where the community is the incubator of methods and techniques (Carroll, 2001); “the ability of teaching and learning to interact so as to become structuring resources for each other” (Wenger, 1998, p. 266); the “conscious community” that directly negotiates goals and processes, norms and activities (Palloff & Pratt, 1999, p. 23); that “the existence of a community establishes itself during the social process of appropriation of the resources that support its activity” (Henri & Pudelko, 2003, p. 477). These principles are largely supported by the empirical studies by the fact that they were *not* applied in many of the studies which had little CoP success. So the approach in this study was *minimalist*, and the participants were largely in control.

Strategies from the literature, Appendix H, that particularly focus on *mutual engagement* include the *face-to-face meetings* with a *timeframe of specific events* and social gatherings, as this was a *hybrid* course. *Online discussions* were promoted and modeled in the *multiple communication channels provided*. There was *direct discussion* almost weekly of *participation expectations*, which were *modeled* by the instructor and researcher. The course was based largely on *authentic problem solving* with the website design and development project. The course utilized *sub-groups*, assigned for the book reports and *self selected* for the website project. *Peer mentoring and support* took place informally both in class and at work sites. Cooperation was encouraged for all course work, even the individual assignments, except for which *all work* was supported and *published* on Sakai

(*online*), which was open to *participant management*. Indeed, the course was characterized by a significant *surrender of control by the instructor* and a great degree of *informality*. A number of similar strategies from the literature, Appendix H, were utilized to support *Joint Enterprise* and *Repertoire*. Those strategies from the literature that were not incorporated were of the more formal or structuring type that contradicted these others. This is addressed further in Chapter 5.

### **Data Sources and Collection**

Validity and reliability are further addressed in greater detail below, but they are important in the initial consideration of data sources and collection, particularly issues of triangulation and documentation. This study followed Yin's (1994) three main principles of data collection:

- Triangulation: Numerous sources of data, both quantitative and qualitative, to *converge* on results and help protect construct validity (Creswell, 1994; Maxwell, 1996; Yin, 1994).
- Database: All data were collected and stored electronically, with electronic and print backup. Data were coded in print, and then processed electronically into subsets, and then again printed, coded, and processed electronically. There was both a paper and electronic trail, documenting the research process and protecting reliability.
- Chain of evidence: All data sources were coded in their analysis path, leaving bread crumbs to facilitate back-tracking. Tracking data in this manner maintained links between evidence, its contexts, and inference (see Appendix L for a table of these links).

Primary sources included questionnaires, focus group interviews, and individual interviews.

Secondary sources included memos authored by me, the key investigator, and the instructor of the course. The instructor and I have considerably diverse backgrounds and perspectives. The instructor's expertise in her field and in qualitative research lent a great deal of protection of reliability and validity. These multiple sources of evidence provided *converging lines of inquiry* (Yin, 1994) to ensure accuracy of findings.

### *Questionnaires*

Pre- and post-test questionnaires were completed by participants via an online survey tool. These questionnaires were identical, except for some demographic information collected in the first one: home internet connection, technology use at home and work, and degree of contact with colleagues. The first questionnaire established a base line for the current strength of community and individuals' attitudes and perceived behaviors related to participating in CoP; the second questionnaire was intended to measure change, if any, of participant perceptions on these factors over the period of a semester (see Appendix M for the questionnaire). The descriptive statistics from these questionnaires provided the main quantitative component in the study.

The first section of the questionnaire included an adoption of all 13 questions from the Sense of Community Index (SCI), “the most used and broadly validated measure of a SOC [sense of community]. It has been associated with predicted relations across different types of communities, age groups, and cultures” (Chavis & Pretty, 1999, p. 637). The SCI questions were changed only slightly to better match this study group context, as users of the SCI are meant to do. For example, question 13, “I expect to live on this [block] for a long time” became “I expect to be professionally involved with my peers 2 years from now.” Also, the original SCI uses a dichotomous response, mostly true or mostly false. As this study group was a small, already established community, these were changed to a four-point Likert scale to maximize measurement of potential variance.

The questionnaire included additional inquiries related to CoP predispositions and behavior. On the same four-point Likert scale were frequency questions on how often one has contact with a peer, learns from a peer, and has influence on a peer. Open-ended questions addressed similar inquiries.

### *Focus Groups*

Three focus-group interviews were planned for the beginning, middle, and end of term. The inquiry for all focus groups was unstructured and heavily dependent on issues raised by the participants. Four focus-group sessions were audio taped and transcribed to protect the accuracy of these data sources. However, only two actually provided useful data from a CoP research standpoint, with an exploration of progress, problems, and solutions. For the final focus group, I shared preliminary results with participants to confirm accuracy of the findings.

### *Memos*

Since both the instructor and I were quite busy with our participant roles during course time, field notes were limited or nonexistent. Therefore, we each prepared unstructured memos to document observations and insights. Memos are “any writing that a researcher does in relationship to the research other than actual field notes, transcription, or coding... to facilitate reflection and analytical insight” (Maxwell, 1996, p. 11). The memos also kept each of us in the loop due to missed sessions. I missed two due to conference travel, and I was the sole instructor for two meetings. I prepared 10 memos, in which I recorded my observations of CoP behavior as it related specifically to Sakai, the nature of interactions and artifact exchanged online, including in-class processes by which the group determined and carried out its online activities. The instructor submitted six memos; they tended to deal more generally with community and purpose. The memos were prepared with MS Word for electronic data processing.

These memos were important as a means of capturing the processes of the study group. Because the kind of data that was meant to be collected by the focus groups occurred in a more dispersed, random manner, the memos were even more important than expected for capturing CoP processes that occurred during the semester, particularly those more subtle and physical behaviors not captured otherwise. It was expected that I would provide a great deal of technical support

throughout the semester, and as part of these interactions, there would be numerous opportunities for participants to provide direct feedback to me on the Sakai tools themselves and how they are used to support the course project and program community. This was indeed the case, and as I could not write field notes to capture these data, it was included in the memos. The memos were expected to provide a progressive interpretation of events as they unfolded and play a role in the analysis of the Sakai record and the general activities of the CoP. They were instrumental in this regard.

#### *Sakai data*

All communications and artifacts shared in the Sakai worksite were saved on the Sakai server, including all discussion, chat, and all documents and other resources such as web links. Descriptive statistics as described by Preece (2001) were used to quantify individual contributions from participants, the types of communication and artifact shared, and how often the communication and sharing took place. The nature of the Sakai materials themselves and their quantifications provide a significant data source, incontrovertible evidence for one to judge the extent of CoP, or lack thereof, at least from the online perspective.

#### *Interviews*

The instructor was interviewed at the start of the semester for a description of the current level of community for the group, the nature of its activities, and use of technology to date. All participants, including the instructor, were interviewed individually at the end of the semester, at their convenience as to time and location. These interviews were semi-structured with a few planned questions (see Appendix N). Other, more targeted inquiries addressed themes and concerns that emerged over the term. Participants were asked to confirm and elaborate on the class and participant responses to course activities as observed by the primary investigator and instructor. The interviews were intended to gauge the overall impact of the course worksite and the course activities with regard to learning and community. The interviews were audio taped and transcribed. Again,

taping the interviews was necessary as they are primary data sources that cannot practically be substituted.

### **Study Procedure**

During the first week, study participants were directed to fill out the first online questionnaire within the next 3 days. It ended up taking more like 3 weeks to get most responses, and Jane took much of the term (never got the second questionnaire from her, or Kayla). On the questionnaire, participants were asked to provide a pseudonym. Most did not seem to understand the concept, however, even when it was explained to them in person, so the participants were assigned pseudonyms.

For an hour during each of the first three class sessions, participants received some basic training on the Sakai tools. Again, the course began with little structure because the intention was to provide greater opportunity for course/online activities to emerge from group negotiation of project work and how Sakai could support the work, for the class and otherwise. We started with the group book report assignments and a general statement of the course project, with a limited collection of support technologies. Participants were not *directed* through any particular procedure and sequence of activities for any of the course projects. Rather, they were encouraged to begin using the tools as they saw fit for their groups' initial book-report assignments. They were repeatedly asked to consider and negotiate how they will utilize the Sakai tools to support their main class project of cooperatively developing the resource websites for their clients, and they were repeatedly encouraged to use Sakai to share whatever else they thought would be valuable to their peers.

At the fourth class meeting, study participants met for a one-hour focus group on activities and uses of the Sakai tools to support the course projects. However, the participants were nowhere near ready to discuss process and product, as there was yet little sense of purpose. The second focus group interview occurred more spontaneously a few weeks later. All of a sudden we were all talking

about technology use from a CoP standpoint, so I got out the tape recorder, but even this discussion was a bit premature. Participants were asked again to join the researcher in the purpose of further developing the online resources and activities in support of their professional community, clearly a challenge for them.

It was the third and fourth/final focus groups that yielded more useful data, as the participants had their purpose more firmly established. The final focus group was held after the last course meeting, to check with study participants regarding preliminary findings. At this time, study participants were prompted to fill out the second online questionnaire.

During the last two weeks of the term, subjects were interviewed individually for up to an hour on their responses to the emergent activities and tool use in the course.

The research-specific time requirement for each participant was estimated at three hours total for the semester, an hour for each questionnaire (which was generous) and an hour for the interview. The focus groups occurred during class time, and any other activities were part of the course, regardless of the research.

### **Analysis and Validity**

#### *Analysis*

According to Maxwell (1996), “Generating an interpretation of someone’s perspective is inherently a matter of inference from descriptions of his or her behavior” (p. 76). Maxwell claims a “well-rounded” study utilizes methods of *categorizing*, or coding based on theoretical principles, and *contextualizing*, or grounding data in specific relations within the research context. Maxwell also suggests matrices to reduce data and present it in an accessible manner. The methods of capturing community attitudes and behavior described above will be used to *contextually* ground data in emerging themes with which to populate the *categories* of Wenger’s (1998) matrix of the three CoP elements (see Appendix D), assisting with *inference* and data interpretation (Maxwell,

1996). Appendix I offers evidence of past research using this method (Harris & Niven, 2002; Rogers, 2000).

Yin (1994) agrees that every investigation should begin with an analytic strategy that preferably relies on theoretical propositions. Within this analytic strategy, “four dominant techniques should be used: pattern-matching, explanation-building, time-series analysis, and program logic models” (p. 102). These analytic strategies link directly to issues of validity, discussed momentarily.

The most important strategy is Yin’s (1994) *nonequivalent dependent-variables pattern matching* technique, where an empirically based pattern is compared with a predicted one. In this case, the emergent themes of this study were compared to the theoretical propositions of Wenger’s (1998) matrices. All data from the questionnaires, interview transcripts, memos, and Sakai was coded per emerging themes, or *non-equivalent patterns*. See Appendix L for a complete table on how the variables of Wenger’s elements are tied to the research questions and the data evidence.

The *explanation-building* strategy (Yin, 1994) is helpful in considering explanations of data that do not match the variables or cross over them. All data were coded such that it could be tracked back to original context. A quote from an interview transcript coded as joint enterprise, for example, was also coded for source of quote and page/line number. Iterations of Sakai use and explanations of how they came about were also captured throughout the term with the memos.

The third strategy of a *quasi-experimental time series analysis* was utilized with the questionnaires and was especially focused on change for the general variable of mutuality. All responses to the pre- and post-questionnaires were exported from the survey tool to MS Excel for statistical analysis. The descriptive statistics were important for establishing a baseline, less important for indicating change in attitude or mutuality among the community, given the short time frame.

The *program logic model* (Yin, 1994) is essentially a combination of the *pattern matching* and *time series* strategies; the key ingredient is “cause-and-effect sequences” (p. 119) linked together for explanatory or exploratory power. The interviews and final focus group provided checks and balances as to the accuracy of what was observed and researcher inferences as to why.

### *Validity*

The validity of inferences is always a concern in qualitative studies. According to Maxwell (1996), the validity concern is addressed by ensuring that there are no other plausible inferences. Maxwell discusses threats to three types of validity: *description*, *interpretation*, and *theory* (p. 89). He says that recording and transcribing interviews addresses concerns for the quality of *description*. Participant interviews were audio taped and transcribed. He points to researcher bias as the main threat to *interpretation*. Indeed, the greatest problem with case studies is allowing “equivocal evidence or biased views to influence the direction of the findings and conclusions” (Yin, 1994, p. 9). Maxwell’s (1996) *theory* validity is related in that researchers should always consider “alternative explanations and understandings of the phenomena” (p. 90). To address *interpretation* validity, Maxwell (1996) suggests detailing the researcher’s assumptions and theoretical predispositions, which is done momentarily in the researcher effect section. Also, the instructor’s perspective as an expert in the field provided confirmation of observations and inferences as well as some helpful consideration of alternative explanations. Probably the strongest method of protecting *interpretation* validity is through member checks (Yin, 1994), which occurred in the personal interviews and the final focus group; both provided the opportunity for targeted questions to confirm emergent themes or inform plausible alternative explanations for what was observed and inferred.

Yin (1994) aligns with Maxwell on validity concerns, though he uses different terms. Again, Yin calls for “analytic generalization” in theory development from a case study, where previously

developed theory is “used as a template with which to compare empirical results” (p. 31). Wenger’s (1998) matrices provide the templates in this study. Yin outlines four *tests* for judging the quality of research design and its analytic generalizability: *construct validity, internal validity, external validity, and reliability*.

Construct validity involves the issue of researcher subjectivity in determining the emergent themes. It was addressed in this study with the *multiple forms of evidence (triangulation)* and *chain of evidence*, as presented in the data sources section, as well as member checks just discussed. The multiple forms of data and multiple personal perspectives of this study triangulated (Creswell, 1994; Maxwell, 1996; Yin, 1994) to ensure *construct validity* of the explanations and understandings.

*Internal validity* is mainly concerned with protecting against researcher bias to maintain the explanatory power of researcher inferences. Protection of *internal validity* was provided by the use of all four of Yin’s (1994) four main analytic devices, as presented in the analysis section: *non-equivalent pattern matching, explanation building, quasi-experimental time series analysis, and program logic model*. Data on participant behavior as observed by the instructor and the key investigator was collected via the memos and was juxtaposed to the questionnaire data collected on participant attitudes and perceived behaviors. Further, as indicated, the personal interviews and final focus group offered significant opportunity for member checks.

Finally, in all case studies, external validity, or generalizability of results to other settings is of significant concern. Due to the study’s small study group and its possible uniqueness, results may be called into question in relation to other settings. This is typical for much research in education. The main protection of external validity is Yin’s (1994) fourth test of *reliability*, which requires very good documentation of procedures so that they can be replicated and have a chance of obtaining similar results (p. 95). The memos not only assisted with data analysis but also provided the necessary documentation for repeatability, along with the data itself, its coding, and the

breadcrumbs from inference back to original source of data. The methodology of this study was inspired by previous research on CoP (Harris & Niven, 2002; Preece, 2001; Rogers, 2000) that utilized Wenger's (1998) matrix; results of these studies can be compared to those of this study for consistencies and inconsistencies. Also, this methodology will likely be used in future cases, potentially reinforcing theory building that results from this study.

#### *Researcher Effect*

With a mixed-methods study, particularly one that is heavily qualitative, it is important for the researcher to share his predispositions (Maxwell, 1996; Yin, 1994). To *not* do so could conceal potential researcher effect, which poses a liability with regard to the generalizability of this study. Of course, this is true for any study of *intentional* CoP, or academic settings in general, where activities are by design, based on the *intentions* of researcher, instructional designer, and/or the instructor.

Here I will share some details on my background and perspective, *my identity*, which certainly affected my choice of research topic, my interpretation of the literature, and the progress of this study. I have made numerous decisions affected by any number of factors, including personal and professional experience, my own culture and history. As Hargreaves (2003) explains, professors of education are public intellectuals: "Our work enters a field of action that changes students' and teachers' lives. It is a moral and not just a technical endeavor" (p. 8). I happen to identify more with issues of social justice in setting the foundation for this inquiry at the start. In the process of preparing this document, in fact, I excluded research on other fields that offer perhaps equal justification for the study, such as distance education or knowledge management in work settings. My own experience with these fields has shaped my interest in CoP, yet social justice is the greatest personal or *moral* motivator of this research and also the most relevant to CoP. I feel that attending to actual student experience and authentic needs is the right thing to do, and as an instructional

designer and technologist, it is a central tenet of my job. Of the various learning theories, CoP theory seems the most attuned to learner needs. In sticking with my social justice theme, I could have explored ways to apply theoretical principles of CoP to K-12 education, an important endeavor to be sure. But I hoped for greater impact overall in facilitating teacher training and professional development, supporting teacher participation in CoP, with the expectation that teachers' appreciation of learning through CoP would be a more natural and successful motivation to use principles of CoP in their own teaching methods and professional lives in general.

There is a back-story to my interest in teacher preparation. Throughout my 10-year teaching career, I experienced teaching as a practice that mostly happened behind closed doors. Nobody had any idea what I was doing, and I likewise had no idea what others were doing. There was little collegiality, while at the same time, some of my more successful lessons were adapted from ideas that *were* shared by my colleagues. At one school, I developed a curriculum file cabinet in which teachers could share lessons and activities they had developed, organized by the program courses. I thought this would be a valuable resource, particularly for new teachers or teachers taking on a class for the first time. After about two years, almost all additions to the filing cabinet were my own.

I started my study of instructional design and technology largely because I was feeling quite inept with computers. I was not even certain, frankly, about the nature of the field, which I soon came to understand was the analysis of learner needs, and then designing and developing instructional situations to meet those needs, applying technology as *appropriate*. However, at the same time, I have observed that this is a significant challenge even for the most professional instructional designers, that of really addressing learner needs and not other, personal or institutional agendas, or simple assumptions of those needs. In some respects, this duality is at the heart of this study, both in design and results, as the next chapters will make clear. I was inspired to examine teacher preparation from a CoP perspective when I took a course on applying learning

theories to instructional design and technology. A course on ethnography gave me the opportunity to investigate a particular teacher cohort case.

For this case I performed a small examination of the nature of community among a pre-service teacher cohort during the last semester of their program, their practicum (Powell & Evans, 2006). I explored the degree of communication between peers and with faculty and staff and how knowledge artifact was shared, or was not, and how accessible it was to others in the group. Outside of course work, there was very little communication between members of this cohort, let alone exchange of professional artifact such as lesson plans and the like. When such cooperative work took place, it was random and one-to-one; it was *private*. And the preservice teachers, with one exception, observed a similar lack of cooperation between their supervising teachers and their colleagues. With the limited scope of this one case, I found that activities provide little opportunity for cooperative work, academic competition individualizes practice, paper-based artifacts are less accessible and revisable, and a private portfolio process lacks consideration of the public audience.

If professional knowledge and practice are private when these teachers enter the field, how can they become public later, per the NBPTS standards, and how do teacher trainers ensure professional development in general? CoP theory addresses this problem. Based on my own experience and this pilot study, I perceive a need for greater cooperation in teacher and preservice teacher practice. In essence, this need is for that shared filing cabinet I tried years ago, only now it is conceived in electronic form.

Through initial activities and even those that emerge through negotiation of participants, the researcher and instructor in this study promoted CoP, with the technology and ideas that are shared for its use. The researcher modeled CoP behavior and supported participants in their project tasks, reinforcing the *ideal* of CoP. There were complex human interactions and relations unique to this case. I made every effort to document this social phenomena and researcher impact, what little there

was. Before launching the class and study, it was unclear how proactive the researcher and instructor would have to be, *or should be*, to initiate and sustain activity and member contribution to the CoP. As indicated, the instructor did not mandate specific participation quotas or specific uses of the technology; rather, the *intention* was to set things in motion and observe what happens. However, due to the rather undeveloped technology skills of the participants, and lack of experience with cooperative work and community support systems, a good deal of *encouragement* was required. And they may not have gotten enough. There was always concern of primary role of researcher and avoidance of researcher effect on my part.

There are numerous ways in which both the instructor and researcher impacted the CoP; these were accepted from the start. After all, a CoP needs its leaders, or brokers (Wenger, 1998), a point overlooked in much of the research, and this particular group did not really have anyone prepared to step up to a leadership position for the initiative. It was hoped that by the end of the term, one or two participants would be able to take on some leadership roles. One could argue that the effort in avoiding researcher effect in this study was counter productive.

## CHAPTER FOUR: RESULTS

The results are organized by Wenger's three main CoP elements: *Joint Enterprise, Mutual Engagement, and Repertoire*. Within each main element section, the organization is by data type: questionnaires, memos, focus groups, Sakai data, and individual interviews. For each of these data types, in keeping with Yin's (1994) and Maxwell's (1996) methods of analysis, emergent themes were qualified in relation to the theoretical principles of the three main CoP elements. With the greater depth and breadth of the individual interviews, they are unique in that they exhibit a lower level analysis of emergent themes within the frameset of the three main CoP elements, as evidenced in the subheadings for each Interviews section. It is important to stress again the significant interdependence of these CoP elements. There is some cross referencing between data types and CoP elements in order to maintain the interconnectedness. Connections to data sources are maintained as much as possible to retain context, per Yin's analytic strategies of explanation-building, time-series analysis, and program logic models. Some important notes on each data type bare attention at the start.

### *Questionnaires*

Due to the small sample size of the study group, anything beyond descriptive statistics in a quantitative analysis of the questionnaire data would not be meaningful. For the reporting of descriptive statistics on the Likert scale questions, the smaller the number, the more positive the response. For the group as a whole, there is not a great deal of variability in the mean responses or the standard deviations with the sense of community questions (see Appendix O). However, among some individuals, there were some significant shifts in response from disagreement to agreement or vice versa, though no patterns really emerged. Also, there are some interesting responses to the open-ended questions. An important note is that the second Questionnaire is missing two respondents from the first, Jane and Kayla.

### *Memos*

The instructor and I wrote memos throughout the term. I include among the instructor's memos a letter she wrote to the participants early in the term to provide some guidance for the coming weeks while she was away. A lower level analysis was attempted with the memos, as with the interviews, but interestingly, the three main themes that emerged align quite well with the three CoP elements. However, the themes are weighted differently between the instructor's and my memos, which are treated separately in each section. *Repertoire*, or technical issues, was the dominant theme for me, followed by *joint enterprise* and then *mutuality*; for the instructor, *joint enterprise* was definitely the dominant theme, followed by *mutuality* and then *repertoire*. As I was the facilitator of the technology, it is not a surprise that technical issues were the dominant theme for me. As for the instructor, who was responsible for the syllabus and curriculum, it is not unexpected that her dominant theme was purpose. It is interesting that the observations recorded in our memos are very much echoed in the interviews of participants. This lends credibility to the emergent themes, as it might otherwise seem *convenient* that they do fit so neatly with Wenger's (1998) CoP elements. The memos represent our observations of process and product and provide a rough record of how the participants responded to the various activities. They contextualize the other data and are therefore presented mostly in chronological order for each main CoP element.

### *Focus Groups*

The intent of the focus group interviews was to capture how the group negotiated the use of the new technology, particularly Sakai, and what protocols the group determined. However, the participants were mostly task oriented and were unable to move beyond the course project toward much engagement in reflective or reflexive discussion on the nature of the group's CoP, let alone how the technology could be used to support it. Continued inquiries in this area consistently found the participants perplexed. The instructor and I underestimated the time needed for the participants

to progress in their technology skill development and mindsets on community purpose. Therefore, the focus groups did not yield the data that were expected, to inform design for online CoP support environments. Nonetheless, they are informative with regard to the application of CoP theory to instructional settings.

The first focus group was held too early for it to be of much use from a study data standpoint, as the group had yet to establish what they would do for their group project, which they eventually determined to be a website to support parents in support of their children's reading. Overall, the second focus group discussion illustrates some ingredients of CoP, such as *mutual engagement* on a specific task with the use of a common *repertoire* of professional knowledge. Nonetheless, it was very much task focused, devoted to discussion on the mechanics of the website to be developed and its content, not how they could use Sakai to support their work, on this task or otherwise. Still, through moments of frustration, the group was able to dig deeper and work cooperatively on the task at hand. Though this focus group also provided little data, it is helpful for establishing context, the level of authenticity of the activity. A summary of the second focus group is provided as Appendix S. The third and final focus groups yielded more useful data. Specific themes certainly emerged, but with such large group discussions, they were a little disjointed. For the third focus group, the predominant emergent themes were as follows:

- Confusion on purpose: project website vs. Sakai community site
- Lack of participation/posting by participants to Sakai
- Organization and format of posting - protocol
- Culture of sharing; type of content to post

For the fourth or final focus group interview, the dominant emergent themes were as follows:

- Technology difficulties, lack of understanding and skills
- Purpose/advantage of Sakai, vs. other knowledge sharing mechanisms
- *Joint Enterprise* of the CoP

These themes also fit fairly neatly into the CoP elements. Because the thematic presentation is more summary in nature, some context is lost from the dialogue flow.

#### *Sakai data*

The areas of analysis for the Sakai data are the resources area and communications tools: chat, discussion, and email archive. Since participants did not contribute announcements, this tool is not relevant. There were only five announcements, one from me and four from the instructor. They were administrative in nature or the instructor's updates on her health and progress.

Participant contributions were quantified by tool and authorship and qualified by theme and general *trends*. With the exception of the chat tool, where the interaction was more social in nature, the data demonstrate significant task focus throughout. Very little Sakai data represent the kind of community-oriented behavior expected for CoP, namely voluntary contributions of content not directly associated with course tasks. A word on each tool follows. Sakai data sections for each CoP element presented below generally follow this organization: chat, discussion, email, and resources.

*Chat.* As expected, the chat tool was used very little. The participants had fun toying with the tool as a novelty during the first class on January 19. Among five of the participants, 27 messages were exchanged (some had yet to get their log-in credentials). In the later part of the next class, on January 26, there was a chat of 36 messages posted by seven participants. For the third class on February 2, there was a chat of 31 messages exchanged by five participants. All three of these chat sessions were strictly social in nature, the later one, for example, mostly involving plans for an in-class birthday party for the instructor. From March through May there were maybe eight more short exchanges of around six messages or less, most social and asynchronous in nature.

There was one scheduled chat for a class that neither the instructor nor I could attend on February 23; however, the instructor participated in the chat from home. The chat tool was utilized for the whole three hours, but not continuously. All participated from a couple different locations

due to some confusion in arrangements among the participants. They exchanged 144 messages, most of which were either focused on the task of planning the website or were more social in nature.

*Discussion.* I explained how the discussion board works during the first couple classes, differentiating between categories and topics and explaining how to the participants how they could create new ones as the need arose. The term ended with only six categories, four of which I created at the start: Instructional Strategies, Roanoke Reads, Sakai, and Technology Skills. In March I added a category on Pre K-K activities to exemplify how they might organize their work. In April Helen added a category on the issue of “No Child Left Behind,” related to a New York Times article that I had shared. In all there were 42 postings to the discussion forums. Of these, five of the postings were mine; interestingly, the instructor did not post to the discussion forums.

For the rest of the discussion postings, 12 were for an in-class discussion on *grouping* that occurred early in the term, during other activities; the participants were exploring the tool. This is the only topic that occurred under the instructional strategies category. There were three messages on the New York Times article. A major category should have been Roanoke Reads, where there were only 14 postings, six by Kayla, three by Rose, two by Amber, and one message each from Helen and me. The Sakai category was not utilized as intended; Kayla started a topic there on their scores for the state assessment for teacher skills regarding reading, which received eight postings. My one topic in this category was a question about utilizing Sakai; it received one response, from Rose. There was one posting for the technology skills category, from Amber, but it was seeking help, not exactly the right place; the idea for the category was for the teachers to share technical skills or solutions, not just problems. Finally, there were two posts for the Pre K-K section, referring to the websites posted in the resources section. The discussion tool experienced very little actual discussion. Rather, it experienced mostly discreet messages or announcements.

*Email.* There were 56 emails sent to the Sakai list. Of these, 35 were sent by me and five were sent by the instructor. Therefore, a total of 16 messages were sent by participants, only Helen, Stella, Amber, and Ann. Amber and Ann sent 13 of the 16 messages, seven and six respectively. It is likely that during the term numerous additional messages were sent via private email which could not be captured. Most of the participant email occurred near the end of the term. There was no *dialogue* established. Most messages were discreet, with only a few that got replies.

*Resources.* By the end of the term, there were six folders in the Resources tool (see Appendix T for screenshot):

- Book Reviews
- Literacies and Technology
- Online Technology
- People/Portfolios
- Roanoke Reads
- Websites and Activities

The Book Reviews Folder had three folders devoted to the three group book reports. The Literacies and Technology folder housed documents devoted to course and program administration, such as the syllabus. The Online Technology folder held training documents for the various technologies used for the course. The People/Portfolios folder contained a folder for each participant, to house personal places in the community space. This is where participants included their bio page and where they could put any other documents they wished; it was thought that documents could be kept here until participants were ready to share them more publicly, or *publish* them more formally. For the future, the idea was that these places could represent more involved participant identity, or even professional development portfolios. The Roanoke Reads folder contained a folder for each grade level of the website project. I modeled the first couple of folders and Kayla created the others. The instructor created a folder titled *Other* for miscellaneous documents associated with the project, most of which were posted by myself and the instructor. Much later in the term, the Websites and

Activities folder was finally created where one might share non course related material. Ann created this folder and posted four of the nine files. I posted a writing activity to model the sharing behavior that was expected. The instructor posted a couple things. Kayla and Helen followed suite by posting one file each.

*Interviews.* The individual interview transcripts were analyzed to identify emergent themes. Again, due to the nature of the data, its breadth and depth, the analysis was more detailed and the themes that emerged were more discreet and are therefore listed independently as they fit within the CoP elements. They were weighted in their degree of dominance in relation to each other, and they are presented in this hierarchical fashion, most prevalent theme first, at the beginning of each interviews section.

### **Joint Enterprise**

#### *Questionnaires*

Most of the questionnaire data relates to mutual engagement. Only the first open-ended question from the second Questionnaire (Appendix R) is more associated with joint enterprise: “Compared to previous semesters in this program, or past higher education experience in general, how do you think the use of Sakai affected your learning, particularly through interactions with your peers and their work?” Most of the participants did not see much influence of Sakai on their learning. Sally acknowledged an effect, how the system saved time, and the access it provided to peers’ work was a benefit. Sheila liked the additional “avenue” of communicating with peers. For Ann, Sakai was mainly a convenience: “I do not think Sakai had much of an effect on my learning.” From Amber, “I do not know if it affected my learning at all. It increased the discussion among peers.” Stella made the surprising statement that “Sakai didn’t really affect my interactions with my peers and their work.” From Rose: “We were able to post items onto the internet to share with each other.” The language used is important here and throughout the data. Rose did not state that they *did*

post, only that "We were able to." Helen observed that "The use of Sakai taught me that there are ways to share resources and communicate with peers other than traditional ways." She continued: "Sakai helps keep me aware that I can share resources." For Helen, perhaps more than the others, Sakai was a gateway technology; she later indicates direct experience in how the skills she learned in Sakai transferred to other technologies.

The instructor commented more than once on the challenge of the Questionnaires: the questions "don't really work very well for me. As I read them, when I come to the word "peers," I am usually thinking of my own [University] peers, and not the students in this program." Her response to question one:

"My thoughts about how Sakai affected my learning are similarly unlike what the students might think. I saw Sakai as a marvelous new tool to use in this and future courses, and I found it to be MUCH PREFERABLE to Blackboard. I think the use of Sakai was essential to the learning experience over the semester and really don't have any idea how we would have pulled off the creation of a web site without it. While it supported interactions with peers in the class, the most important interactions were the face to face interactions in class. But this may have been "my fault" in that I am a very face to face person, and I have made limited use of technology resources in my classes."

The instructor is much more positive about Sakai than the other participants, which illustrates her difference in perspective. Interestingly, she reinforces the importance the others later place on face-to-face interaction. She indirectly acknowledges a lack of leadership on her part in promoting the use of Sakai, or being ill equipped to play that role.

### *Memos*

*Aaron's Memos.* On the ride with the instructor to the second class session, she and I talked more about the plan for the class. After the first day, I was very concerned about time; I felt the original ideas were too ambitious for this group. I wrote "the instructor had no problem if only a few know how to develop websites. We also talked about the possibility of only focusing on a site for students, as the parents and teachers sites in addition could be a bit much." I think the instructor may have been a little discouraged by this, but I also think she saw the reality of too little time to do

so much (as it was, the class was barely able to complete the one site). Note that the instructor and I simply assumed the teachers would choose to do a site for their elementary students. However, they wisely negotiated at the first focus group to design and develop a site focused on parents' needs instead: "they felt that though their students are their primary concern, they can make the most difference by appealing to parents, as this is probably where the biggest gap is as far as online support and resources." The importance here of the participants' contribution and ownership should not be underestimated. It lends to the all-important level of authenticity of CoP purpose and activity.

My memo on the next class, after the book report presentations:

"I assigned them to consider further how they will use Sakai for their project. Specifically, I asked them to consider 3 main questions: What is the project exactly? How will you break out tasks and accomplish the work? How will you use Sakai to support this process? I also gave homework for updating the bio webpages with photos and links, using the free Nvu application. There was little time to discuss this, so I gave a brief walk through of what they would do and promised some how-to docs in the next few days."

"... I tried to keep the directions very simple, perhaps too simple. 2 weeks later I learned that [Kayla] had prepared her own directions that she felt filled in the blanks. I looked at it briefly and did not see how it was any better. I've seen this before, where a teacher reads something that does not match what she has in her head. Instead of getting her head around it, she creates a new document that does match, even if it is misinformed."

I suppose I was a little miffed that Kayla revised the directions; I felt like they would confuse participants even more, and that the focus was getting put on the technical rather than the general purpose, which was to create a biographical page that could be used both on Sakai and the project website. Only a couple of the participants showcased their portfolios proudly; they appeared to be focused primarily on performing the technical steps of the task and getting it *finished* rather than problem solving and considering a purposeful biography.

I missed the next class due to a conference: "When I got home, I checked what had happened in the Open Book the past week and a half and was rather disappointed to find very little additional contribution.... A couple days later I double-checked and looked in the Chat Room.

There I found a transcript of a chat that had occurred that Thursday, including the instructor.” I summarized as follows:

“There was clearly a problem with getting everybody on the same page. The dialogue was quite fragmented, spinning in many directions, with folks continuing to ask about the instructor’s health as they joined late. Apparently there was a last minute plan to meet somewhere off site that got mixed up, so some were there and some in the classroom, all arriving at different times apparently. I think most were online at some point. It didn’t appear that folks had gotten much past the last decision of a few weeks ago, to focus on parents. An outcome of the chat session was that 3 groups would look at leveled book lists and web resources.”

I emailed a response to their chat session, “that it was time to begin considering navigation, a menu hierarchy. I got a note from [Kayla] that they were working in groups on the main content areas. I responded to everybody with some clarification, that a big picture discussion may be helpful in producing a working model. What will the site look like, how will one navigate?” I do not think they really understood this until the next class when the group was deep into a discussion on the content of the project website. They had decided to organize by grade level, and I asked, “Now what about those categories discussed at the start, books, web resources, and etc.” I wrote that in their following discussion they finally “realized that all the grade levels would have the same sub links, with different material depending on the level.”

After the class came to some consensus on the design of the website, we spent time working on technical skills. When I explained that several of them were not fully developing their bio pages, I was challenged as to “why they were doing this task (presumably because I hinted it was not being graded). I explained that, per consultation with the instructor, she and I felt it was important that they develop a basic understanding of how websites work and how they are developed.” This answer focuses on the technical; clearly there was a dual purpose, but the one on sharing identity with the community had been lost, or I somehow knew it would be less convincing. “Some of the students really made an effort to get the technology tasks accomplished; others did not seem to care,

as if they did not understand how it would serve their needs.” The last paragraph of this memo entry:

“The important thing is that they are using Sakai and don’t seem to be having many technical issues with it. They have the whole semester to learn development skills, and if they never do, I think this is not a problem. It fits my general stance that teachers don’t need to be web development experts; this is way too much to ask. Hence the greater usefulness of tools like Sakai.”

Interestingly, several participants later complained that they did not develop the web skills they had expected and did not seem to recognize the opportunity they had missed with the development of the biography web pages.

The next class started with “examining what resources had been added with regard to the [project website].” One of the things I got them to think about was “if there are links to resources related to the activities, they should be with the activities rather than the [separate] websites [or resources link].” I recorded that “It was suggested that we have a [City] picks for a book list, as determined by local elementary students, a top ten list per level, perhaps with an expert list as well.” The class was very much focused on simply getting the task done, though they had been asked continuously how Sakai could support them in performing the task. Further, Sakai was used little to negotiate their purpose, for which co-presence seemed to be required. Later in the class we worked on a rubric by which we and others would evaluate the site:

“The first suggestion, made by Ann, was that the website should be easy to maintain. The rest of the rubric items flowed as would be expected: usability, accessibility, attractive, honest, etc. I kept thinking how the website would be maintained, and promoted. I shared my concerns about the livelihood of the website. I mentioned Sakai’s future as a management portal for the website, maybe having yearly officers who would head this maintenance. I also asked how the website would be promoted. Here and elsewhere, when I mention the future of Sakai, there seems to be practically no response. Students don’t appear to be able to see past the end of the semester. Later conversations with the instructor talk about how getting students beyond the central task focus is difficult.

“This discussion eventually led to a discussion of technology skills development and the use of Sakai in general. I knew there were some lingering questions among the students about the bio pages, but it turns out they were even more concerned about why they were using Sakai. They appeared to be confused about why both. First I pointed out that Sakai skills they had, developing those skills was finished really, it was a tool to support sharing files and communication on the project and, in the future, for the community in general. I explained that we thought everyone should have a basic knowledge of web development skills, hence the bio pages. I later in the week sent a pep talk email

explaining my general thoughts and reinforcing the instructor's point: 'what would work so far have been like without Sakai, using only email?' I'm still not sure this point has hit home. The general vibe this night was that some students were feeling a bit overwhelmed by the technology. In their minds perhaps, they were concerned there was a lot more to learn about Sakai. They also seemed anxious about not making progress in web development. I was shocked, frankly at the challenge to Sakai, why they didn't get its usefulness for what they had done to date. The instructor was and is stumped as well."

At the next class, we started by sitting at a conference table and discussing progress and game-plan for the rest of term. The instructor talked about involving some of the participants in presentations she and I were putting together for conferences. The class talked about school politics, the standards movement, and education-related matters. Then "We spent a great deal of time going over the book lists. The instructor brought the discussion around to what was happening in Sakai and how all were expected to participate and contribute, not just a select few *tech wizards*."

We then proceeded into Focus Group Three. In the summary of it in my memo, I made these comments:

"We talked about future possibilities with Sakai, collecting best activities for the classroom and connecting them to standards. Again I tried to get them to talk about what they are doing with Sakai and how they might improve/change use for supporting their work. They generally seemed satisfied with the current practice. I mentioned the need to think about where things go when 'publishing them to the group,' i.e. not individual folders, particularly if the community is not notified.

"Helen mentioned that she was getting better with technology, feeling more comfortable, and responded that the skills she picked up with Sakai and etc. did transfer to a task she had performed unrelated to the class. Sheila reinforced the notion that *baby steps* (my term) is all it took to start sharing best practices, a top 10 activities or the like.

"I mentioned the discussion that took place early in the semester on grouping, and somebody, I believe it was Ann, said that that was during class time, as if such activity outside class was unlikely. Indeed, I believe Kayla first brought up inviting me to her class because there was this notion that they don't have time in the day to participate in such activity. But my thinking is that they are done at 2:30. How long does it take to plan for the next day? Or grade papers? This is elementary ed after all.

"Generally, students seem more receptive to Sakai and what they are doing, but they still don't seem engaged with its utility. They still seem in mode of complying with tasks as given. There was a lot of content that had been developed in the past week, but none of it had been uploaded to the resources folder. We broke up the meeting with 30 minutes left to begin doing that. Helen actually helped Stella with uploading a document to Sakai. During this time I talked out loud through some housekeeping I did in the resources section, putting things in better places, reorganizing documents."

Unfortunately, it appears I was giving up at this point, doing the work for them that they should have been negotiating as a community. However, such negotiations do take time, and we were getting short on time.

The next memo is largely about technical issues. The next one as well, but it started with a discussion of the future of the website and of Sakai as an ongoing professional community portal. We discussed leadership roles. “The instructor mentioned a rotation of every 6 months I think, where I was thinking every year. She mentioned the possibility of a Sakai site for a school website. Sheila, surprisingly to me, seemed interested in this.” Amber, the “webmaster” at her school, saw “the advantage of using something like Sakai to allow each teacher the ability to add/edit their own content.” I responded in my memo, “However, it appears that they still don’t quite get what Sakai is, the utility it offers; it is still seen as a *website*.”

*Instructor’s Memos.* The first memo of the collection is a letter the instructor wrote to the participants around the second week of the term, providing a plan for the next three classes. It is interesting because of rather high expectations relative to what actually happened:

“After the three PowerPoint presentations, I want you to engage in a critical discussion about the content across the three books to answer three major questions. First, what common themes can be identified across all three books and what are the implications of these common themes for our work on [the website project]? (I’ve read the books now and there are a few common themes, but they have to be “distilled” to some extent.) Second, what distinct themes did you identify that were not common across the three books, but that have implications for our work on developing [the website project] this semester? Third, based on the common and distinct themes you have identified, write some “big” goals for [the project website]. You don’t have to base all of the goals directly on your reading – you can identify some goals that don’t come out of the reading, but that make sense for our planning work. Lastly, make a plan for putting your (a) PowerPoint, (b) common themes, (c) distinct themes, and (d) goals for [the project website], on the Open Book so that I can look at them when I find myself able and ready to do so. If this does not take the whole 3 hours, at the end of class, Aaron can either do some more data collection with you or teach you a bit more information about using the Open Book.”

After presentations and discussions, we were out of time. Participants did not complete any of these tasks for “homework”; in Sakai no themes were outlined by participants, nor goals for the project website. For the next class, the instructor assigned the participants to research “What characterizes a

good website and what is a bad website like, i.e., what do we want to avoid? What do we need to know about developing a truly useful website in order to start planning?" However, there was no product of this work exactly. The participants may have given thought to all of these "assignments" and may even have written some things down, but not in any form that got shared with the group, in handouts or on Sakai. Some URLs were shared during a chat session.

In her first memo, after the second class, the instructor observed how the book reports did not quite go as she had planned: "I expected that all of the participants would sit down and engage in substantive conversations about what they had read. This isn't what happened, and I should have known better." She goes on to explain research on task centeredness of students, and how if an instructor wants higher order thinking or reflection, it has to be imbedded in the task, which she felt she had not sufficiently set up. The instructor ended this memo with a "positive message" emailed to her from Helen: "By the way, I have even been in the Sakai website this morning and I think I sent a message to Aaron!!! I am learning."

The instructor was absent for three weeks, during which time, I think she felt the class was getting away from her a bit. She wrote in her next memo:

"My plan was to use my role as teacher, be a little less collaborative than I might have been in the past, and push the students hard toward developing a real plan. I started this by taking potshots at their ideas of creating lists of leveled books and telling parents what they need to do to help children learn to read. I pointed out that both of these ideas are good - but TOO HUGE and more than we can handle in the time we have available. I got some surprised looks from the students. I knew that I was coming on pretty strong, but I didn't know how long I was going to last and felt I needed to get something accomplished fast. Once the students got over being surprised, I felt that they came together and accomplished a great deal. The idea of dealing with the different grade levels was not something I would have predicted, but the students' logic that this would be most meaningful to parents made sense to me. I didn't write down the organization that Kayla wrote on the board, but I thought it served to point out the complexity of the task at hand, and I thought it was good for all of the students to grapple with this complexity."

The instructor provided some badly needed motivation; this was the class meeting where they did finally come up with a plan, at least the start of one, and started thinking about the navigation and user interface of the site. The class did make some collective decisions, and the instructor's

reflections on this session demonstrate community ownership of purpose, a central tenet of CoP; however, it took a significant push on the instructor's part. She wrote that she considered creating a rubric to evaluate the project and student work, but that she held back in the hope of creating the rubric cooperatively with the participants. This memo ends with a description of me providing structure for the group to outline the interface of the website. Here the participants had to get even more concrete.

The instructor's next memo followed spring break, during which the class had met and produced some content for the website, giving the instructor more confidence that the class would at least complete a website. In this memo, the instructor reinforces her observation of participants being very task centered and not inclined to give much thought to purpose, particularly with Sakai. She reported that participants said "they didn't want to learn any more things to do on Sakai; rather, they wanted to learn how to develop the web page." The instructor claims that "unless they [students in general] are doing something in class that they are convinced will help them accomplish the main task, they don't see a reason to do it." She reflected further:

"They don't need a place to store computer files. They store them on disks and CD's. And they can share those disks and CD's with their colleagues, or they can email files to one another. This is easy, they already know how to do it, and they currently see no real need for technology like the Open Book in their real lives."

The participants do not see any *purpose* in expanding their *repertoire* with other, more advanced technologies when what they are currently using does *suffice*. The instructor reinforces the general point by observing the participant insistence that I needed to visit their classrooms and see what their teaching is like, this during a conversation about the use of Sakai. The instructor found this fascinating: "They think there is something important that you need to see, and I don't know precisely what it is."

In her fifth memo, the instructor remarks on the issue of teachers not having time in their work day to do any work on the computer: "from 7:30 in the morning to 2:30 in the afternoon is

pretty grueling. After the kids leave, the teachers usually spend the last 30 minutes of the day cleaning up the room and getting materials ready for the next day.” She explices the personal lives of these women - the families, husbands, pets, and other duties they have upon their return home:

“Although I am not close enough to these particular women to know their personal details, my understanding of elementary teachers is that they work with children all day at school, then come home and do the “women’s work” of cleaning the house, making dinner, cleaning up after dinner, doing the laundry, doing the shopping, and the like.”

Not to mention taking care of *their own* children she claims. She does indicate “they are also doing lesson plans and creating materials for lessons and grading papers in the evenings.” However, the interviews found that this is not the case in several instances where the impression given was that the elementary teacher’s workday is done at 2:30 or 3:00, at which point professional lives are over for the day. The instructor further explains, “Many elementary teachers that I have known in the past have found it incredibly challenging to be what they believe to be a good teacher, a good wife, and a good mother.” She also contextualizes the professional development opportunities, particularly for technical skills, typically “workshops offered by their school districts.” She further comments:

“It does not surprise me that they use the computer for less than an hour a day. They don’t get a lot of email from their colleagues because their colleagues don’t have time to write it - and they don’t have time to answer it.”

This memo was likely somewhat in response to concerns I had shared with her, my disappointment in the participants’ response to the intervention in general, their possible lack of understanding. I had suggested greater intervention, to which she responded in their defense: “I don’t think we need a heart to heart with them at all. They have all done what we have asked them to do to the best of their ability, and we can’t ask for more than that.” She explained further:

“As to the notion that available time to be on line could be a deal breaker for online support for CoP, I do think it is very important. I don’t believe I’ve ever read or conducted a study about teachers and the practice of teaching in which time did not emerge as one of the most important themes.”

“Does this mean that online support for teachers won’t work because they don’t have time for it? I don’t think so - but I do think it is something you will have to explore in your final chapter. At this

point, based on our experience this semester, I think that in order for them to completely buy in, the online support has to actually provide support for what they do every day, and preferably, they have to discover that there is online support that can actually save time for them.”

### *Focus Groups*

Close to the middle of the term for the third focus group, I tried to gauge “how we might use Sakai for the rest of the term, for the project website or whatever.” Kayla responded, “I think we are at a critical point where we need to go ahead and get everything we have up there to see what’s next.” There was more challenge from them on not being able to judge usability, for example, until it all gets up. By “gets up” it seemed they were referring to the content of the project website. Right off there was an illustration of the confusion the group still had at times discerning between the two, the website vs. the Sakai worksite. I further explained my interest in *Sakai* and tried to confirm they understood the difference. There was still some hesitancy, six weeks into the term. The instructor interrupted: “Just let me ask this, why do y’all think that we’ve learned to use Sakai?” From Kayla, “Eradicate email problems back and forth.” From Amber, “Can post something and everybody can go look at it.” That was about the extent of their understanding - valid, but external reasons the instructor and I had provided for the most part, and task focused.

In a later discussion on the purpose of Sakai, the instructor asked, “Do you think it’s good for us to put teaching ideas or interesting websites.” Ann responded that there are a lot of places like that on the web, and the instructor responded “But this is for us.” The locality of it and support of the intimacy of their group and their practice was lost on them. In the final focus group, Helen made this surprising remark:

“We weren’t clear why we were doing the whole thing when there are, I guess, right now we’re the only people in it. We see each other once a week. We just couldn’t understand I guess our purpose. I know that [project website], and honestly, I understand more about Sakai, the resources, the people page, all of that I understand better than actually doing the project website.”

I try to clarify by asking what she means, whether she is really talking about purpose or whether she is talking about the technology difficulties or skills for developing the website. She replied it was

the later. Amber made a comment about the first exercise on creating a simple webpage: “The bio page took a lot of time. And I regret that because all of that time we spent trying to get those pictures up we could have been doing [project website] stuff.” The instructor responded: “The skills that you needed to learn in order to do the bio page are the same skills that you need to learn in order to develop a website,” for which the participants had complained, I might add, about not getting enough skill development. I explained to them that it is normal for the web development skills to be more challenging than Sakai. Purpose was a surprising challenge to the participants, in many ways.

I asked them whether there was something that they thought “would have been better from a more authentic practice or community perspective? You mentioned... maybe the project should have been just you all posting these lessons and ideas that you have.” Helen responded that maybe that would have been easier. Sheila responded with a different way of doing the same project we were doing, but actually a more challenging approach it seemed rather than simpler. Kayla shared her disappointment that she still can’t create a website, despite her computer skills. The participants consistently avoided answering this question even on a superficial level, let alone with deeper reflection on there activities and purpose.

I explained that to develop strong web development skills was unrealistic for the class, as we focused on a lot of other skills and activities. The instructor explained that it was a *Litarcies and Technology* class, with the focus on literacies rather than technology, that the goal was to develop one website, together, not for everyone to become web developers. She pointed out that they now do have some fundamental understandings. For example, “Helen knows for absolute sure, that um, if she makes a link to something on her desktop, it’s not going to show up on her webpage.” She observed other skills, and I stressed how much time and practice it takes to develop those skills.

I repeated my question, “Is there more authentic activity that should have been part of the class that you could have used Sakai to support?” For example, I acknowledged that “[The project website] is not necessarily an authentic exercise; it’s not something that y’all would have gotten together on your own without this class and said, ‘hey, we need to put together a website for the parents’.” In response to my inquiry, Amber asked, “such as?,” which was not the first time they sought the answers from me or the instructor. I responded that I did not know, hence my inquiry. Helen pointed out the resources section of Sakai where they could post things. I took the bait and responded:

“Maybe we could have said each of you post 3 of those artifacts a week or something to the resources...Sakai would have been the site we’d develop and it would have been content more for your fellow professionals rather than parents. Would that have made more sense? Or something else?”

Helen makes a very important observation, “That was *our* decision to create [the project website] for parents.” I clarified that yes it was, for parents, but that the website development objective was provided by the instructor and me. I reinforced that for what I had just suggested, Sakai might have been the concentration. Helen then goes back off topic, for which she had a terrific habit, and related the difficulty of the website development, “Are there easier ways to do it?” Then there is a discussion with Helen and Amber about other options like Frontpage, and I explain yet again why we used Nvu. Finally, Kayla responded to my question:

“I did think that it would be very easy, if you created a parent database...to set up parent communications with a single teacher. However, I felt like if you did it as a whole school, it would get very overpowering and very confusing very quickly. But I can see each teacher having a Sakai page for parent contact and that kind of thing as being very beneficial.”

A discussion ensues with Sheila and Amber on using Sakai in this way. I express my understanding of this need and explain there are other, better tools for such a purpose. Here I do finally get a response to the question with their pointing to a current need for what is more practical in their work, but not really in line with CoP or the use of Sakai.

My final question was “What do y’all think about the future of Sakai in your program?”

Kayla responded fairly positively: “I think with some tweaking it could be extremely beneficial, but it definitely has some quirks.” I made the question more concrete and asked how they would respond if their next professor asked ‘do y’all want to keep using Sakai, or do you want to switch to Blackboard?’ There was muted response of “yah” and “probably.” Even with all the material they already had in Sakai, and the functions Blackboard didn’t support, they would switch back. I found this particularly telling regarding their attitudes toward the whole framework of the study. Ann provided some lingering hope: “I don’t think I would, because I like the two way communication options, being able to post things that you need.”

As the group began working on course evaluations, I asked whether they thought it was me, that I did not provide enough or the appropriate training. Somewhat in denial I guess, I asked if they really thought Sakai was too hard for the general teacher. Kayla responded: “I really think it is the layout of Sakai… it becomes a visual blob of information…it’s just not organized in a flowing manner I guess like we’re used to seeing.” I tried to get at the specifics, why they found it so cumbersome vs. file navigation on a desktop or webpage. For windows, perhaps they are used to icon views, where Sakai displayed something more like the details view, less visual, more to read. At the same time, they still did not seem to grasp that they had some control over the flow of the information and as yet had been unwilling to address it.

### *Sakai Data*

As described, the joint enterprise was twofold, the projects of the course and the goal of developing a sustained online presence and activity in support of the CoP. The Sakai data are mostly relevant to the former, as most communications and shared documents directly supported the completion of course tasks. The success in using the Sakai tools to support the course activities is without question. In the end, the participants saw value in using the tools to support their

cooperative work, though they certainly challenged their usefulness along the way. For example, an early chat message from Stella commented, “Too bad this class isn’t just on emailing each other.” She and others clearly struggled with the technology and its purpose or advantages. Of greater interest from the study’s standpoint is how Sakai supported the other joint enterprise, the communications and activities of the CoP in general, outside the course tasks. In this regard, the Sakai data are thin and back up the results associated with the other data collections.

From the transcript of the class session held in the chat tool, it was suggested by Helen that a site for parents should support questions from parents, which would necessitate a teacher being online to provide answers. The instructor responded that “it requires that we regularly check the site (for years to come) to provide responses as questions come in.” It was later agreed by other participants that this was not realistic. From Rose: “We feel that our website needs to be static because it would be way too much to keep up with in the years to come.” It is pretty clear from this early stage that these participants do not want to entertain continued engagement after the class is over, at least with this project.

From a participant standpoint, there was little evidence in the discussion, email, and resources tools associated with *joint enterprise*, certainly no direct discussion of purpose. Indeed, though the participants were prompted throughout the term to have such discussions, they did not occur, not within Sakai anyway. Two of the discussion categories, *Instructional Strategies* and *Sakai*, were configured by me to support joint enterprise beyond course tasks. There were small signs of some shared purpose in the brief *discussions* that did occur voluntarily within these categories, but they were fleeting, and none of them had to do with their practice in the classroom. They were concerned with job security and state assessment for teacher credentialing. Still, it was encouraging that Helen created a category on her own to discuss the New York Times article. The few emails sent were in the last month of the term and dealt with technical issues or the appearance

or administration of the project website. Not a single message was sent to the email list from a participant that dealt with practice outside the course tasks. The resources tool showed some encouraging life near the end of the term with Ann's creation of the *Websites and Activities* folder, to which some participants shared resources *not* directly related to course tasks. However, it was perhaps too little too late for the term, as participants seemed ready for the term, and their school year as teachers, to be over. Ann uploaded or added four items, Kayla and Helen one each. That was it for the entire term for any voluntary sharing of resources of any kind, that is as far as Sakai is concerned. It is important to remember that resources were likely shared between participants or with others outside Sakai channels.

Most of the email messages were from me. Out of necessity, many dealt with technical issues, which could have given the unfortunate impression of technology being the dominant purpose of our endeavor in general. About halfway through the term I sent a message directly addressing purpose. It is presented here in its entirety:

"[The instructor] made a great point Thursday, and I'm not sure everyone heard it, so I'm going to repeat it. Consider what you've done so far, only using email and a listserv, no Sakai? Remember that in the coming weeks, you'll be doing a lot more. Consider the utility of Sakai for maintaining the livelihood of [the website] as well as future resources you may develop. Your technology anxieties are normal, but you actually have all the Sakai skills you need, and me to support you. You have published a web page, not an insignificant task. All that is left really is more of the same in creating a website, more pages and links. All of you can do this, really, and you will feel quite an accomplishment.

"A key proposition of the National Board of Professional Teaching Standards (<http://www.nbpts.org/>) is that teachers should participate in professional learning community. Sakai is a very useful tool to support such community of practice, in which participation takes a mindset that your collective knowledge is extremely valuable. The more that is shared, the greater the reciprocity of others, and the greater the access to resources that benefit you and your students. You have begun building quite a resource. Note that in some settings, teachers have gotten such activities to count for professional development credit.

"I know it is hard to think outside the academic course context, but The Open Book is your space. What you contribute should not be limited to course or program activities. It is for ANYTHING you wish to share, both social and professional; it is YOUR online community space, indefinitely!"

This *speech* reinforced a number of encouragements voiced in person during class, by me and the instructor, and it was not the last word from me on the subject. I modeled the purpose with the email tool in particular by sharing a number of resources, such as the New York Times article on No Child Left Behind which sparked a brief discussion in the forum. The instructor shared a few things as well. Nonetheless, the initiative seemed to have little impact. Getting the participants to engage in a discussion of such a purpose proved near impossible, let alone actually engaging in the purpose.

Near the end of the term, the instructor sent a message to the email list regarding an opportunity to share a successful lesson plan for a \$300 award if it were published to the site, ReadWriteThink.org. I reinforced this opportunity with a message that “Of course, all of you who submit can post your lessons to Sakai as well. Indeed, now you have a \$300 reason to write something up :‐)” The only response these messages garnered was from Ann: “That’s a great idea in theory, but I’m assuming that if they want to publish your idea, they wouldn’t want it to be available anywhere else on the web. Does anyone know a definite answer about that?” Even in the face of \$300 prize money, a reason is found not to publish to Sakai. I replied with a number of reasons why copyright issues were not a concern.

Finally, for the website project, the purpose was to help local parents in supporting their kids’ development of reading skills. What was to really make the website special, make it stand out from other reading websites, was the page on local resources. However, the group had neglected this page all along to the point the site was published and the resources page still did not exist. On May 21, I reminded participants of this and tried to motivate some action. The instructor responded in kind the next day, reinforcing the importance of the resources page, and asking if any participants “would be willing to make a collection of these links after the semester is over. Is anyone willing?” These were links she had suggested for the resources page. Only Ann responded: “I would be willing to help. Perhaps some of us could meet and work on it together.” She did not get any takers.

The instructor and I followed up with additional ideas and resources, one in particular that would have made the development of the page pretty easy. I set up a method within Sakai so folks could work collaboratively on the page from a distance. The group had worked hard, and they had a valuable product to show for it, one that could help them do their jobs and provide a valuable service to the community. Yet when it came to the most crucial component of the product and working beyond the term to get it finished, they were not interested. This says a great deal about their joint enterprise.

### *Interviews*

The Joint Enterprise themes from the interviews are listed below, leading with the most prevalent. The interview content associated with Perceptions of CoP theme is twice that of the next theme on purpose. Then the themes taper off in importance fairly evenly, with the last theme of “Expectations for Individual Work” only arising from two individuals.

1. Perceptions of CoP
2. Question/challenge of Purpose
3. Necessity of Mandate
4. Sharing
5. Academic Hurdle
6. Learning Moment
7. Expectation of More Web Development
8. Expectation of More Individual Work

### *Perceptions of CoP*

According to the instructor, “they knew how to do it in the end. They knew what it was for. They could see possibilities for the future.” The participants were predominantly positive about the *idea* of CoP. All expressed their appreciation of the concept of professionals sharing knowledge with each other. From Stella: “this is pretty cool you know. I click these buttons, and I learn a lot.” Ann shared this specific example of her own activity and contribution:

“Finally adding the folder about websites and activities that we could all add to, I think that was probably the most practical function of Sakai and just being able to go into that and like you added an activity and then [Helen] added one related to that and then I added a couple related to [Helen].”

So, that helped build the learning community too and you see how somebody can take your idea and then expand on it..."

When I asked her how this occurred:

"...I found this really great website with tons of resources that another teacher had designed for her own class, and so we figured out the easiest way to share that website was to put it on Sakai except there wasn't really a place for it. So, I just created a folder so we could put that website into it and then gradually it grew from there."

However, few participants had recollection of concrete examples like this of individual CoP activity and contribution. Positive comments about Sakai were mostly in the abstract.

As to the future of their CoP within the Sakai context, feelings were mixed, often contradictory, and most who put a positive spin on future prospects did so impersonally, in passive, conditional terms, never with a sense of ownership. An example exchange:

Jane: I like *other people* to know those kinds of you know reading strategies to help kids that maybe they didn't get in undergraduate education.  
 Me: How are *they* gonna learn those?  
 Jane: *You* are gonna share that with *them* on Sakai.  
 Me: Who is?  
 Jane: Well, if *I were* to upload or if *I write* my own article, then *I could* you know talk about a strategy and tell them how I used it in the classroom and then they, hopefully then they would read that.

When I pressed Jane for what it would take for more sharing of knowledge to actually take place in Sakai, she offered no suggestion other than "I think some people are more drawn to that than other people." Amber saw a lot of potential benefit in Sakai and gave a few examples, which I suggested could be happening now. I asked why it was not, and she mentioned the need for more time, that it would happen eventually, that "it would be up to the instructor to make sure there was time dedicated to that." Apparently, Sakai use in professional settings requires an academic context for assurance that it would happen. When pressed on this point, she confirmed the *academic framework* (my term) was necessary "because of the way people are":

Amber: I mean so many people when the day is over they go home you know they don't wanna stay for in-service and they don't want to talk about lessons, they are ready to go. So, I think it would have to happen either in an in-service or a class because I think people if they are not forced to listen, they will opt out of it.

Me: What do you mean "forced" to listen?  
 Amber: I mean if they are not in a class where they are listening to the lessons or if they are not in a staff meeting or something like that, they are not gonna stay for it.  
 Me: So why would they access the lesson on-line in Sakai?  
 Amber: I think some teachers that are really enthusiastic and want to learn more will, but I think there would be some that would never turn the computer on.

Kayla was not exactly positive about contributing: "I would be fine with it." This despite the fact that she was one of the greater contributors. Kayla required a critical mass, which was a common theme in the literature; she said it would be better to include the whole school district perhaps (which we had offered as a possibility).

Sheila provided a more balanced perspective. She expressed confidence that "a lot of ideas could be shared." When I asked how - on their own or with significant leadership - she responded, "Both. I do think we are formal structuring and people are gonna have to be taught, and I do think it will be a certain, yeah leadership, someone stepping out." Later, she said, "You are gonna have a core group of people who will buy into it and start exchanging ideas and from that you build.., [but] some people don't even check their e-mails, they won't do anything." She further explained that she's learned "you can't force people...you just have to pick your battles and start with whoever is willing to start... and see if it grows."

As another participant had argued, however, if not this class of master's students to lead the charge, then who? Kayla reinforces the need for leaders who perhaps yield more power:

"...it's gotta be a group consistency thing. I think if it's mandated that everybody's gonna do it, yeah, at first everybody is gonna be hesitant, but eventually they'll get over it and roll with it. And then I think there's tons of things you can do."

Kayla was a leader among the group: "I tried to make it happen in this class, and it didn't happen." I asked if she ever directly encouraged her cohorts, and she said not really. She tried to lead by example. When asked how she felt about that, she responded with a very important observation: "Well you know as teachers we are more likely to talk it and sure enough the next week we would

come into class and we would talk it, you know, and that's what it is... putting it into a computer is not our way."

### *Question/Challenge of Purpose*

A couple of participants actually stated that they simply never quite understood the purpose; they were confused by the different technologies and what was to be done with them. Stella explains:

"Sometimes I felt lost as to where we were going...you know, what is this journey we are on and maybe if we kind of knew where we were supposed to end up we might, I don't know, we might have not been so scattered in the beginning."

Stella was new to the program, a "freshman" graduate student. She exhibits what is perhaps a common experience of freshman graduate students who flounder a bit when more of the product is left up to the student. Regarding CoP, Stella declared, "That's a very abstract concept, a learning community. I mean the whole issue of cyberspace is crazy, abstract stuff that some people can't grasp." For others, it was obvious that there was still some confusion when they mixed up the project website and Sakai during the interviews, or they spoke of them together as one entity. Helen asked, "But [the project website] is also a part of that whole Sakai thing, right?" The instructor acknowledges that "it took a whole semester for everyone to get on board...we were beating our heads against a wall because they weren't in the Zone yet" (Zone of Proximal Development, Vygotsky (1978)). She felt we could have gotten the participants in the Zone earlier, but only by dropping the first month's activities, the group book reviews and presentations.

A particularly frustrating exchange occurred with my interview of Helen. Despite several attempts at inquiring as to how activity on Sakai could be better promoted, she said it would simply happen, that it did not need to be further structured. In almost the same breath, she suggested reasons that people would not participate. She would later suggest "a need to get organized on how

and who's gonna do kind of like what." At first no purpose is necessary in her view, but later she indicates the purpose needs to be provided.

Sheila had yet another take on purpose:

"If I chose to put something on [Sakai], I would make sure that whatever I put on was polished, that I had done my homework, that I knew what I was putting on, and I knew it was good information... of real value. Something that if my name is on it, someone looking at it would say it's solid, you know this is good."

Again there is the *conditional* statement of contribution. She is the only one who expresses concern about quality. She seems to be speaking self-consciously, more in her capacity as an administrator rather than a member of the CoP. I challenged her on the notion of contributions being "researched-based," whether just an idea for a lesson or activity would be appropriate. She then back-peddled a bit and said it would, "but you would understand that." It was not clear whether she supported such open, informal exchange, or whether it had to be very controlled, and "polished."

Finally, the instructor provided a more realistic outline of the motivating purpose driving most of the participants, "reasons participants are in the program: personal benefits, such as extra prestige, salary, less hassle." Their overriding goal is not to develop professionally or share knowledge with peers. Rather, there's a [different] goal out there, and we [the department] have put up all these hurdles before they can get to that goal and this course is one of those hurdles."

#### *Necessity of Mandate*

Several participants, including the instructor, suggested that a mandate might be required to better initiate and sustain activity within Sakai. It was also acknowledged that this would have made the course different and would limit freedom and the natural growth of the CoP. From Ann: "I have had other courses where we were required to post things, and I think that obviously helps the participation part of it, but I also think that would have taken away from this class as a community, *requiring* us to communicate with each other." This reflects the *Catch 22* observed in the literature

and theory, between *structure* and *function*. From Stella, “I mean it almost would have to be forced from the beginning.” Sally shared the following:

- “If you guys had said we need ten things added, then that would have increased our interaction a lot”
- “I love structure”
- “You should have just made us do things... I mean well I guess it would be hard we are all adults too. Like I can’t really imagine teaching adults. Like I don’t want the kids to be bigger than me.”

Kayla reinforces Amber’s aforementioned comments on the professional context, that “within the school they can say, you know, post two of your favorite activities up online and that gets it going you know.” From the instructor: “Maybe I should have mandated more things should be put on there... I could have had them discussing more.” However, due to past trouble in the college with inappropriate comments in discussion forums, the instructor was wary of doing involved discussion board activities. Lesson plans were another suggestion put forth by a few participants. The instructor recognized them as an option, but she and I both thought this activity would have changed the nature of the class, made it and the CoP more contrived.

### *Sharing*

As discussed in the section on Perceptions of CoP, there was a general positive attitude regarding CoP and sharing knowledge, and then contradictions surfaced. Some participants were surprisingly quite frank in their statements regarding their proclivities *not* to share. From Sally: “...just put it out there for everyone to use, and it’s a very foreign thing or just not an urge that I, it’s not something that I feel like I am gonna go do that. ‘This was so great I am putting it on Sakai.’ I just don’t think like that.” From Rose:

“I mean me personally by the time I get home unless it’s something I have to do for class, it’s me not taking the time to pull it up and look for extra things, you know what I mean? And at school I certainly don’t have time to look for different things. Not that it’s not important and not that it’s not interesting, but when I come home, I’m home unless I have something I *have to* do for class.”

Rose simply did not see voluntary participation to the online CoP as a possibility. I should note that contributing at work is not really an option. These teachers are completely absorbed in monitoring

their students all day. Still, even from Ann, one of the more active contributors, “I guess this is just a really hectic time for me, and I used Sakai basically for [graduate] class things that I knew I had to get done. I didn’t really have a lot of time to explore it other than that.”

### *Academic Hurdle*

This theme represents comments to the effect that the course is over, this project is over. In essence, the CoP is finished, or at least on summer break until the next class. The whole academic tradition, the expectation of the professor as task master, was observed by the instructor and me to be of significant interference with the CoP initiative. The instructor: “This course was not something they looked forward to...I got, ‘we don’t want to do this.’ I mean, it’s one of the hurdles they know they have to jump.” While based on explicit statements, this theme is also implied a great deal in other comments and throughout other themes. When I asked Ann if there was something she would suggest in support of building and sustaining activity with the CoP, she responded:

- Ann: Ah, I don’t know how you can force us to after the class is over to be honest.
- Me: Well=
- Ann: =I think that they are just taking the class to complete their requirements and have it done, and I don’t know if it will extend beyond that or not.

According to Stella, there are “time constraints of people’s mindsets of thinking, ‘well, this class is over. It had a name, Literacy and Technology number whatever is over.’ People see the end of the term as an end, which is bad in a way, but you move on.” From Sally: “Just remember that students are task oriented. You can take away from that, you can learn that from us.” She continues: “But you know, we get all these emails now...see, our class is over, it’s over (laughs).” And from Rose: “I know a lot of what we did was done in class as a group. You know when we were getting activities together, we met as a group and while we were chatting about it, we just typed it right in and uploaded it to Sakai before we even left. So, it wasn’t like we had to do that when we got home.” When I asked her what might facilitate more interaction on Sakai, she did not have an answer. She responded with the time issue again and that “when I go home, like I said, I am home,

and I try not to bring work home.” She gets home at three o’clock, at which time her professional life is apparently finished, unless she has a task that she is *required* to do. In the final interview with the instructor, in the context of a discussion of participants appreciating the use of Sakai beyond our particular tasks and course, she claimed, “I don’t think that these students have any reason to think beyond this course.” I responded, “ ‘We are done.’ That came up in the interviews...why is she asking us about the resources page when the semester is over?” The instructor: “Over, yeah. What is wrong, she gave us a grade?”

### *The Learning Moment*

This appears to be a shared professional term among these educators in their practice. It is part of their *repertoire*. They were reflexive in observing these learning moments among themselves. From the instructor: “part of the learning process...you start something new...doing what the teacher is telling you to do.... And if you don’t at some point say, ‘what good is this?’, then you are not moving through the learning process very well.” According to Helen, “I think it’s like that teachable moment thing.... Sometimes you don’t really think about it all at once, but then when something comes up or you say ‘hey this worked,’ or teachers need to know about this... that’s when I think, okay, Sakai.” The elusive learning moment was a common response from participants when asked why there was not more activity or why it took so long for some of it to happen. Ann’s comments on her addition of the Websites and Activities folder in Resources:

“I don’t think it would have been practical and meaningful before that one incident. I think that was, it was like a learning moment. It was like that was the time when it was practical and it was just the right time to put it up there. I think that we were all during the class focused on the actual class project and using Sakai as a class tool and not an everyday-for-us kind of tool. I think that if we had talked about those kinds of things more directly earlier in the semester I think it would have probably grown a lot faster, but I don’t know if it would have been as meaningful.”

The fact is the instructor and I talked a great deal about these ways of sharing, from the start of the term, and they were reinforced throughout the term. As Ann puts it: “I think it took time to get used

to Sakai, and I think it took time to realize that we could upload things just for us and not just for the class.”

### *Expectations*

Finally, there did appear to be some disappointment among some of the participants as to the class not meeting their expectations. Some thought that the course was going to be more about the integration of technology in the elementary classroom and that there would be more of a focus in the course on these skills, despite the instructor’s specific explanation to them that this is not what the course would be covering. She observed that until schools have the necessary resources, “I don’t think teaching elementary teachers at this point how to integrate technology is really a very productive thing.” She relates this to an analogous story of sex and AIDS education in Africa, without providing the necessary tools - condoms. Others wished there had been more individual work, this from the two participants who shared the most during the term, Kayla and Ann. Kayla’s regret:

“I still wish we could have created something I mean personal so that I would feel like I could, I had done something personally, and I know that was the point of the bio, but I could do that in my sleep you know, you know what I mean?”

The problem was most of the other participants could not “do it in their sleep.” Ann suggested individual web portfolios:

“I think if you are doing it for your personal use, you put more into it. And it’s more meaningful. But then if you took that web page that you had created and shared that with the rest of the learning community, I think everyone could have so many resources that would be really a neat thing to happen.”

I was not clear why teachers would have more time for these portfolios than for Sakai. Portfolios potentially take even more time to develop and maintain. It is clear that these participants had a need to further develop their own thing, whatever that might be. Yet they had the opportunity to make their work stand out with the biography pages. There was nothing limiting what they did with these web pages. They could have been developed into full blown websites, but this was not the

purpose of the class. It would have taken individual initiative that these participants did not appear to have. In the end, the accomplishment of designing and developing the website for parents was not enough apparently. The participants were disappointed they did not produce something more individual to present/represent their work, which cuts somewhat against the grain of CoP.

### **Mutual Engagement**

#### *Questionnaires*

As indicated at the start of this chapter, there was little variability in the responses between Questionnaires 1 and 2 for the sense of community questions (see Appendix O for the question data). Ann and Amber displayed the most variability, on a total of six and five questions respectively, while everyone else's answers remained in the same positive or negative camp. Ann's shifts in responses were in the positive on Q 3, 4, 6, 15, and 21. These responses reflect the transition of her being new to the group and not really knowing anyone, or anyone knowing her, to being integrated into the group. Question 21 reflects her criticisms of Sakai, despite the fact that she was the most active user from a publishing perspective. For Q20 she switched to the negative-feeling that colleagues do *not* influence her methods. She was a giver, not a receiver.

Amber shifted her response to the negative on Q4, 9, 12, 14 and 23. She no longer saw all her peers as friends, felt the group could solve problems together, would recommend the program, or learns best in cooperation with her peers. And where she did not feel greater collaboration was needed with peers at the start of the study, in the end she did. Her change in attitude toward the negative on these questions is hard to explain, as she was probably the most open and outwardly good-natured among the group.

On Q8 and Q21, Sally displayed a reversal. By the end of the study, she apparently felt she had less of an influence on the program, despite the fact that she had been allowed, along with the

others, unprecedented ownership in the course and its process and product, relative to past courses in the program and likely in their college education in general.

Regarding the frequency questions (Appendix P), for the class as a whole, the differences in mean responses are also not very significant. Indeed, they present quantitative evidence that there was little change among the group's behavior for the use of technology, the sharing of knowledge with peers/colleagues, or the sharing of knowledge electronically. The mean of the means, or the average of the mean response of each question, is identical between the two questionnaires, 4.3, or just less than once a week. Four out of the nine questions actually show a slight turn to less frequency. The standard deviation (SD) for every question is greater in the second questionnaire, in five cases twice the SD of the first questionnaire, thus indicating much greater variability of participant responses on the frequency questions in the second questionnaire. Yet, despite all the cooperative work for the term and the use of technology to support the work, on the whole, the participants mark little change in their associated behaviors.

A mean of responses for all the questions for each participant was calculated (second table, Appendix P). The instructor's responses averaged the lowest at less than monthly, with a positive shift to less than weekly (Higher education professors are likely even more isolated than public school teachers). Sally's responses were next lowest in frequency, averaging shy of less than weekly with little change between questionnaires. Stella started at the same frequency, but increased to closer to once a week. Helen is next at a little better than less than weekly with little change between questionnaires. Ann was just ahead of her in frequency, also with little change. Sheila started out at once a week but finished at every day. Rose started and ended at almost a few times a week, which is more than what her behavior indicated. While Amber started at a few times a week, she shifted to less frequent on five questions and ended at an average of once a week, reinforcing her strange, generally negative response to the second questionnaire. Jane and Kayla did not

complete the second questionnaire. Since Jane completed the first very late, her responses are questionable. Though she was not a big contributor among the group, she claimed a frequency of almost every day in questionnaire one. Kayla's responses were close to a few times a week. There was clearly a great deal of variability between the participants, which questions the accuracy of respondents/responses. Also, had all the exchange indicated in these responses been represented in Sakai, it would have been a terrifically active environment indeed. Unfortunately, much of this activity must have taken place via other channels or in the physical environment.

Specific questions were examined for the degree of variability and in what direction (second table, Appendix P). For the question of how often the participants publish or distribute an electronic resource to multiple peers, the frequency decreased among the most participants, four, but increased for four participants as well. Of all the questions, it was expected this would show an increase among all the participants. Three participants reported less frequency in communicating with peers on non-work related issues over the internet, while five participants reported an increase. These two questions demonstrate the greatest variability and balance in positive or negative shifts among the participants. It is unclear why the course would cause a decline in frequency for any of the questions. Of course, the changes may not be related to the course.

The open-ended questions of questionnaire one (Appendix Q) were largely meant to capture the nature of the community going into the study, so they are included to some degree in the description of the study group in the Methods chapter. Generally, the participants indicated that with certain program peers with whom they work, they have a lot of contact, both physical or over the phone and internet. Similarly, they all have a degree of social relations with co-workers outside of work, but mostly in the graduate program.

For the question on the amount of work participants have shared with peers since starting the program, there appears to have been some confusion between the start of the program vs. the start of

the course. Nonetheless, the general message of most of the participants is that they have shared much more than usual. Sally wrote, “The peers in my program have heard about 75% of my work, I think this is a large amount because I have never had to present every project I do to my peers before (in undergrad for example).” Sally’s distinction of “heard” is important. She’s likely presented a lot of work verbally, but not in a concrete, published fashion. Rose did not even respond to this inquiry. From Amber: “I have shared a large amount. We commonly discuss ideas or strategies we come across in our reading.” From Kayla: “Since enrolling in the masters program, I have shared any and all resources that I have found useful. Generally I give it a trial run and then share my findings.” Jane’s answer was simply “large.” There seems to be a slight defensive tone to the responses and non-responses.

In response to the question of what work participants would be willing to share with program peers, the participants all responded they would be willing to share all of their work. However, there are some interesting comments. Helen wrote: “Now that I have a command of creating PowerPoint presentations, I would be willing to share 100% of the work to this point.” For some reason she seems to see PowerPoint as the only channel for her to share. Jane wrote: “I have enjoyed my classes and I have a desire to share what I have learned with other younger teachers.” The term “desire” is important, as she does not state she is willing; this distance from the actual behavior of sharing is common in the interviews. An important note on Sheila is that she is very formal in her response(s); her role as an administrator at the school where she works, and person of authority over some of the participants, may have had a greater impact on her participation and the entire group than was captured by the data.

Of the open-ended questions in Questionnaire Two, the one most relevant to mutual engagement is “What do you recommend to ensure continued and increased contribution to Sakai by you and your peers/colleagues, outside course/program activities? This question touches on the

litmus test of CoP, continuity. Here the responses are rather negative. Sheila, Amber, and Rose chose to leave the question blank altogether. Rose put “N/A.” The notion of continuing to use Sakai after the semester was over was too difficult for the participants to imagine or accept. Sally wrote, “I guess we could make an agreement to post something...each semester... that might benefit our peers.” She did not seem very positive about the possibility. Ann stressed the importance of sending a notification so others know something has been added. Stella suggested making Sakai “available through other courses,” as was the plan. From Helen: “An increased use of Sakai will be somewhat difficult to continue to develop because of time management issues and the fact that there are numerous activities and lesson plans already available online. Why reinvent the wheel?” Though Helen seemed to *come around* in focus groups and her interview on the advantage of Sakai over these other resources, she is still not convinced apparently.

The instructor acknowledged the need for more training of her colleagues on the use of Sakai for them to effectively use the system in their courses. The training was available, from me and from the University. She is the program leader, but she apparently does not feel empowered to make the other faculty attend such training, let alone use Sakai in their courses. She was confident that the next instructor, who happened to be Ann’s husband, would use Sakai, as was I. The instructor and I had met with him a few times about it, and I had offered any support he needed from me. Yet he did not utilize the system. Ann was less than positive about the system, and she certainly could have had an influence on her husband’s decision. Perhaps I should have been more proactive in getting the other faculty members in the program on board. However, I was not sure this was my place, there were scheduling difficulties, and the summer break was looming large.

### *Memos*

*Aaron’s Memos.* Though it was not a specific goal to observe *social* community behaviors or relations and evidence them in my memos, a number of comments and reflections in my memos

relate directly and mostly indirectly to the sense of mutuality among the group. At the first class meeting, “The instructor shared her health issues that may keep her away from a few classes. She had a sympathetic ear in her students.”

I wrote that “It is a pretty positive environment, upbeat, relaxed. I felt fairly welcome there. Maybe a bit of tension among a couple of the new students, but for the most part, the group of 7 [original cohort] seemed to adjust to the addition of 4 more pretty well.” And “The group came together after the break quite nicely. There were smiles around and catching up. The older women sat together. There do seem to be a couple cliques, or a self-organized hierarchy.”

At the second class, the participants inquired of the instructor’s health, which became an ongoing concern during the term, as she was going to have major surgery. The next class we had an hour of social time over snacks to celebrate the instructor’s birthday. In the previous class, I had suggested we all contribute to getting her something, but unbeknownst to me, the participants commenced planning something via the Sakai chat tool (apparently without any concern that the instructor would discover this and spoil the surprise) and then via email after class and during the week. The arrangement included snacks and a gift basket with something from everyone but me.

From my memo on the birthday social:

The discussion was social and scattered at first, but gradually turned to professional conversation, which I’d say dominated a greater half of the time, during which there was more whole group conversation. There was a great deal of shared knowledge for which I felt out of the loop. One topic was the professional development video case studies they view every month in their schools, Teach First. They talked about whether these were all supposed to be good examples or whether some were surely meant to be criticized. The talk was generally jovial, demonstrating that the group gets along well. The new members seem to have been accepted in the group rather quickly.

This gathering was gradually brought to a conference table for the first focus group. I started the meeting with the pseudonym problem. They had all seemed to misunderstand the request for pseudonyms on the online questionnaire. After explaining the purpose of the pseudonym, to protect their identity in publications and such, they proceeded to take care of the problem by passing around

a sheet of paper and having everybody write their names and “fake names.” As I started to explain that this would defeat the purpose, as they would see each others’ pseudonyms, one of the participants suggested they could identify themselves when speaking by using their pseudonyms. At this point I started laughing and kept laughing as I tried to explain the principle again. Then the instructor started laughing, and it spread through the room, at which point it was a lost cause. Perhaps it was clear to the participants that protecting their identities among each other would be near impossible. The instructor and I both concluded that they simply “didn’t care.” I wrote, “They do seem remarkably comfortable and trusting with each other.”

The next class was predominantly devoted to book report presentations and discussions. The instructor was absent, and I was focused on supporting them from a technical standpoint, getting the laptop projector working and video taping presentations. “All 3 groups did some interactive activities with the audience during their presentations,” and I thought the class did a good job self-monitoring their process. I wrote:

“After the first presentation, ‘I said what now?’ And Sherry asked what they should do next, talk about the PowerPoint or the content of the presentation. I responded, “Why on earth would you ask me, this is your community.” I sounded a little rough, but I didn’t mean to be, and I don’t think she or anyone took offense; in fact a few snickered.”

I recorded that all had seemed engaged in each other’s presentations.

*Instructor’s Memos.* In her first memo, the instructor wrote, “I purposely sat close to Rose and Sally. They work at the same school and always sit in the very back of the room together - as far from me as possible. They always talk to each other and whisper sometimes in class.” She then explained what good students these two have been and her appreciation for their sense of humor. These two continued their behavior of sitting together and talking during the entire term, and the instructor seemed okay with it. At times I found it extremely distracting for both me and the rest of the participants. They would not get important procedural steps for an application (Rose completely

ignored anything to do with the email list for example), and they distracted others from the information as well. At other times, I tried to keep a *community* mindset and just go with the flow.

In her fourth memo, roughly mid term, the instructor described the group's 30-minute gathering to celebrate a baby shower for Sally, who was not able to make it because she had given birth the night before. They talked about the baby, Jane's grandbabies, and my visiting their classrooms. From this and, presumably, previous conversations on the matter with participants, the instructor wrote this reflection, included in its entirety for its importance to the study:

"I got the message that these students don't think you fully understand what it is like to be an elementary teacher, and they think you would understand them, their needs, and their lives as teachers better if you spent some time in elementary schools with young kids. My interpretation is that they are worried that they are going to disappoint you or not provide the kind of research answers you are looking for, and they think that if you understood their lives better, you would be less likely to end up being disappointed. This phenomenon is very fascinating to me. You, as a researcher in this class, have become important enough to them that they have concerns about disappointing you and maybe not having your research turn out as you had hoped. And yet, they are determined to be honest with you and think that if you understand the context of their lives, the results of your study (although not what you might have wanted and expected) will make better sense. I'm sure they would not state it this way, but it would seem that they innately know that a full understanding of context is necessary in order to make true sense of any phenomenon. My overall wisdom, across all of the research I have conducted, is that context is the most important factor in almost everything."

### *Focus Groups*

The instructor and I were frustrated with the lack of contribution by the participants. The instructor shared some motivating anecdotes and said, "I think if we went around the room here and everybody said what's one of the greatest things you ever did? What worked about it? ...I think we have ideas to share with other teachers." I asked the group,

"Would it have been better if y'all had shared ideas like [the instructor's examples]? ... even sharing those may not be your practice. I don't know how much you actually have to document what you do, lesson plans that you give to administrators and what not. I mean my argument for [the instructor] was 'don't teachers have this in some electronic form?'"

Amber commented on all the online discussion boards she uses, "where you can look at a certain standard and teachers have posted things that they do to teach that, and I use that a lot." Sheila responded, "it's almost impossible for one person to come up with all the ideas to look at the

standards for each grade level and make suggestions for how it can be taught, or the activities. Is that what you're saying?" The instructor responded enthusiastically, "Yes! Yes!" However, Sheila continued with treating it as a "huge project" rather than daily practice. Amber responded, "Wouldn't you start that by just documenting every good activity that you do?" Rose commented, "It would take years." They still seemed resistant to the idea of voluntarily sharing their work, informally. It had to be a big, formalized project that they thought was unlikely or too much to accomplish.

I went back to my main supposition:

"There is always I think some artifact that represents everything you do in the classroom, if it's a handout that you give to students, or if it is actually a lesson plan that you've written up for yourself to remember what you've done... it doesn't take a whole lot of extra effort to make that document or artifact digital and sharable. Umm, some will disagree. Some will say that is not teacher practice."

Helen commented, "I will agree that there are some teachers that are very stingy with their things, and they don't want to share." But she continued with this claim: "Now luckily at [my school], and I can't speak for your schools, but at [my school] we share everything." Kayla is more objective, "even if your entire school shares, there's still going to be...", and Jane finished "the glory hog." Several in unison confirmed Jane's comment. Ironically, Jane was not very enthusiastic later in the term about sharing a test she had produced.

I explained how my pilot study demonstrated how teaching is "still very much a paper-based field." I shared how a supervising teacher's resources were all in milk crates. The student teacher would revise the student teacher's work by reproducing it electronically, which would then be printed out for submission to the supervising teacher and used in the classroom, then filed away back in the milk crates, presumably for later revision. How cumbersome, I commented, the lack of efficiency. I further expressed how other teachers can benefit from the knowledge contained in those milk crates, that this sharing is not taught in teacher training, likely "because it's in

academics, because, you know, like it or not, there is that level of competition, even in teacher training, you know, you're getting a grade." The instructor responded:

"I think it's high time that we moved far beyond keeping everything in files and milk crates, well and even having to share it on floppy disks or CDs that we burn and things like that. I just think that we need to become more open as a profession. We need to...the knowledge in this room floors me sometimes. And you are all keeping it there in your own private rooms for your own private use."

We talked further about how there is some "very narrow sharing." And the instructor commented how the project website is great, but static. She said, "I want y'all to just be thinking about what else could we do, what should we do, how could we do it, why should we do it?" During the discussion, some participants supported the CoP concepts, but they still lacked engagement in the purpose of collectively sharing their work, particularly in relation to the immediate context. The issue of technical skills was a consistent reason for the lack of contribution. The practice of sharing within an online community was foreign to them. In their minds it seemed to remain a task, a project to complete. There was some indication that they prefer the physical realm, sharing with colleagues in person.

#### *Sakai Data*

All of the chat sessions are tied more closely to the mutuality element of CoP. Much of the *talk* is social in nature, asking how each other is doing and the like. The first chat session held was spontaneous, at the start of the term when the tool was introduced to the participants. It is particularly social in nature, focusing on dinner that night and weight loss. The second extended chat mostly shares the challenges with technology and celebrated the upcoming weekend. The third extended chat, after the rudimentary greetings and how-do-you-dos, was mostly spent planning the birthday party for the instructor. The other more random messages represent participants trying to stay connected, with little actual exchange.

Even with the chat session that was supposedly devoted to class, at least a third of it was spent on social connections, the instructor's health, and others' families. The participants were

separated for this chat session, which proved the tool useful. A third of the way through the chat, Rose wrote, “I am here with [Sally] and [Stella]. We are at the [library]. We had all planned to meet for dinner and discuss the website development...however, we were the only ones at the [restaurant]. We discussed the website and came over here to be online with you all!” Despite the confusion, the participants made the effort to get online and participate with the class.

Of great significance to the study, however, is the lack of mutual engagement represented by the extremely limited use of and exchange within the other tools: discussion, email, and resources. For the entire term, there were maybe eight discussion postings by participants that were not directly prompted by the instructor or myself. And only some of these were somewhat connected to other participant postings. There was a significant lack of mutuality even with discussion postings related specifically to the course tasks. For example, Ann had a great idea regarding a “Ten-a-Day campaign” for children to read at least 10 minutes a day. She was responding to something shared by the instructor in class, but she was not only suggesting its support within the project website, she saw ways for using the campaign locally to also promote the site. Had others been reading the discussion postings, this is an idea that could have gotten some traction. However, by her own admission, Ann herself was one who did not attend very well to what others posted.

Even more surprising is the lack of use of the email list. There were 16 messages total from four participants, most in the last month of the term, and not one message a response to another participant’s message. For the resources tool, only three participants contributed outside the course tasks - Ann, Helen, and Kayla. They posted some lesson ideas or resources in the Websites and Activities folder. However, there were few signs that they or the others appreciated what was shared, a total of nine items for the entire term, three of which were posted by myself and the instructor.

### *Interviews*

From the interview data, the following themes emerge that are relevant to the CoP element of Mutual Engagement. The two equally dominant themes are listed first. The later two received less focus:

1. Sharing and Reciprocity
1. Impact of Sakai on Community
2. Community in General
3. Leadership

#### *Sharing and Reciprocity*

It was determined in the review of literature that a great hurdle to intentional CoP was establishing levels of participation and contribution that would sustain the CoP. It is the sustained life of a CoP beyond institutional boundaries of time and space that would separate it from being simply a *Learning Community*. In the instructor's final interview, we had this exchange:

- Me: I think it's getting them to understand that reciprocity that's difficult  
 I: And as isolated teachers in the classroom, they don't have an understanding of that... I did all this work and this is my stuff.  
 Me: Yeah.  
 I: Why should I just put it out there for anybody else to use?  
 Me: So, there's a lack of understanding that they are all in the same boat, really? I mean the ultimate goal is to educate the students the best they can.  
 I: And they do understand that, but it's very personal to them. It's them and their use. Them and their class. Them and their...

The instructor describes a paradox between teachers recognizing the ideal that sharing their knowledge and knowledge artifact is the professional thing to do, and their protective feelings toward their work. In general, comments from the other participants support this paradox, particularly when juxtaposed to their behavior, their lack of sharing. From Rose, who contributed little on Sakai: "I would always email it anyway so you know this is a way to share it with people in my graduate class" (Why just the graduate class?). Rose said she does not "reinvent the wheel." When I asked for clarification, she said, "Like you know if someone else has done it, then I don't wanna reinvent the wheel and do it over. I would rather someone share it with me so I would be

willing to share it with them because I would want them to do the same." In other words, '*OK, let's share, but you start.*' From Amber: "Some teachers are very ah skeptical about sharing their work... but I am not at all like that." She elaborates: "Because I mean I am constantly on-line getting ideas. So, I feel like it's my duty to share my stuff, too. I have many lessons posted on different websites anyway. Things I have done I will post online because I feel like if I spent hours doing something, I want to save someone else that time and especially if it's a lesson that's gone really well." These two speak to the ideal, but their actions, at least within Sakai, are not exactly in alignment. Though Amber was more communicative than others via email list and discussion forum, she did not share anything in the resources section, though she seemed the best candidate to do so.

I was particularly interested in Jane's perceptions. I asked, "What about posting your work to the resources? Like some of us, some folks did over the term?" Her response was "I would," a conditional, as with many of the other participants, as if they had not had the opportunity to take part in such behavior the last 16 weeks. She continued:

"I think you do have teachers who are willing to share and others who don't. I have been in a situation where the teachers did not want to share... Yeah, and that was hard because it was when I first [started in] education, and I didn't think it was gonna be like that. I thought everybody liked to share, and I think working together is a better situation than working on your own. Definitely."

Jane had discussed in class a test on which she had spent considerable effort. It sounded like a very valuable thing to share with the group, but she never did. Later she provided what are certainly valid reasons for a lack of contribution - teacher culture and lack of time. When Sally was asked about sharing, she said "That would be fine," again in the conditional, and not very convincing. I asked, "You didn't have an issue with that? Sally: "No. I think it's a great idea." When I asked Sally to respond to the anecdote of Jane's test, she responded: "I could see where she [Jane] would maybe not wanna put those on because she spent so long working on them; however, if we do share it saves everybody time." Later in the interview I asked, "but what do you have to lose?" Her response: "I guess it's not that you are gonna lose anything you just don't wanna share because you

are like that took me three hours to make that and it should take you three hours.” I asked Sally how greater reciprocity could be accomplished. She responded with a quid pro quo: “Like we know each other. So, if I said hey, I am making this test are you gonna make the next one? But then again we would have to be teaching the same grade level.” Sally tried to explain other factors:

“Well, it's a time thing. I would need to be in a habit of when I finish something okay now I need to add... I would need to get in that routine and then it would be like oh I don't have that extra minute...I don't think like that now you know what I mean? I don't think any of us think like that”

She continued, “but I guess the more I used it, taking other people's ideas, hopefully that would make me wanna upload things....” Yet there is still that need for a value exchange of reciprocity, and with the taking preceding the giving. Stella, who contributed little within Sakai, was certainly overwhelmed by the technology and developing the skills necessary to share, yet she displays the necessary attitude, but then most did:

Me: Outside from the technology aspect, I mean just regarding just sharing your knowledge and knowledge artifact with peers or colleagues, you don't have a problem with that?  
 Stella: No, no, no, no. Not with that at all. In fact, I am, in fact I love where I work because it's a place like that.

Ann may have contributed the most to the CoP, at least within Sakai. She claimed, “I am used to sharing my work with the co-workers at my school so it wasn't a big deal.” Helen, one who was particularly challenged with the technical skills, responded positively to Ann's sharing:

“[The instructor] said she wanted to see other people you know putting things on the website...and then going in and seeing I think [Ann] had put up an activity for writing, and I thought well gee I can do that. So, then I just sort of experimented with it. So, seeing the other peers do it sort of motivated me...it gave me some ideas of things I could share.”

Further, Helen appreciated what was shared:

“I looked at all of it...sometimes you think you don't have a lot to share, but then when you see what other people put up there you think oh yes, I have an idea about that. So, that's kind of how it helped me.”

It is important that there is an audience for what is shared. Helen was the exception as far as examining what others were sharing. It is interesting that the two most active participants in contributing to Sakai, Ann and Kayla, stated that they did not really explore what was shared. Lack

of a critical mass of content was certainly a problem. An important, related observation is that for these two participants, immediate or direct reciprocity was *not* their motivation to share.

Finally, in response to this line of inquiry, Sheila, the principal, provides some interesting insights from an administrative perspective on the notion of reciprocity: "It would be nice. Quite often, teachers are reluctant to share that kind of work because they feel like they have created it. Again, you are gonna have to start with a group, a small group that is willing to do this." Our exchange continued as follows:

- Me: Well, and it probably takes someone like yourself to say hey, you know you are developing that on my dime you know, and it's gonna save you time in the long run and you are reciprocating with each other ... this is gonna be less work for you and less work for your peers or colleagues.
- S: I agree 100 percent that it's really funny that this has come up because this is a discussion we have had in the last few months, administrators. We want a bank of social studies questions and science questions so that teachers do not have to keep reinventing the wheel because a good question is difficult to form sometimes. We are finding teachers reluctant to share their assessments. I said the same thing you are creating that on the County's money. It's not yours.

It is very interesting that even with her position of *power* she does not see a mandate as possible. Rather, she stresses the voluntary behavior of a few to lead by exemplifying the behavior of sharing. It is the "how" that seems the more crucial question. Though Sheila discussed the possibility of creating a Sakai site for such a purpose at her school, she never followed through. Based on the literature and this research, a systemic approach seems absolutely crucial, one that addresses purpose and a consistent process for sharing.

### *Impact of Sakai*

For some of the participants, this inquiry was a little confusing, the notion that Sakai could have an impact on their community, either socially or professionally. It is interesting how many times I had to further define the question. Nonetheless, it seems they eventually understood and provided some sincere reflections. Perhaps the main problem was that Sakai was still somewhat foreign to them. It was not yet part of their *repertoire*. One point of confusion was the impact that

Sakai technology had as a subject of discussion - a challenge that the participants cooperatively met rather than a tool that facilitated communication and community development. Sheila made this observation: "One of the things was the camaraderie that was formed in the group just learning to use it you know." Amber agreed:

"I mean it was constantly have you put this on Sakai? How do you get this on Sakai you know, come look at what I did on Sakai. So, it encouraged a lot of dialogue. Unfortunately, most of the dialogue this semester was on technical parts of it... But I think now that we got the hang of it the conversation could switch to more educational dialogue instead of you know how do you do this? How do you upload?"

Amber also observed the system's impact on general community:

"I think, we are not a group that calls each other on the phone or anything like that. Now we do email back and forth, but Sakai has forced us to talk more because we talk in the chat room or you know..."

Other participants recognized Sakai's impact on social relations and general community ties, beyond the interactions specifically focused on the technology itself. Helen illustrates: "Yeah, I definitely think the chat room, the discussion board, it's an easy way to kind of see what everybody's thinking you know even if they, two of them were having a discussion in chat room even if I, I can still even if I am not part of that, I can still learn from them by going on Sakai." This is a rare instance of acknowledging the simple benefit of public sharing. Sheila recognized the impact Sakai had on communications and supporting the community bond:

"I thought it is a good way to communicate when you are not in the same building, when you are miles apart, and you want to discuss something before class.

"And then realizing it can work for us, and it can make life better, and it can make learning easier, but it was taking baby steps, of course, as far as learning how to use it. Ah, but we did build relationships. We built personal relationships through that and that we, it was just the camaraderie, but then the professional relationship of sharing that information. So, no, it did help."

Stella reinforces this component of the theme:

"Ah, socially I think it fostered relationships, personal relationships quicker than people would just verbally face-to-face and class meetings all the time you know. We got on the chat room and people felt you know free to be silly and say things you know it's like IMing people. It was kind of fun, and you learn a lot about people's personality in a very short amount of time when they are being that free on the computer as if you were in a chat room. Ah, but we were there physically present with

each other, too, which helped. You could put a name to a face and someone's personality could come out on the computer whereas if you are in a [chat room] you can't, tone of voice is lost and some personality is lost. So, personally I think it fostered a bond I guess you could say quickly, quicker than you would otherwise."

Ann recognized Sakai's impact, from both standpoints of sharing technical skills and Sakai's support of the community bond: "I think we actually communicated a lot, especially through just regular e-mails on the [Sakai] listserv and things like that." However, she was the only one to stress more the collaborative work:

"I think it definitely helped me become a part of the group faster especially working on group projects together because then you are kind of forced to interact and you get to know people better if you are working on a project together. So, that helped in trying to figure out how to post things to Sakai and put things in certain places. Working on that together also helped professionally just trying to problem solve together."

"I think most of it was just the nature of the collaboration, just the group project part of it, but obviously it was easier with the Sakai program to do that."

Responses were less positive overall, however, regarding the impact on *professional* community, if they were able to even discern a difference. Ann did, and her comment was rather blunt and surprising, as she was one of the greater contributors: "not much of an influence to be honest. I didn't check Sakai a whole lot other than to post my things on it. So, looking at other people's things wasn't a real incentive I guess to go to Sakai."

Kayla, another participant who contributed more heavily, stands out in this section due to an absence of comment in her interview regarding the *mutuality* component of CoP. Amber observed that by the end of the term, the group appeared closer to using Sakai for more *professional* purposes. From Sally:

"I would say it was helpful. I would say it was beneficial because here's this thing and we can all share and you don't have to be all there to get it. You can get it anytime and it's always gonna be there. So, I would say it's a good advantage for us as a learning community. And now if we can remember to use it..."

In fact, Sally is the only one to have used Sakai since the end of the term, aside from the instructor. She has shared pictures of her kids a few times via the email list, more than two years after the

course, after they have graduated. It is rather surprising that it is Sally who continues to use Sakai, when she hardly used it at all during the class, and the others, who used Sakai much more relative to Sally, have completely abandoned it.

### *General Community*

Some important details about this group of participants are helpful to provide perspective. First, though a few of the participants share greater mutuality because they work at the same school, the class as a whole is bonded almost strictly by their physical meeting once a week. And even then, according to the instructor, “Their learning in the past has been much more isolated; I don’t think we’ve had any big projects done before that was a collaborative task.” From an online perspective, the instructor explained that “No one has ever made any reply on a listserv.” On the listserv and with independent email, her communication with the participants has been minimal and administrative.

Nonetheless, the instructor observed mutuality or community among the group from the start of her work with the participants: “they already have some knowledge of each other and were able to joke with each other.” There is not much evidence of the impact Sakai or the cooperative projects had on the general community, but there were general remarks of how they talked a lot more this term. In her final interview, the instructor exclaimed, “I do think they are enjoying participating together.” Later, reflecting back on my role, she said,

“you came into the community and you really became a part of the community fast and that was in part by my absence when I had the surgery, but I mean you became an integral part of our community, and they appreciated you, they appreciated your knowledge. By the end of the semester, they were making jokes about you.”

Comfort with joking about each other was a sign of strong community bond to the instructor. Indeed, in all observable respects, this group was quite harmonious. Even for such a small group, there were definitely a few cliques, but everyone seemed to get along fine, and the cooperative projects seemed to help everyone get to know each other a little better. Jane said, “I think it’s a very

close group we have right now, very comfortable so I don't feel intimidated or anything like that...Ah, so but as far as sharing in a community, I mean I have learned lots from these peers in this cohort."

### *Leadership*

As discussed in Chapter Two, CoP theory and research address leadership as an important CoP element. At the center of the CoP *circle* are the key players who mentor others from *legitimate peripheral participants* to more involved roles. The instructor appeared conflicted regarding her role as the leader. On the one hand, she has "attempted consciously to become more of a constructivist," and she felt when she has given her students a choice of what to call her, this constructivist approach allows them to call her by her [given name], as opposed to the use of her title, which is what they used to call her when her approach was more "the holder of knowledge" or "the authority." She said, "as learner I see myself as their peer." On the other hand, she remarks that her *actual* peers "are the people I teach with [her fellow professors]. I don't think as an elementary teacher anymore." She explained further the huge difference between her students and herself. This exchange is significant on a few levels. First, it explicates this conflict of peer versus superior, a dual role that she observes she is playing, and there are obvious conflicts in relation to this dual role. When does the professor acting as peer-learner step up and lead? And to what extent does she lead? Further, the instructor outlines some of the big differences between us researchers and theoreticians and the people who are in the *real world* doing the *real work*. This observation is echoed, albeit indirectly, with the other participants throughout the interviews. They do not have time or the inclination to go beyond a peripheral engagement, let alone take on any form of leadership.

Though I tried to maintain distance as a researcher and stick to my role as technology consultant, I was in a position of authority to these participants. The fact is I did *manage* the class

on a few occasions when the instructor was absent and when I covered specific technologies. When I shared how leadership came up with participants in their interviews and my concern that I could have done more, the instructor said, “You had to do it that way,” meaning I had to limit my role.

### **Repertoire**

As a reminder, content area repertoire was outside the purview of this study, as was CoP repertoire already existent for the group, at least in the physical or co-present realm. The research questions were more interested in how the technologies and CoP-related behaviors were incorporated into their *repertoire*.

### *Questionnaires*

There is really only one question, Q15, that has more than a few tenths of a point difference between Questionnaires 1 and 2 - “I am content with my current teaching resources.” The response shifted from a mean of 2.5 and .5 SD to a mean of 2 and 0 SD. A .5 response difference is a small shift in the positive on attitudes toward available resources; perhaps the work with the technologies and sharing of knowledge contributes to this shift.

Ann and Sally felt less need for better ways to communicate with peers/colleagues on the computer, Q21. The instructor and Helen disagreed, feeling they do need better ways. Q21 had the most variability from positive to negative or vice versa. It is very likely a bad question, as it could be interpreted in different ways as to what technology they use at work, for example, vs. in the class/program. Stella shifted to the positive in her feelings on her current teaching practices, Q16. Sheila shifted to the positive on Q15 and Q19, more confident at the end of the term with her teaching resources and her ability to share them with others.

One open-ended question in particular from Questionnaire One relates to repertoire: What activities or communication technologies would enhance professional community in your program? Most of the participants had nothing original to offer, demonstrating their general lack of

technology awareness. They referred directly to the technologies of the course, such as Sakai and its tools, or the website they were to develop (several waited until a few weeks into the term to finally respond to the questionnaire, hence their reference to these technologies). Only Ann suggested something different, the use of Portaportal as an alternative to some uses of Sakai. Amber used the question as an opportunity to vent about issues with a completely irrelevant university technology. Kayla pointed out the need for greater resources, namely a better network and newer computers; Sheila reinforced these comments, also suggesting the need for better staff development. However, Helen, who works at the same school as Sheila, was complimentary of all the technology in their school and how the “Central Office personnel are always willing to supply web sites, and other faculty members also share web sites. Our school technology coordinator is most helpful in providing us with sites and technology activities.” Jane completely ignored activities or technology in her response: “An open environment creates good communication.” None of the other participants had a single *activity* to offer. They only focused on technology, which foreshadows the rest of the study.

Question Two of the second Questionnaire is most relevant to repertoire: Compared to past professional development activities, how do you feel about the use of Sakai? Is it a viable alternative? The participants were somewhat positive in their responses, with many caveats however. Generally, they acknowledged the utility of Sakai over other systems, yet they felt it could be more user-friendly and would be very difficult for other teachers. Sally thought the system was great. “However,” she declared, “I am a people person and I would rather learn from people talking to me than from a computer.” The Sakai system is too impersonal for her, an issue reinforced pretty strongly in several of the participant interviews.

In response to Question Two, the instructor takes the opportunity to further compliment the Sakai system: “I consider Sakai a great alternative to Blackboard. It looks better, it is ‘friendlier’

and more accessible, and I think it has more possibilities for enhancing instruction.” The instructor observed issues she had with the discussion and chat tool, but also acknowledged that she was not want to use them anyway:

“I am using Sakai for both of my courses this summer. However, my use of Sakai is still quite limited. I have not required discussion and no students have used it to date. The main thing students are doing is downloading my PowerPoint presentations and other resources, and they are uploading some of their assignments. So the only thing that is “new” here is that, rather than emailing things to me and having me upload them to Blackboard, they are uploading things themselves. The students like the idea that they will be able to go to the Sakai site later, after the semester is over, to access this information. I managed to make alterations on the websites so that I got rid of all of the resources I didn’t want, and I made all of the students “instructors” so that they could work freely with the site. They are only doing what I have told them to do.”

She points out how the summer courses are more intensive, meeting more often with a lot of assignments to complete: “I think they probably feel that they have too much to do too fast, and they don’t have time to get creative with Sakai or start discussions.” She touches on a crucial finding of the study:

“I still need to know a lot more about technology and I need to learn how to effectively integrate it in my teaching rather than just using it as a storage place for my students and I to place information to share with the group. I need to learn to think about technology like Sakai and its possibilities when I am planning my courses and write it into the syllabus.”

The final chapter elaborates on this point.

### *Memos*

*Aaron’s Memos.* There were some technical issues during the first couple classes, at first with participant accounts, and then with the computer lab (Explorer) and Sakai (the email tool). These were fairly minor and to be expected. The participants seemed a bit overwhelmed, meeting in a computer lab for the first time, trying to remember their university online credentials, which they rarely used, and the need to use this new web browser, Firefox (to solve Explorer problem). The lab assistant helped us out a good bit, and the technical problems were eventually addressed by the University’s Computing Services. Even with the initial problems, “In 45 minutes, maybe, I had teachers chatting online who had never done that before. I thought this was rather amazing, both

that several had never done it before and that we actually had it working quite well, despite the technical problems.”

At the second class, I solved some remaining account issues. Most had been resolved by email during the week. Then I explained how to use the email list, that using *reply all* sends to everybody, and this is better for community. Other tasks for the day:

“Filebox account (except for two students who did not have their VT account login info, one new and one didn’t know it). I showed my folder with URL link and actual file (index intro). Each set up a personal folder in Sakai. Each copied the index file to their desktop and edited it in Word. Then a student [Ann] volunteered to show them how to upload the file to Filebox. Then we set up the URL link in the personal folders of Sakai. It was not viewable because we neglected to set it as public in Filebox. After fixing this, students were able to link to their first webpage (none of them have done this before and only a couple have actually developed webpages, using Frontpage I think). They seemed less excited about this than they were with chat, but this was after they had been at this for almost two hours. Considering their overall lack of computer skills, the instructor and I were impressed with what the students accomplished. The instructor pointed out that some teachers were closing applications altogether instead of minimizing the windows. I told them how to do this, one commented that it was the most valuable thing they had learned. Another commented that she was not aware of the refresh button’s function, but she called it the Ebay button, as she used it to refresh auction bids.

“Ideally I would have gotten the picture set with them, perhaps this would have been more impressive. All the filebox and Sakai functions seemed to work fine. All this took a couple hours. Afterwards the instructor let them get in their groups for the book report projects.

“During this time some actually referred to the ‘PowerPoint on PowerPoint,’ what fonts are better and how color is bad and fancy stuff is bad.”

This excerpt from my memo is telling. These participants really were amateurs when it came to all this technology, and the instructor and I asked a lot of them. For the most part, they were successful in accomplishing all the tasks. They had actually done their homework to study the PowerPoint presentation on developing good PowerPoint presentations, which was encouraging, and they were applying some of the things they had learned. It was a good start.

For the next class, “At one point they shared the fact that they had used the discussion tool during the past week. I was quite surprised at this and showed it. I shared how impressed I was and happy that they used it. They seemed quite proud of themselves as well.” I went ahead with a focus group on this day, though I suspected that “they were not ready to talk about technology support for

their activities; and it turned out that this was true, but more because they simply didn't have a grasp of what they were going to do yet, what activities would support their work." I spent the rest of this class working with the participants in the computer lab:

"My support was all on PowerPoint and none at all with Sakai. I showed them the Google images search tool and how to copy and paste an image, from the web to Word for example. [Jane] seemed to be rather frustrated at the end with her tech skills and embarrassed to share her questions with me. She seems the most reserved and the greatest technophobe (however, I see that in the [online] discussion that took place, she contributed twice, wow). They all apparently got their PowerPoints uploaded fine. At one point I helped [Stella] find where the plan of study document was, in the syllabi folder, probably not where it belongs but where the instructor put it. I had to tell her to click the plus sign to open the folder."

The next class was dominated by book report presentations, for which "each group had used the resources folders [in Sakai] set up for these presentations to upload their PowerPoints. Some uploaded certain sections to be combined with the final version. Others uploaded some images to be included." Though participants voiced otherwise in the interviews in particular, at the time, the advantage of using Sakai for supporting cooperative work, compiling disparate data, seemed largely unappreciated by the participants. This was possibly due to the fact that actually only one person for each group was doing the uploading of documents, somewhat defeating the purpose.

At the next class, I helped Kayla and Helen "with a photograph issue on Helen's website, they did not have the path name correct. Rose also had a photograph problem and was near tears in her frustration. It turned out the photo in Filebox actually was nonexistent, no data." The class thereafter I gave a very brief lesson on using *plain text* or HTML to author documents in Sakai, so that they are more easily editable, which Kayla reinforced. I wrote, "Though a few were listening, for the most part it appeared to be in one ear out the other." Later, Amber shared what she had added, "only it was in her personal folder, and she had sent no notification. The instructor is guilty of this as well. Despite two previous attempts to discuss a protocol for the use of Sakai, there still appears to be a lack of a basic understanding of its application and use, they lack the previous experience perhaps to make these judgments."

The next class memo dealt largely with purpose. The class thereafter was largely spent on Nvu and web development skills. Directly from my memo:

“Kayla asked whether she/they would have a chance to discuss issues with Sakai, particularly the discussion forum. I explained that I was interested in such feedback, but that it was not actually instrumental in my study. The instructor asked what folks had contributed to Sakai and went around by groups. When somebody mentioned they had posted something to the discussion forum, I took the opportunity to show people how to find it, how to navigate the forum in general. The instructor explained how she had seen a question from Kayla regarding what info to include on textbooks, in the discussion digest on the homepage, but she was unable to click it to access the whole message, and she couldn’t find it in the forum. How she sent me an email requesting how to find it, but gave up and emailed Kayla directly. Here I chimed in and explained how I had spent some time writing an explanation for how to find the message, only to be frustrated that she had given up and replied to Kayla via email. She finished by explaining how I had also sent her a response suggesting that that might have been a message [the instructor’s] for the list, not just Kayla.”

The class worked some more with their websites, and I wrote: “With maybe 25 minutes of the class, folks were clearly starting to lose steam. The instructor said straight out that it was time to quit. They had actually accomplished quite a bit in 2 1/2 hours. They all seemed satisfied that they had learned some skills.” The discussion on emailing the list rather than an individual is one of the few times such observance of protocol took place, and it was mostly between the instructor and me.

After the class, I met up with the instructor and Ann outside and stated that it would have been nice to have the participants start learning the web development skills earlier, but we had not had the time and the participants had not seemed that interested. Ann corrected me and said “It wasn’t that they were not interested; they just were not ready.” We talked about how the hands-on, step-by-step guidance was helpful for the participants, but I observed that it took a lot of time, which we didn’t really have. The participants seemed unwilling to do any “homework” on technology, and the instructor did not push it.

*Instructor’s Memos.* The instructor’s first memo addresses a day I began the class with an introduction of a lot of tools. In hindsight, it really was a lot for them to absorb. This is how the instructor described it:

“I think we moved from looking at Sakai as a sort of novelty to play with toward viewing it as a tool that we might be able to make good use of. I was as much a learner as anyone in the class. I now

can't remember exactly how we moved Aaron's biography out of the Open Book and onto our desktops so that we could edit it. I do know how we got it off the desktop and into the Filebox, and I know how I got it from the Filebox onto the Open Book. My understanding is that the only thing that can be automatically uploaded from Filebox into the Open Book is something named index.htm. Otherwise, it will move everything out of the Filebox. This activity helped me take a peek at how we might create webpage documents and get them into the Open Book, where we can all view them. I think this was good for all of the students and myself. Everyone was very engaged and actively involved."

She did not quite get everything, nor did anyone else, and it is not any wonder given the breadth and depth of the lesson. But they did get it eventually, for the most part. I think it was a fairly positive session, and the instructor seemed to think so as well, despite some confusion.

Having missed a couple classes due to her health concerns, the instructor tried to participate in the fifth class via the chat tool in the Open Book:

"I didn't feel that this went very well. It took a long time for everyone to actually appear there in the chat room... because people kept joining the group and saying things to me personally, I didn't have any sense of being able to "lead" the group... the ideas that were being shared...seemed too big and unfocused to me, and I felt a need to be physically with the group and get them focused."

This represents a glaring theme observed in the study, that the teachers, including the instructor, are not exactly comfortable working in cyberspace. They lacked the practice. However, in defense of the technology, they had not set up any protocol for the use of the chat room.

In her next memo, the instructor observed the general feeling among the participants that Sakai was just another technology to have to learn: "I think there was a general sigh of relief when Aaron said they had learned what they needed to know about the Sakai." In hindsight, it appears that my comment may have been misunderstood by the participants. I was speaking from a technical skills standpoint, which they understood, but I later wondered whether they had felt they were set in their *use* of the tools as well, where there was still plenty of room for improvement. The instructor further reflected on the advantages of Sakai, comparing its utility with challenges she faced in another class with the use of Blackboard and limited classroom technology. She closed with frustration "at being unable to get Nvu to download; thus I cannot fix my bio page using the

instructions. I gave it a shot, simply creating a word document and saving it as a web page, but the picture does not show up.”

In the instructor’s fourth memo, she describes the rubric the class collectively determined and that she finalized and posted: “By the way, I put this rubric in Sakai, perhaps under my name.” Of course, if the intent was to share the document with all the participants, there is probably a better location than her personal folder in Sakai, even if that folder is public. Later, the instructor reports that Rose “sent a link to everyone,” to a website they had all viewed in class and found useful. Perhaps a links space in Sakai might have been considered, easier to access than searching back through the Sakai list. These protocol issues were at the heart of the study, and the absence of data on them is telling.

The instructor discusses a number of technical issues in her final memo. She covered our explanation to participants of issues using a template with NVu, and why, again, we were not using FrontPage as our development application. She recorded frustrations she and the participants had with the discussion forum on Sakai: “And then Aaron got it up on the screen and showed us how to work it.” Then she explained our creation of the Nvu pages, how it seemed to go too quickly, but that “We were all successful, with Aaron’s assistance, and the students were very pleased with our accomplishment by the end of class.” She closed the memo with an observation that some participants were worried about retaining the skills they had learned.

### *Focus Groups*

In the third focus group there was discussion of what was hindering the participants from posting material to Sakai. Sheila responded that they compile stuff together and then one person posts it. The instructor argued that this is not how it should work, that each participant should be posting content, reading it, and then it is compiled. Kayla made a good point about how easy it is to edit documents on Sakai if they have been created with the HTML editor, which I had explained to

them in the past. We discussed how documents could be collectively edited and that it was as simple as cutting and pasting from a Word doc, without having to download and re-upload. This was exactly the kind of protocols I had in mind for the group to negotiate, but this discussion seemed meaningful only to Kayla and Ann.

I asked about what they thought of the organization of content within Sakai. Ann explained how she had created a general activities folder for sharing her PortaPortal site, as there had previously been no logical place for it to go. She commented that this is probably what I had been trying to get them to discuss, that the content posted and the system itself was not just for this class, because what she posted will be there *forever*. This was one of the few incidents where a participant took control from an organizational standpoint. It was encouraging, but fleeting, as the discussion steered away from this crucial topic. There was then talk of further use of the discussion forum. I pointed out the online discussion early on in the class on grouping, but then there was not really any further use of the tool. Kayla responded that this discussion took place in class, as if it could or would not happen outside of class, a point reinforced by other participants in different contexts.

There was some discussion of the website content, where to find it and other things that had been added. I discussed how things might be shared and organized, how to send a notification for important items, particularly if it is put in a more “obscure” place like a personal folder. I explained to the group again that the premise going into this study was to “let y’all be in charge of your space – how you use it would emerge from the activities to support your projects.” Though a repeated mantra, the group never seemed to accept the ownership.

In the final focus group, I challenged the participants directly with an inquiry as to whether “this community could grow and that Sakai could become a local online center for sharing knowledge? Is that just something elementary teachers won’t do you think?” In response there were several irrelevant comments; again, this is the type of question the participants had continuously

tried to avoid. It was a consistent frustration not being able to get the participants to think more deeply about their activity and purpose. Kayla finally offered the kind of feedback I was after:

“The majority of the things that I share are hands-on, usually make-and-take activities that I’m most proud of...Those are also the things that I don’t think I could do justice putting on here. I could explain it all day long, but until you see it, you’re not going to see what I see in it...And then I would have to post pictures, you know it would be an ongoing thing.”

I was interested in what might be more easily sharable in elementary education. My response:

“Well, something that is completely text, like the exam that Jane shared today, that takes a long time for a teacher to produce, that’s a problem that’s been solved by you...Other teachers are facing the same problem. I mean I guess that’s the basic theory behind this, to save them the trouble, put something like that online.”

At this point Helen interrupts with this question: “I want to ask a question about that same thing.

How is this unique to thousands of other websites that I can go to and find a quiz?” At the end of the term, I was surprised by this question, but I respond, “What do y’all think?

- Helen: I mean I know it’s local, it’s more local, but...
- Aaron: There’s that... “you know all the members, personally...
- Helen: right, but the curriculum, and if I want an idea on a book, I can go to many websites and find activities, lesson plans, tests, that people all over the country have made...
- Amber: I think one thing that would make it unique is that you can go to lots of chat rooms, you can go to a lot of other websites and download stuff, but its hard to find all of that in one place.
- Instructor: You can type in “The Black Stallion” and find 500 websites that mention it.”
- Amber: But to have a website that has a chat room and a discussion and documents might be hard, and I don’t know, but it might be.
- Aaron: Well, once there was a critical mass established and there was a bit more content, I think there is advantage in the locality of it. So if I find this exam that Jane produced and I have questions about how she did the exam or the results that she’s had with it, I could simply email her or call...
- Jane: ...when I do search, I’m really not finding what I want. And that’s the thing, that I want something that’s going to go along with my SOLs. So, maybe you could do that, you know with Sakai. Maybe that’s where it would come in. Like I could post it up there...[she never did]
- Sheila: I do think teachers would like that, because our teachers have redone tests, and it takes them hours, just like you did, and I do think they would jump on Sakai if they knew there were tests on it that would help their kids.

Only here at the end of the term are participants negotiating advantages of using Sakai, which illustrates the time needed for this aspect of repertoire, to support the CoP and get it to thrive.

The participants' focus on usability issues, mainly the discussion tool of Sakai, were a frustrating distraction throughout my data collection, particularly since it was the resources tool that was more important, and it worked fine. The instructor said, "Well obviously some of us put resource things in stupid places sometimes." She was referring to at least one of her own postings. The class laughed. I responded thus:

"That's part of that conversation I was trying to get throughout the semester in establishing that protocol collectively rather than [the instructor] and myself mandating it and saying 'you're going to do this, you're going to post this and this at this time and in this place.'"

The instructor observed that "Some of it did occur naturally, and quickly, but then it died out." Jane answered my question with a comment on how much easier it was for her to learn Blackboard. She was not able to pinpoint why, though she did mention two nights of training and a *requirement* to post things. The instructor responded: "But of course Blackboard would not have worked for us, um, okay, I can't sign you all up to put things on Blackboard. You would have had to send everything to me and I would have had to put it up myself." I clarify that "She's talking about the resources." I continue:

"As you are all local , that resources section seems to me would be the more crucial than the discussion forum where you can call or email and have discussion all day long...four of you see each other in the same school. It may seem silly to go into a discussion forum online to discuss things that you can talk about in person during the day."

#### *Sakai Data*

In an early, lone chat message from Helen, she brags about her success downloading Firefox without any help. Then she explained her trouble opening the PowerPoint presentation about creating good PowerPoint presentations, which they had been assigned to view. The chat tool was obviously not the appropriate place for her message, as nobody was there to give her a response. She made a similar mistake a week later, asking me how to share the URL for a survey. However, in this instance she wrote that she realized that though Sakai indicated I was in the system, it was not indicating I was in the chat room. Sometimes the chat tool was used to make an announcement,

also not exactly the best use. Without any outright negotiation, that was observed anyway, Helen and the other participants gradually learned what the tools were best suited to accomplish. Of course, with such a small group, the chance of people being online at the same time made spontaneous chat less likely. The tool was certainly useful on a few occasions when participants could not be co-present.

From the class session that was largely supported by the chat tool, the instructor started with asking what the participants had “learned about making good web pages.” Immediately there were interruptions of a social nature. A number of websites were posted, but they apparently had not been digested. Nothing specific was shared. Helen shared a site called *Webmastering for Dummies*, to which the instructor responded, “Sounds like the perfect starting place for me.” This illustrates both their weakness with technical skills and their sense of humor about it. Soon thereafter Helen indicated that they, the group that met in the classroom, were talking about the webpage, and the instructor responded, “Okay, you all talk and help [Helen] get her picture up. Talk is definitely more productive than chat room writing.” The instructor recognized that the chat tool played a supportive role, that it was counter productive to try to hold the entire class in the chat room, especially when several participants were co-present. Twenty minutes later Amber shared Sheila’s success with getting her PID and Helen’s success with getting her picture on her bio page. The instructor asked about the PowerPoint files for the book reviews, if they had been posted on Sakai and where. Kayla responded, “The PowerPoints are in Resources and Book Reviews [folder],” which was the logical place, which, incidentally, I had had to create for them.

Within the discussion forum, the *grouping* topic definitely captured some attention. It demonstrated a shared teaching method for the field of reading, yet one that apparently had many interpretations. There seemed to be a great deal of potential for some in-depth dialogue on the subject, but it did not occur in the forum past that first day. The same could be said for the topic of

No Child Left Behind. This was certainly a hot topic on which the participants had thoughts to share, but apparently not in the discussion forum. In looking at the participant postings, most were quite brief and independent of any other posting. A few responded to larger questions such as defining *flex grouping*, but what dialogue existed remained fairly shallow. Even the postings on the website project can not really be characterized as *discussion*. Rather, postings were disjointed and more administrative in nature. The participants were clearly not very comfortable with this form of communication; nor did they seem to feel the need or see the advantage with more involved or interactive sharing in this way.

More than halfway through the term, April 2 to be exact, I posted a question to the Sakai section of the discussion forum: "How should artifacts be managed for publication to colleagues?" I further defined the question as follows:

"Take for example the book reviews resource. If you were going to invite colleagues to view it and other resources, how should they best be presented? Does the PowerPoint presentation suffice as a review of the book that would be informative to your colleagues? Or should there be an html/text document as well that gives a brief summary of the book's message? Or do you not think these resources are important to share? You put a lot of work into them. What would make them more worthy of sharing?"

Only Rose responded to the question, and only with regard to her personal preference for the PowerPoint presentations, for the bulleted lists and visuals, not with any consideration of a larger audience.

More surprising was the lack of use of the email list; there were only 16 messages from participants the entire term, despite several reminders to participants on how to use the list and encouragement to do so. Later in the interviews it was learned that Rose was oblivious of the features of the email list or how to use it. Others claimed that they would rather just email it, as opposed to posting to Sakai. Of course, this begged the question of why not use the Sakai email list. Kayla claimed that if she had all her classmates email addresses, she would have used her old email method; in fact, she never even used the email list. Only Helen, Stella, Amber, and Ann used it, and

Helen and Stella were much less technically inclined than Kayla or Rose, not that there was much technical know-how involved. Indeed, it seemed the benefits and ease of use of the email list completely escaped the participants' awareness.

Again, most of the email messages were from me, and most of them dealt with technical issues and technology training. From the beginning of the study, the instructor and I tried to engage the participants to consider how they could use Sakai, from an activity perspective as well as protocols for organization of material. Mostly this was done verbally. However, in introducing the discussion question above, to which only Rose responded, I sent a message to the email list. In my prompt I wrote:

I want you to consider what is important both from a content point of view as well as how to present and organize content within Sakai. As you work with Sakai, keep in mind your peer audience and potential colleague audience when publishing work. For example, Stella added a word doc of third grade activities. I have replicated it in an html doc that is now more accessible and more easily revisable (I also set text to flush left, so it is more ready for cutting and pasting into [the website]). Kayla reinforced the point in class the difference in how these documents are accessed and revised. For another example, the presentations folder is now gone, and the PowerPoint on how to do PowerPoints is now in the class folder, Literacies and Technology. Does this make sense?

The next day I modeled the questions further. I posted a successful writing activity from when I taught English. I explained where it was located and asked if this was the appropriate place and method of sharing the activity. I further explained how easy sharing was for any text one has already written, how to copy and paste into a Sakai file. I also explained how one could respond to the activity I shared, either directly within the file or in the discussion forum for example. Nonetheless, the participants remained stubbornly uninterested in examining these protocol issues, yet later in the interviews, they were more than willing to lean on the excuse that content was too difficult to find in Sakai.

The resources section seemed the most valuable to the participants from a course project standpoint as well as general support for CoP. Yet there was a striking lack of activity with this tool as well. It was well utilized to support course tasks such as the book reports, personal bio pages, and

the website project, any of the group projects the participants were directed to do. However, for any voluntary contributions, namely within the Websites and Activities folder, there were less than 10 items shared, not enough to even justify further consideration of organizational schemes.

The participants certainly used the system to support their group projects, but still in a fairly rudimentary fashion. See Appendix T for a couple of screenshots that represent Sakai at the end of term, the resources area and discussion tool.

### *Interviews*

The three major themes from the individual interviews that emerged in relation to the CoP element of Repertoire are the following, fairly balanced in their emphasis:

- Technology Skills: web, computer skills a struggle
- Time and Practice: lack of time or practice and training to use Sakai tools, or others, and have them become habit
- Sakai Benefits: participants recognized advantages that Sakai and other technologies have to offer.

Technical problems were observed by the interviewees, including some usability issues with Sakai. However, much greater emphasis was placed on obstacles of skill development, not enough time and practice, and a lack of habit in using the technologies. Nonetheless, many saw the benefits of the technologies, particularly Sakai; they gave thoughtful examples of how and why certain Sakai tools were particularly advantageous.

### *Technology Skills*

A lack of technical skills and need for more training, as well as a lack of time for such training are common themes in the literature, and this was a repeated point of discussion between the instructor and myself from the beginning, when she exclaimed what a difficult concept it was for the participants to know their PID and password for various school systems. Rose shared her frustrations, “I thought I was pretty good in technology. I mean I do our school’s website, but I realized that I have more to do, more to go.” There was actual fear among some of the participants.

From Stella: “I’m afraid I am gonna break something.” Stella, for one, had never even done a PowerPoint presentation before this class. For Sally, computers are not her way:

“Some people seem to live and die and can do everything on a computer, but to me I feel like that just takes more time. Like I will jot a note to a parent and the girl next to me she’s like well why don’t you type it so you have a hard copy for next year when the same problem happens.”

Sally understands the benefit, yet:

“I will open up a dictionary before I would you know do the spell check on the computer or whatever... I don’t go to the computer first I guess...I don’t enjoy it.”

Others, like Jane, simply struggle with computer technology in general:

“I have a hard time with my email because I get so much and it just overwhelms me, I am like oh my gosh. I’ve got to sit down and do this. And then I don’t know what to do with it, should I keep it, you know...”

I asked her if she ever looks at the email archive in Sakai, and she responded, “Maybe not.” Still, Jane went from being anxious about the software/hardware to commenting on how much she was learning and getting interested. Amber observed the varied skill levels of her peers/colleagues and the challenge in getting other teachers to use Sakai. A few felt their skills had improved, but there was still a significant discomfort with the technology.

### *Time, Practice, and Habit*

In much of the literature, teachers do not have enough time. This study was no exception. Many participants complained of how long it took to learn the technology skills. Jane described a day in the life of an elementary teacher as non-stop corralling, with little time to “get over to the computer.” According to Stella, “I just feel like there were so many glitches or holdups or people feeling lost or having to catch up for just the whole uncomfortable feeling of navigating Sakai.” According to Rose, her school’s *webmaster*: “learning Sakai, learning all of the different programs to do the website it was just like I can only absorb so much.” Rose and Stella both suggested that Sakai should have been introduced in a previous term. Amber said, “For so long we got it all confused and thought it was all the same thing, but Sakai itself, no, I don’t think it’s hard to use, and

I think it would be fine for us to keep using it.” Ann did not use the system much; she said she might have if the notification tool had been used more. I asked if this would not be too annoying. Her response: “I think every once in a while it’s nice to say hey I added this. If somebody feels like it’s important enough to notify you about, then you would go and check it out.” Later, Ann shared this: “I think people enjoyed learning it, but I think if they don’t have a practical use for it, it’s not gonna stick.” I responded, so “it has to be something that’s assigned to them in class for them to actually do it.” She agreed for most teachers.

In the preliminary interview with the instructor, about a month into the term, I shared my frustrations that the class was either “not really on board with the whole idea of Sakai becoming an open professional community resource… or they just don’t understand it.” She responded, “Some of both? Until you understand it, until you really understand it, you can’t embrace it.” She shared what turned out to be some very insightful predictions:

“When we sit down around this tape recorder and have them start talking about how they’re going to use Sakai with their projects… I don’t think they’re going to have any ideas how to organize their work with Sakai… the idea of using it at least is very foreign to them.”

She was correct in her estimation. The notion that the participants had the ability to control their Sakai experience totally escaped them, even though more Sakai talk could have solved most of their problems, particularly with organization of content, an issue that came up often.

The use of technology was not a personal habit among most participants, nor a part of teacher culture. Stella commented on this point:

“I am a verbal person and not technological really, and at first if I had to describe the emotion of what we did in the class … it felt unnatural to try to communicate with my peers using that venue. I am more of a let’s meet at the coffee shop and talk about stuff”

When asked what might have better supported community in the class, Stella followed up with these reflections:

"I think more time just to have open conversation... the times that we sat around the table and talked about stuff, ah I seemed to feel like we got more out of professionally you know more out of the class. I don't know if I am just too human-to-human to think it can come across like that on Sakai."

Kayla reinforces Stella's reflections:

"I guess as teachers we are so conversational and so social I don't know if it will ever get to a complete computerized thing, and if it does, it's kind of scary. You know what I mean? Like I would rather talk to them. We get more out of conversations with each other as far as teachers go."

Moments later in her interview, Kayla added this:

"...in the real world if you are sharing resources, you are gonna share them with that person. You are not gonna put them on the Internet. If I am doing something I want in class or you know that I see that's benefiting in class, I am gonna share it. I am not gonna take the time to go put it on the Internet."

Kayla elaborates:

Kayla: I feel like if I am doing an activity, I wanna be able to show them, I wanna be able to tell them what I am doing, I wanna be able to answer any questions about things that went wrong while I was doing it.

Me: You don't think that kind of activity can take place within Sakai?

Kayla: Well, I feel like you have gotta post the resource and then you gotta start the discussion and then you have gotta, I mean it's just easier to walk across the hall and tell them.

### *Sakai (Technology) Benefits*

In her final interview, the instructor made a special point to remind me that she had never heard of Sakai, that I was a significant influence on what happened for the course. She also notes how much more difficult the course would have been without it. In fact, all the web-based technologies we employed during the class were new to her. She remarked on Filebox, the University's web hosting service for students and faculty: "One of the things you have taught me, and I hope that I will use, is the value of Filebox." She recognized they could have used individual Fileboxes with Blackboard, but it would have been "a lot more...disjointed." The instructor was certainly more engaged than the other participants with the operations of the technologies, and she clearly developed a much greater appreciation of them.

Several participants commented on the Sakai benefits being twofold, as the system also served as talking point of cooperatively developing technical skills in general. Here is Stella's response to an inquiry on how the accessibility to peers' work in Sakai was an influence on her learning:

"Well, the best example I can think of with this class on that is scurrying to look at everyone else's bio page in the beginning, going did they get their picture uploaded? Is it in the same place as mine ... and then going hey, yours looks great, how did you do that...maybe I am supposed to know about all this stuff ...how to upload and download files and what URL's are... but I wouldn't say its a comfort zone, and I didn't use Sakai to try to find out what great stuff my colleagues were doing."

Jane reinforces Stella's point:

"Yeah, but I mean when we would have to do an assignment or something like that, we would all run around here talking and figuring out, we are constantly talking about what do we have to do, how do we do it? What have you done? It was that kind of a thing...Not actually going in and seeing something that I could pull out and use in my classroom."

Some commented on basic benefits of having an online space. Sally admitted, albeit somewhat grudgingly, "So it was nice. I am not a big technology fan. I'm sorry...It saved time I think." She further comments, "I could always find them [electronic files] on Sakai whereas I could lose them other places [such as her computer]. Ah, and then the more people put on there the more I generally could use it by going to it and looking to see if there was some new you know new lesson plans, new ideas, new websites." She provided a particular example, "It made me learn about PortaPortal and had me look at a site that I would never, ever look at." Ann appreciated Sakai's support for some activities, "especially when we did the presentations at the beginning of the semester when we had to be in project teams so that way we could save them on Sakai and each of the three of us could get to it whenever we needed to work on it and add our parts to it." Amber reinforced Ann's comments and expressed a wish that there were more resources, as did Jane, but Rose and others complained that there was enough to cause problems with organization and navigation. Sheila observed that Sakai "can aid in learning in the fact that you never have to really leave the class. If you want to go to it, it can be ongoing."

Finally, exchanges with two different participants highlight the challenge of Sakai becoming an integral part of their repertoire. Regarding the sharing of a lesson plan, Rose argued that she would rather simply use email, that it is easier. I challenged why the Sakai email list would not be better or easier, just one address. She responded, “I don’t know how to use it.” The entire term she missed out on the email list, arguably the simplest of the tools used; with no awareness of how it worked, she still tried to argue that her school system’s email was easier. An exchange with Kayla was much more complex. She had perhaps used Sakai the most and was more aware of its features and benefits, yet at the end of the term, she is reluctant to acknowledge them. In a self-contradicting dialogue, she argued “Other than [Sakai] holding and being able to edit stuff on-line without having to, everybody email it to everybody, I felt like you were still checking your email, so to me it sounds easier just to email it.” She later admitted:

“I mean it’s definitely easier to have everything in one spot. It depends on what you are doing as far as email goes. If you are looking to mass send it, obviously it’s easier to put it on Sakai and do it that way, but for communication purposes with one-on-one or to ask people questions and things, you are still gonna go back to email. Whereas in Sakai I don’t think I would use it for that purpose.”

The notion that others might benefit from the one-on-one dialogues between teachers, that Sakai could make them public with no greater overhead, was difficult for the participants to grasp. I later asked about a message she had sent to the email list about textbooks, “In the past, how would you have done that? She responded, “I would have emailed it, and I probably still would have emailed it if I had everybody’s email address, but I mean it’s just, I guess it’s what you are used to.”

### **Summary**

The results are summarized more thoroughly in the discussion chapter in addressing the research questions. The results align remarkably well with Wenger’s (1998) three main elements of CoP. Of course, one could argue that the theory overly influenced the analysis and recording of emergent themes, and the organization by CoP element in the preceding section might reinforce this impression. In fact, the original organization of the results section was by data type, in an effort to

retain context. However, reviewers thought it would be better to center the results more on the theoretical propositions, a matrix that does reduce data and allows for a more accessible presentation (Maxwell, 1996). Besides, the case study method was chosen to *develop and test theory* (Yin, 1994). Yin argues that every investigation should begin with an analytic strategy that preferably relies on theoretical propositions. Besides, the methods employed for this study do protect reliability and validity, particularly with the triangulation of multiple data types that agreed remarkably on the main themes, as did the instructor and I in our observations and analysis.

*Joint Enterprise.* Purpose was an overriding theme in that participants could not look past the course tasks as given and take ownership of the purpose of the service learning exercise of the website development, nor imagine a larger purpose for their professional community beyond academic borders. They did not buy what the instructor and I were selling, a permanent place online to manage communications and knowledge artifact for the group. The participants certainly participated in negotiating their book reports and the purpose of the project website; there was a relative degree of authenticity. However, there still seemed to be a lack of engagement with the participants simply going through the motions to satisfy the course requirements. The purpose of the biography webpage, as a way to identify oneself professionally as part of the community, was completely lost on the participants. The bio pages became simply a task of a series of technical tasks to complete. The purpose of Sakai was also lost on the participants for much of the term, even for supporting their course work, much less for more CoP-related activities. Generally, the participants did not feel that such activities, the sharing of knowledge voluntarily, were a reasonable expectation; they felt such activities would have to be *required*. The academic hurdle remains too high for CoP initiatives it seems. Also, aspects of the participants' professional practice and culture interfere with public sharing and online support for CoP.

*Mutual Engagement.* There were those *learning moments* when the participants *got it*, when they did understand the purpose and value of Sakai and utilized it well for both their projects and sharing something voluntarily, without being prompted. Yet such behaviors were fleeting, and the frequency questions alone present a fairly dismal picture regarding the level of interdependence among the group – no increase whatsoever in sharing with peers/colleagues, despite all the cooperative work of the course, and the recognition by participants of Sakai's value in at least supporting increased interactions between members of the group. It seems the impact Sakai had on the community was more as a talking point than as a communication and file sharing tool. The community was strong from the start of the study, which may explain to some degree the lack of increased sharing. They might share, but privately, with select individuals, and via more traditional channels such as chance meetings in the hall or individual email. Yet, there is evidence that they are in fact unwilling to share; and the email list in Sakai was little different than how they normally send email (easier to use for emailing the whole group), and it was hardly used at all. The participants simply seemed to have no appreciation for or interest in the application of Sakai tools in supporting their CoP, and if they were to share more, it seems there needs to be a more formalized scheme of reciprocity so that it is *share and share alike*.

*Repertoire.* It could be argued that a lack of technical skill and practice with the technologies hindered participants from sharing. There is no question that the participants were uncomfortable with the technology, but this is natural when learning new skills with computers and software. Yes, they had to grapple with a lot of technology in one term, and it took them some time to come to terms with the purpose each technology served. Nonetheless, in the end they were fairly successful developing at least the basic skills and understanding of their uses, particularly taking into account the lack of experience and skills of most of the participants at the start of the term. Certainly, as is often the case with teachers, more time and practice would have helped. Still, there

is a lingering doubt that some of the participants would ever really embrace Sakai or similar tools. Though the participants eventually voiced appreciation for the facility Sakai offers, it still may represent too great a change in practice – from sharing with few to sharing with many, from hard copy to electronic, and from more personal to less personal.

## CHAPTER FIVE: DISCUSSION

This section more thoroughly summarizes results while addressing the research questions, as informed by the emergent themes from the data and analysis and how they fit each of Wenger's (1998) CoP elements: Joint Enterprise, Mutual Engagement, and Repertoire. This section continues an analysis through Yin's (1994) analytic strategies of explanation-building, time-series analysis, and program logic models, tying together the disparate data points and providing interpretive and explanatory remarks. The paper concludes with ramifications of the study and a look at future research.

A prelude to the discussion is necessary to keep it in context. From the perspective of simply evaluating this course, the instructional interventions and learning that occurred, the course was a great success. Were this study analyzing results in relation to constructivist, cooperative problem solving, or service learning, for examples, the outcome would be quite positive. One could argue that given the lack of technology experience of most of the participants at the start, they did a remarkable job in developing necessary skills that will transfer to many other settings and tasks. Further, they worked well together, where they had previously experienced little collaborative work. There is no question that they reflected more on what they had of value to share with their peers/colleagues, and considered more the possibilities of sharing those items, physically and electronically. Yet it is communities of practice that framed this study, which differs from numerous studies in the literature review in that it is more disciplined in defining *true* CoP and assessing the results of the intervention based on this definition. If sustained online presence is the litmus test for success of this *intentional* CoP intervention, along with significantly increased sense of mutuality or sharing of knowledge artifact, then the results are somewhat disappointing. Many studies that have indicated more positive results typically have a less disciplined framing of CoP. The discipline of

this study better informs contexts and strategies for instructional design in support of CoP, and future research of such endeavors.

### **Joint Enterprise**

The research questions relevant to joint enterprise are as follows:

1. What activities emerge for the use of technology?
2. How do they come about?
6. How do online activities contribute to overall changes in community practice?
7. What concerns do participants have about the future of their CoP? Why?

As with the CoP elements themselves, some of the research questions are interdependent and relevant to the other elements discussed below. It is difficult to treat one element without dealing with another. For illustration, the joint enterprise reality of the group is to get a degree, and more topically, to successfully complete the course and related tasks, which means working on the cooperative projects successfully. However, from the study perspective, there was more interest in the purpose of nurturing CoP online, beyond academic boundaries. In essence, part of the joint enterprise was increased mutual engagement, from an *intentional* CoP perspective, within the online environment. Because of concern about the *authenticity* of such activity, it was a *secondary* goal, or not directly incorporated into the course tasks and activities. Unfortunately, this goal was not exactly embraced by the participants, and they shared many explanations. What surfaced as the predominant reason is Community of Practice is simply not *their* practice, at least in an online sense.

For research question one, the activities that emerged for uses of the technology were rudimentary and largely in response to the course tasks. They were not really activities; rather, they were utilities, developed more out of necessity to complete the tasks. Regarding question two, there was little negotiation of the activities. A few individuals stepped up and led the way in getting things started and posted to simply *getting the job done*. Most of the participants expressed interest verbally in the joint enterprise of increased mutual engagement, though usually passively and

conditionally; and their behavior, their actions in relation to Sakai in particular, did not agree with what they verbally promoted. When I pressed them on this contradiction, the participants responded with numerous *excuses*, all of them explicated in the interview and focus group sections of Chapter Four. Mutual engagement was not the assignment after all; it was the book reports, bio pages, and the website project. Responding to questions six and seven is somewhat precluded by responses to the other questions. Regarding question six, the data indicates there was indirect impact on mutual engagement in the sense of the community bond: the cooperative work and talking about their use of the technologies. Participants acknowledged the benefit of sharing knowledge online and expressed a willingness to do so, yet they shared very little and recognized little benefit in what was shared. Regarding question seven, the participants seemed to have little concern for the future of their CoP in an online sense, and seemed to be comfortable with its physical state for what it was.

A dominant theme of the study was how steadfastly confused many of the participants remained when it came to differentiating between the project website and web development vs. the community worksite of Sakai. Often questions regarding Sakai were misinterpreted to be about the website. This is evidence of their strong task focus, but it also illustrates their weak grasp of Sakai's purpose or the purpose of the other technologies in general. Both the instructor and I were shocked that even the utility of Sakai for supporting the project work was not fully appreciated by the participants for more than half the term. Because they did not fully understand the technologies and their purposes, they challenged the need to use them. For example, participants never really took ownership of the bio page task; they did not understand or appreciate that the bios could eventually represent who they are to a much larger audience, or develop into full blown portfolios, or that they could substitute a portfolio in place of the bio. Rather, the task was all about the web development skills, and with mixed and contradictory attitudes. They did not really appreciate the task, yet they complained that they did not get enough web development experience.

As Kayla expressed it, “putting it into a computer is not our way.” The general message among the participants in the interviews was that it would take a great deal of time and effort to really develop online CoP presence, and still it would be a sketchy proposition. A major impediment seems to be little authentic purpose for using online CoP support mechanisms; there is no precedent or authentic purpose of sharing professional knowledge in a collective place, physical or online, for the sake of simply helping each other. Rather, participants suggested that CoP purpose would have to be *required*, provided to them in the form of a course task, and even then there was question as to what that would involve. In this case the participants were distracted by the more concrete purposes of getting a grade for the course and graduating with a degree, for numerous reasons not relevant to CoP. Nonetheless, Sakai did have some impact outside its utility for the course projects; it did seem to at least make the participants more aware and appreciative of the notion of sharing their knowledge, and the possibilities of doing it electronically, even if it is with their standby of more traditional channels such as exchange in person.

According to Riel and Polin (2004), shared purpose involves a “shift in power relationships,” a shift that simply did not occur in this study. The participants wanted to stay in their comfortable role as students and look to the instructor and me for power or decision making. And even then they often seemed reluctant - very slow in responding to assignments, if at all. One might expect graduate students to be a bit more engaged than their undergraduate counterparts, to take more initiative and be more conscious of purpose. Yet these participants had to be pushed really hard to finally start developing a more concrete plan for the website project, for which they then developed content which had not been posted to Sakai, which was necessary to cooperatively complete the project. Yes, this was a new and challenging topic for them. Still, in some respects, homework seemed a foreign concept; there were several comments that suggested coursework should be completed in class. Lave and Wenger (1991) emphasize in their concept of *Legitimate*

*Peripheral Participation* (LPP) that *legitimate* means not *forced*. The participation is authentic. LPP suggests that CoP members master knowledge by becoming increasingly *central* to the CoP circle. However, the problem with traditional academics is that such role mobility is not supported: students are always students, and even graduate school can have reluctant students. Empowering learners to be more involved in determining process and product of their education likely would require an enculturation process that starts at the beginning of an academic program, and still there would likely be significant push back from the learners', who have typically had years of experience with more traditional schooling.

Indeed, institutional boundaries are difficult to break through, particularly the academic calendar and the end of the term. Throughout the term there was tension between the two purposes, the course projects vs. CoP in general. This tension comes to light throughout the Results chapter. Based on the theoretical and empirical literature, CoP can not be institutionalized, that it must be born from authentic practice, hence the reason there were no specific sharing quotas, since it seemed a reasonable prediction that the end of the term would bring an end to sharing. The greatest illustration of this challenge is near the end of the term, the final email exchange in trying to get the resources page together for the website. The participants were unwilling to spend just a little extra time past the term to complete what was arguably the most crucial component of the project on which they had been working all term. In this light, consider if certain activities had been required strictly for the sake of the CoP, such as posting a certain number of resources or lesson plans a week. There is little reason to believe such activity would not have met the same demise as work on the website project. Indeed, as the CoP purpose is more abstract, it seems the livelihood of such an initiative would have been even more threatened. There is always the possibility they could have seen greater value in such an exercise, particularly if it were somehow better connected to their

authentic practice, though there is no reason to suspect such an eventuality, based on the data and what little sharing took place.

The following exchange between the instructor and me took place about three weeks into the term, before I had really collected any data. It sums up the study in many ways, before it is barely off the ground:

- I: ... one of the uses of the little bio page is that if we all get our pictures and a little bio and we can have something on the webpage that links to the creators of the webpage, and it has each of our names and can link to our bios
- Me: This is something that maybe they should=you pretty much said up front, and I've been reinforcing this, that this is their project and I tried to reinforce this 3 or 4 times, that Sakai is their site and they can use it however they want, and the design, you know, their workflow.. however they like
- I: Well but, I mean if we, you know, get right down and dirty and honest when we say "this is your site and you can do what you want to"
- Me: They're clueless
- I: But they, well, if they weren't in this class they wouldn't want to do anything, so... or I mean- its contrived for the class
- Me: Yeah well this goes to that (?) authenticity of the class. I think there're levels, you know, sure, the higher level course project is not authentic, but the activities they come up with to support that project, those would be authentic
- I: Yeah, totally, totally
- Me: They're establishing their needs and they're establishing how they're going to meet them
- I: And I buy that
- Me: Okay, that's the kinda argument I was trying to make about authenticity (3), but what I wanted to ask you...
- I: But you didn't make it well (laughs)
- Me: I know. I know better for the next time. Um, I mean that's a crucial point I need to make in my paper

The reader might recall from the literature review that the difference between a CoP and a *learning community* is that the CoP is continuously self-driven by authentic purpose. In an academic setting, establishing a sound authentic purpose is extremely problematic. What is authentic? In academics, one is essentially being asked to challenge the status quo of authenticity, to learn, to think or know differently, to participate in change. Instructional design and technology is about facilitating this intentional change. Such practice significantly challenges the notion of authenticity. Also, one must consider the purposes of the individuals in the academic program. Why are they taking the course,

enrolled in the program? It is rarely for the sole reason to learn, and it is certainly a rare individual whose purpose it is to share knowledge with his or her peers. From my memo:

“Though all the technology was used for authentic purpose, not simply utilized for technology’s sake, it was our authentic purpose, the course’s. The dilemma of what is authentic in an academic setting is a resounding theme of this study’s results.”

The participants struggled with purpose of Sakai, not to mention the other technologies; they saw Sakai as a website. Their suggestions for increasing its use in support of CoP actually had little to do with CoP. They wanted to re-task it for work, a school website for parents for example. This reinforces the importance of authenticity, the connection to their actual lives, every day realities. Another aspect of their struggle with purpose was expectations for the course, that they would become website developers, a skill set they could use for work, again to create websites for parents. The irony, of course, is that the central task of this course was to create a website for parents, which was their choice. Creating a website was not exactly authentic; it was an assignment after all, it was contrived, and there was little likelihood participants would have voluntarily thought of doing it on their own, together, much less followed through with it. Nonetheless, it could have been much less authentic; at least the assignment was to develop a site that would serve other teachers, parents, or kids, thus supporting their work. And there is still the argument that the subtasks for problem solving the project were all very authentic to their real-life work in general, directly and via transfer to other uses of technology. In academics, the reality is all activity is contrived, but there is a degree of *relative authenticity*, essentially the degree to which participants have choice and ownership.

There were those “learning moments” as the participants called them. According to the instructor in our final interview, the participants “knew how to do it at the end. They knew what it was for. They could see possibilities for the future.” She felt this was a solid achievement for this group. That they challenged the use of Sakai and questioned its purpose is a normal part of the learning process.” She elaborates:

"At the beginning I think they saw it [Sakai] as being useless and they felt that we were sort of wasting their time. They didn't get it, they didn't see the value of it. It wasn't anything that we even should be spending class time on. Again, I think they weren't there. They weren't in the zone [zone of proximal development (Vygotsky, 1978)]. Ah, at the point when they started really asking questions about it, saying well why are we doing this? Well why aren't we just learning FrontPage [Microsoft web development application]? What do we need this for? Ah, that's when they were getting in the zone. By the end of the semester they were there. I think almost everybody did see the value of it, they did appreciate it and at that point at the very end it was having a positive impact on the learning community."

I questioned "how so?" Her response:

"When we were getting all of the stuff up for (website project)...they were able to put all that stuff right up, go through it, put it on a projector, go through it as a group, they were so happy, so proud, so wow, look at this, look at what we have done, look at what we are gonna be able to do. Ah, I mean that was a moment and when I came into the classroom and after the two hours in the open house and I said okay show me what you have done, and they started you know putting it all up and showing me and telling me. I mean like that was a moment when I saw that they really got it and they were really there."

This was a class I had missed, and I had been unaware of this event. Perhaps they finally accepted the usefulness of the technology for their cooperative work in class, but whether they ever accepted the concept of using it to support their CoP beyond class is another question altogether. This would take reciprocity in sharing professional knowledge and artifact, voluntarily, outside course tasks. This *big idea* never really got off the ground. Though they finally seemed to understand *it*, and perhaps appreciate them, there was never any ownership of *it* as their own purpose. As the data demonstrate, the teachers pointed to issues of technical skills, lack of time, and the fact that this was not *the teacher way*. The Sakai site is still live and active, but the participants stopped using Sakai and basically wanted nothing more to do with it, per the instructor's report from a year later. The trajectory was lacking, as the program did not continue with incorporating the use of Sakai in following courses; nor, to my knowledge, did the program continue to emphasize CoP. Otherwise, there may have been some potential.

However, they are still very much a CoP. They have passed the litmus test of continuity at least in the physical sense. Most of the participants still meet once a month for a social/professional gathering. They at least share enough of a joint enterprise to warrant such a voluntary physical

meeting of limited mutual engagement, but not the use of online support technologies. They prefer to “show and tell” in person. Indeed, a great deal of copresence could certainly be an inhibitor of online CoP support, despite the fact it is an ingredient for a greater sense of mutual engagement; studies that demonstrated success with online community (Harris & Higgison, 2003) had participants that were more dispersed – there was greater need for the online support.

### **Mutual Engagement**

The research questions relevant to Mutual Engagement are as follows:

2. How do they [emergent activities] come about?
3. Which are more supportive of CoP? The least? Why?
4. What changes occur with individual’s perceptions of their community participation?
5. What changes occur in observed individual community oriented behaviors?

Again, in response to question two, the activities that emerged for the use of Sakai were mostly the result of participants being asked to use the application in support of their group projects, thus challenging a response to question three, let alone four or five. Though a few interactions and postings occurred outside the course boundaries, they were certainly the exception and not the rule. It seems there was an increase in community-oriented behaviors, but this was a function of the course-related cooperative work, which is finished. The use of Sakai had an impact, less in its support of the community and more as a talking point, how to use the tools. In the span of one term, it was perhaps naive to expect that much change of the nature represented in these questions would occur, or at least to the extent it could be captured, particularly in starting with what was already a fairly strong community. Generally, the overall results of the community questionnaires are more a testament to the strength of the community before the course rather than lack of growth in community based on the course. Indeed, based on the frequency questions alone, for the group as a whole, there was no change whatsoever in the degree to which participants shared. This is probably the most baffling data of the study. Even considering the possibility of participant confusion of the questions between work with colleagues or peers, these results are simply not what one would

expect with the intervention of the study, particularly for the course tasks alone, let alone the CoP initiatives. According the CoP literature, however, a year or two *may* be required for there to be significant change in the group.

The group clearly had a strong social bond. They cared for each other and they had amicable discussion on their professional knowledge. They were an established community. The study focused on how mutuality of the group would be affected by a general emphasis on the community and its longevity, and technology to support its activities. The repertoire sections describe how participants were not ready for such technology, particularly as it applies to the more abstract goal of supporting the CoP. It appears they were also not ready to take a closer look at their community, particularly in formalizing any of its activities in any way. That sense of interdependence that is so crucial for CoP did not develop online outside the tasks assigned within the course context. There was little use of the Sakai communication tools. Even when they had the opportunity to stay home and utilize the tools, they often chose to meet somewhere.

A major theme in the interviews was the paradox of people verbally appreciating the value in sharing, but not doing so as evidenced by the Sakai data; or they reported greater sharing on the questionnaires than was evidenced in the Sakai data. There appears to be an issue of ownership, particularly for any work that took a good deal of investment of time and effort. There could be a lack of trust in reciprocity, a feeling that it would have to be a structured, balanced *activity*. A recurring theme was that notions of sharing and reciprocity are not part of teachers' culture, particularly online, that there is a lack of time for one thing and that they prefer random acts of sharing in the physical realm. There was little exchange observed, electronically or physically, of knowledge artifact such as lesson plans, assessments, and the like, anything outside the tasks of the course. There did seem a chance, albeit a small one, that if the program were to continue using Sakai, there would be noticeable change in individual behaviors associated with mutuality and

sharing. Alas, Sakai was not used for the next course as hoped. Had it been, the data are inconclusive on which activity or tool would be more supportive of CoP (question three). Based on the interviews, it seems the resources tool would be the most supportive, as a means to collect various documents of use to colleagues. The communication tools generally seem to be less important because there are other means of communication already in place or entrenched in their practice. Nonetheless, there is evidence the communication tools did *enliven* the community beyond what had previously been established before the course. With the group more dispersed, post-graduation, it seems there would be greater need to use the communication tools, but there is still competition with tools such as their familiar email applications already entrenched in their practice.

There was certainly an impact on “individual’s perceptions of their community participation,” but this was more a function of the cooperative, group activities, the tasks related to the course projects rather than community participation initiated by the participants. Some participants simply shared knowledge for the community’s sake, but there is evidence that these same exceptions would have occurred regardless, by the more ephemeral channel of regular email or a brief encounter in the hall. It seemed largely unappreciated by the contributor as well as the rest of the CoP that any sharing that took place on Sakai reached *everybody* and was available more *permanently*. The participants worked well together from the start of the term, and they helped each other get a handle on the technologies. In the end, perhaps a few participants were more open with the group, more likely to share something on Sakai. There was certainly a strong feeling of *potential* from the interviews. But after more than two years’ time since the study, and after the group has graduated, there has been maybe two contributions to Sakai from one participant. Sally has shared some photos of her kids.

There was discussion in the third focus group on the “stinginess” of some teachers in not sharing their work, referred to by one teacher as “glory hogs.” The exchange was remarkable in its

unanimity on the existence of “glory hogs,” without recognizing there is very little personal recognition in their field, let alone “glory,” or without recognizing the irony with regard to their lack of sharing, at least online in Sakai. If their work remains private, not mutually engaging, who is aware of it to recognize it, let alone glorify it? It is my experience, and the literature on teacher development seems to agree, that teaching is a private practice with little recognition at all. Perhaps it is because of this fact, combined with a fear that someone else might actually get the credit, that causes teachers to protect their work, as if some day they might actually get a token of recognition for it. Or perhaps the nature of academics leading up to and including teacher education programs - the individual work ethic and competitiveness - continues into their teaching careers, still an academic field.

There does seem to be willingness among teachers to share, but share privately, with neighbor colleagues or friends, not in a public fashion to all who might benefit. This prompted the instructor and me to make some motivational speeches on the importance of teachers sharing what they do. However, we appeared to have little impact. I had previously avoided making such speeches myself, except for a pep talk that launched the class/study; this was in an effort to prevent too much researcher influence. However, there is little reason to believe that the instructor or I had much influence in this regard, or that we would have had more influence had we been more proactive. Suggestions from participants were more along the lines of “you should have *required* it.” Well, frankly, there were other things that were *required* that did not happen either. It appears voluntary sharing among learners within an academic context is not likely to blossom without it being required in some fashion; some may actually want/need it listed on the syllabus as an assignment with a point value. As suggested by Olson and Olson (2000) and others, the incentive structure, grades, should be aligned with the aim of CoP with much greater percentage of the grade

allotted to the kind of participation and contribution that is expected. Of course, this contradicts the understanding from the literature that when such structures are withdrawn, contributions cease.

Every context is going to be different, and it will always be difficult to gauge the appropriate balance between the instructional design dualities, particularly structure vs. function. In this case, either more time for the initiative of intentional CoP was required, or more structure was necessary. As indicated in Chapter Three: Methods, the Materials section, most of the strategies for increased mutual engagement, as listed in Appendix H, were utilized in this study, along with those for the other CoP elements. In this case the more informal strategies were stressed, with the idea that participants would provide their own structures, in line with a key defining characteristic of CoP, *self-directed*. A few strategies not utilized were more formalized approaches with the following: roles, recognition of leaders, mentorship, feedback mechanisms, and participation/contribution requirements. These have all had some mixed results in studies, particularly requirements for specific contribution quotas and peer feedback mechanisms. Nonetheless, to establish a certain pattern of behavior at the start, as well as a degree of critical mass of content, perhaps there should be quotas that are gradually withdrawn throughout the term. Also, to overcome the sense of ownership teachers have for their work, perhaps some formalized way of publicly recognizing them and their contributions is necessary, that sense of “glory.” This might be a peer rating system of lesson plans, websites, or other knowledge artifact shared. Not only is authorship more explicit, there is some form of reward for publishing something. Within the feedback mechanisms, there is an opportunity for participants to more formally take part in the crucial aspect of CoP, Wenger’s *reification* of knowledge and practice. Such feedback mechanisms could also serve as a better record of learning or change in practice.

### **Repertoire**

The research questions most relevant to *repertoire* are two:

1. What activities emerge for the use of technology?
6. How do online activities contribute to overall changes in community practice?

Due to the interdependence of the questions and CoP elements, these questions have been addressed to some extent. At first Sakai and some of its tools, such as the Chat Room, were somewhat a novelty for the participants. Sakai was used to handle the course tasks, for which the participants developed rudimentary skills and some appreciation of Sakai's support role. Yet this skill development and appreciation for the system took considerable time, much more than expected. For a good part of the term, in fact, it seems many of the participants considered Sakai a waste of time – another hurdle – a means to an end. There were isolated uses of the various Sakai tools, but no systematic practices emerged, as the Sakai data make clear. Eventually participants stated optimism for its future use, but it was clear that the longevity of the Sakai worksite was very much in question. However, it was recognized to some extent that skills with Sakai transferred to other technologies and tasks; in the end some participants did seem more amicable toward sharing their work electronically, though not with Sakai perhaps.

There were definitely some technical difficulties, to be expected when introducing a number of new technologies in a new setting to people with limited technical skills. Participants certainly experienced some frustration at times. Granted, as some participants expressed, ideally Sakai would have been introduced in a previous term. Some participants clearly experienced some cognitive overload with the technology, as they felt their level of technical skills were too limited to take on so much in one term. Nonetheless, most participants successfully met the challenges they faced in developing the necessary technical skills that were expected of them to manage the course projects. However, Sakai tools did not become part of their regular repertoire. There was a pre-existing repertoire, such as regular email, disks, phone, and mainly physical presence, with which Sakai had difficulty competing. It became quite clear in the interviews that teachers using Sakai to share their

work was perhaps too great a stretch; it is simply *not their way*. As expressed in one way or another, the teachers prefer the physical realm of sharing hard copy and talking about things in person.

*Community* and *practice* were the key focus of this study, and in these areas, participants fell rather short in applying the technologies. A notable observation and frustration is that the participants never really engaged in a discussion on a general protocol of how to use the Sakai tools to organize their work, even for course projects, let alone other knowledge artifact they could share, this despite the fact, demonstrated by several data points, that they had some significant problems with organization of content and finding it. Without better protocols, the notification tool was even more important, yet it was utilized only a few times the entire term, even for the project work. Though repeatedly invited to consider protocols, the group never seemed to accept the opening for them to take ownership of the system. This was likely too high an expectation on our part, given their limited experience, but also because of academic boundaries in general. There was no long term outlook for organization probably because there was no long term outlook for Sakai's existence beyond the term, despite promotion otherwise. It is difficult to discern whether the participants were handicapped in this area of protocols by a lack of technical skills, or by a lack of interest or engagement in the process in general – “just tell us what to do, you’re the instructor” or “this just isn’t our way.” Based on the interviews, it was likely a combination of both. And it is a point well taken that intentional CoP efforts would likely be even more difficult with other elementary teachers not already more engaged with technology in general, as with the participants of this study.

There were some usability issues with Sakai, but this was not a usability study. The participants had a legitimate case for some design flaws with the applications, but none of them were deal breakers. The greatest complaint was with Sakai’s discussion tool. However, participants generally had little experience of other technologies with which to compare their experience with

Sakai tools, or other technologies employed for the study. For most, it was the first time they had used an online chat tool, discussion forum, html editor, or uploaded a file to a web server. Therefore, were any problems they associated with these technologies really important usability issues, or was it simply a lack of practice or habit in using such tools? Also, why were they so concerned about the usability of the discussion tool, for example, when many argued there was little need for it, as they prefer to *talk things out* in person?

The resources tool was more important because this was where files were shared. It worked pretty well, yet they gave negative feedback on the difficulty in finding content there: it got too cluttered with too much stuff. At the same time, they complained there was not enough content to draw them there. Again, they consistently failed to recognize that they had full control of the organization of the content. In my experience, these issues are generally not unlike the difficulty teachers have in finding files on their personal computers, due to poor file management skills or practices, or simple laziness in not looking at the options and considering the most logical choices. Of course, the problem is compounded when you have a group of people managing file spaces. This is where there was a lack of leadership in assigning roles perhaps, and maybe the instructor and I should have stepped in and been more directive in this regard, in assigning such roles and making more suggestions for organization of content.

I was very surprised at the end of term to find in at least one interview that a participant still did not know how to use the email list. She did not even seem aware of it, though it was mentioned repeatedly throughout the term. Others in the interviews still seemed to think that it was easier to simply email peers/colleagues their traditional way. They had a tool they already knew how to use; it did not matter if another tool was easier and worked better.

In one way or another, all the participants commented on the technology barrier- the lack of skills and time to develop and use the skills. So when the technology *is* used, it can then be

frustrating and time consuming. Therefore, it is perceived as too much trouble, and familiar methods such as private email or the physical method of hard copy and verbal conversation is preferred. Though the drawbacks of such methods were repeatedly expressed to the participants, it does not seem that they were fully understood or appreciated. The participants did seem to recognize benefits of Sakai and the other technologies, but they were apparently not important enough to warrant spending more time developing skills and habit in their use.

Another aspect of the *repertoire* element of CoP is community culture, other modes of communication and ways of sharing practice, activities that certainly occurred with the group outside the course context and/or in the physical realm, all of which were outside the purview of the study. Nonetheless, they certainly exist, as described by the participants in the interviews, and some of them are directly opposed to online support of CoP, such as protecting a test as proprietary vs. sharing it with others who might have a use for it, or handing a hard copy of it to *one* other teacher vs. making it available for all online. It is quite a challenge, the notion of taking individual teachers' repertoires, *milk crates of documents of professional knowledge artifact*, and creating a collective database of that knowledge on which there is cooperative dialogue on how the knowledge base can be used and improved.

### **Conclusion**

An important point made in the literature review summary is that CoP is often given a warm and fuzzy characterization that often does not match what is observed in research. Researchers may have unrealistic expectations not authentic to the study group (Kling & Courtright, 2004, p. 98). Authenticity is elemental. As indicated in Chapter Two, research has not adequately addressed this significant dilemma between structure and function of instructional design for CoP. In many cases, instructor or researcher intentions have not allowed for emergence of *authentic* community purpose, process, and product. In a sense, this study may have over-corrected for this shortcoming in CoP

studies. To better ensure authentic needs are met, it was argued that learners should be included in the process of IDT *for* CoP. This was essentially the goal of the study, but it seems the participants were not prepared for such inclusion, or they were not interested. Yes, they were quite involved with decisions regarding course tasks to perform and complete; their engagement in cooperative work in this respect alone make the course a great success. Nonetheless, *A CoP is a self-organized, interdependent, sustained, social network that shares authentic purpose, knowledge, resources, and activity.* In this case, the level of authenticity was simply too low to truly develop a more *self-organized* (Trentin, 2001) and *sustained* (Barab, MaKinster, et al., 2004) presence online. However, online presence is not part of the CoP definition.

Wenger's (1998) trajectory contributes to mutuality by making knowledge processes and artifact accessible both within a particular group, local connectedness, and to a larger field, global expansiveness. Technology supports such access and Wenger's (1998) boundary processes of coordination, transparency, and negotiability. Technology makes explicit and perennializes CoP process and product (Henri & Pudelko, 2003). Technology, Sakai, is an amplifier of CoP. However, establishing a more public audience and purpose is an area of importance largely ignored by many efforts in the literature, and in this study, the focus on this trajectory in correcting for this shortcoming fell largely on deaf ears. The participants lacked the necessary imagination, as witnessed by the instructor, and according to Wenger (1998), *imagination* is one of the three essential modes of belonging to CoP (Appendix D). The other two, *alignment* and *engagement*, were arguably satisfied in this study, though more in relation to the course and its tasks – too much alignment perhaps. This study group had a significant level of mutual *engagement* with each other, more so than a typical class one could argue, but it was apparently not strong enough to support greater interdependence with online access to each other's resources, certainly not beyond the boundaries of the course. So the question remains, was this group a CoP? Is it still a CoP?

Based solely on the CoP definition, the *self-organized* component rules this group out as a CoP. It rules out any CoP in formal instruction where groups are directed by the institution. However, this conclusion puts a lot of emphasis on origins, which I'm not sure are that important. Yes, this CoP was contrived and never would have occurred if not for the reading specialists program. Still, over the four years of the program, it could certainly be argued that the group gradually became more *self-directed* and *authentic* in its shared *purpose, knowledge, resources, and activity*, that it became a CoP, albeit a weak one, and still is. It is an important reminder that observations were limited in this study; a great deal of exchange could have taken place via *outside channels* (or perhaps this is wishful thinking). It is better to have a relative view of this CoP definition. As with the relative levels of authenticity previously described, there is a relative level of self-organization at the course activity level, with the choice provided to the participants, and to the extent that the group voluntarily continues to physically meet on a monthly basis - *sustained*. The level of *interdependence* certainly improved among the group, perhaps not so much from a professional practice perspective, but certainly for the social community in general. For a group of people who continue to get together based on a shared profession, it is difficult to imagine no impact on professional practice.

The results do seem disappointing. It seems there was much greater potential for the group given their special context - a cohort of practicing teachers that takes every class together for four years, with the added benefit of the initiative of this course under study. Consider the more typical teacher education program, let alone other academic programs, where there *is* a cohort, yet the learners take only a few courses together. The rest of the courses are more random collections of diverse learners who may never see each other in a course again. *For now, strictly at the course level, I challenge the appropriateness of applying CoP theory to instructional design and technology.* The study group arguably demonstrates to this day the characteristics associated with

CoP (Appendix A), but it is questionable what influence this course had in that regard. At the course level, it is not clear that the major issue of motivating commitment to CoP can be overcome. As the literature indicates, identification with CoP is a very tacit process (Wenger, 1998) and cannot be designed (Schwen & Hara, 2004).

In the end, there was an end. This study demonstrates that with the more disciplined definition of CoP used herein, CoP has little place within instructional design strictly at the course level, where there are other learning theories and methods that frame the social learning principles of CoP without the higher expectations. Or maybe *failure* is acceptable with CoP research in academics, in the sense that the initiative does not result in a *sustained, self-organized* CoP. Accepting this at the start, the cause could still be a worthy one, but in pursuit of this disciplined definition of CoP, always a disappointment perhaps. The foundation of this study was preparing teachers to be better members and contributors of professional community, not a temporary group of colleagues for a limited period of time. Still, though a thriving CoP did not result, centrally and online, the initiatives entailed here seemed to instill a greater appreciation of the importance of sharing knowledge and best practices. Perhaps this is the best one can hope to accomplish with CoP initiatives in academics.

### **Future Research**

The study did not develop to the extent hoped to really inform design for intentional, online CoP. However, there are some implications that can perhaps be gleaned from the results. I conclude here with a look at what might be done differently for future initiatives and research, still pursuing that more disciplined definition of CoP. A quick list of some considerations:

- Caution with any assumptions of graduate student level of independence – more time preparing participants for being lifelong inquirers, not students.
- With technology novices, introduce less technology in one term or compartmentalize it more rigorously to reduce confusion.

- Work preferably with a course or courses at the start of a program of study, explaining to learners from the start how the program will be fundamentally different than any formal education previously experienced.
- Formalize process of developing community support site and protocols – allow for greater flexibility of negotiation and choice of technology and tools
- Provide more time, preferably a year at least. Devote an entire term to CoP initiative (eliminating the group, PowerPoint book reports in this case would have provided an extra month).
- Get better buy-in and support from other faculty and administrators of the program
- Steep process and product even further in actual needs of the workplace – more seamless connections with the day-to-day work lives of the participants
- *Require* activities that are relevant to said process/product, such as the building of a databank of test questions as suggested by Sheila. Each participant meets criteria for contributions of tests or test questions – recognition of contributions beyond quotas with bonuses of extra credit of some kind
- Pay greater attention to identity, sense of belonging to community and value of contributions – authorship and rating system – leadership.

For the joint enterprise of mutual engagement, CoP as purpose, one could argue that the necessary structures to support increased contribution and sharing were missing from this initiative. A number of structures discussed in the literature were included, but perhaps they were too loose or informal. Maybe the scaffolds were not high enough, wide enough, or strong enough. In hindsight, perhaps the instructor and I should have *required* certain activities such as sharing two lessons a week or the like. The participants were very straight forward in declaring the necessity of requirements for the kind of CoP behaviors the instructor and I had expected, and these requirements will largely depend on context. In this case, lesson ideas, web resources, anything that could be used in support of the participants' day-to-day practices with the children they teach would all be considered *useful*, or more authentic. More structured places than we started with in this study would have to be provided in Sakai or the CoP system for participants to post and organize their contributions. Perhaps a peer evaluation system could be set up that would both provide for assessment for the course and valuation among the participants for their contributions. Leaders might emerge from such peer feedback, leaders who could begin taking more responsibility for the group's activities for when the term is over and the requirement is withdrawn. However, as

previously expressed, the literature and experience suggests that when such artificial structures are withdrawn at the end of the term, the CoP is likely to collapse. The motivational factors one hoped would be authentic or internalized become permanently associated with a task, course, and term that are now completed – “We finished; we have our grade.” A future study could follow the general methods presented in this study, with corrections listed above, with the main difference of more time and structures, which are gradually withdrawn. For this case, I think the collection of much more content of use to the participants, a critical mass, would have activated more engagement and perhaps had much greater potential for a life of its own. Certainly it would also take greater leadership or change agency on the part of the instructors and researchers of the program.

There are a number of “could’ves,” “should’ves” and “would’ves.” Leadership was perhaps an issue that was understated in the data. Wenger (1998) stresses the importance of the community broker for bridging boundaries. Perhaps the instructor and I should have played a greater role as community brokers, modeling and evangelizing with even more emphasis the kind of CoP behaviors we had in mind. Or perhaps greater recognition of key members of the group, such as Kayla or Ann, would have further encouraged them to take on leadership roles, and the others to follow their lead (however, as the instructor noted, the age differences among the participants could inhibit younger, more active members like Kayla and Ann from becoming leaders within the CoP). An area for future study would be a closer look at identities. The proprietorship of knowledge or work is clearly an issue for teachers. For Ann and Kayla for example, it seems they might have benefited from greater focus on individual presence in the Sakai space, such as their sharing of work within a personal portfolio within Sakai. They did have their personal bio pages which they could have easily turned into more elaborate portfolios, which had been suggested as an option for the participants. Yet there would then been a lack of a thematic or typological index of resources as a whole, but then no such collection developed in this case anyway. Perhaps there is a future for the

application of Web 2.0 or social network technologies in the support of CoP, an advantage of their utilization of tags or metadata and associated search functions. However, such systems do rely heavily on the appropriate input of the author. Certainly the intersection of contributor and audience could use some closer attention. What *change agents* would better motivate a potential contributor to contribute to the CoP and/or retrieve what has been contributed? Another study could follow the same methods in general of this study, yet with the greater structures as recommended and with the addition of a peer rating and comment system. This could be done informally within a standard discussion forum or with off-the-shelf tools available for such a function. Perhaps there is a valid argument that if the technology is new to the participants regardless, blogs or other technologies would be no more a challenge than anything else. A collection of individual blogs could be established for such a rating/comment system. These would address the issue of identity and authorship.

There were suggestions for greater authenticity, but they involve institutionalization at the school/work level, likely a conflict with academic goals. Though institutionalization still raises a number of concerns, at least the key ingredients of authenticity and sustainability would be better met. CoP theory still has significant relevance and benefit to an academic department or program as a whole, more at the work and practice level, but it would take great coordination. The presumptive advantage is that the program is already well established, permanent. Courses, learners, and instructors would have a continuous presence to all members of the department via a departmental portal which contains course sites, individuals' portfolio sites, and sundry administrative resources, along with the necessary communication channels. *Without* these basic ingredients, access is considerably limited and, therefore, so is the CoP. *With* these basic ingredients, participants have significantly improved and sustained access to each other and valuable knowledge artifacts to support the future of the CoP. After years of experiencing such an active portal, authenticity would

be better grounded, and alumni, who still have access, would be more likely to continue their contribution and/or branch off into other communities of practice. Significant community could be built around the identities of electronic portfolios that many teacher preparation programs have their pre-service teachers build, but typically for a small audience of just a few professors. How unfortunate that such collections of knowledge are so private and then abandoned! There is a great deal of room for more research on portfolios as identity representation in a teacher community space. The ubiquitous reflections required of individual pre-service teachers could become public feedback mechanisms on shared artifact and practices. The CoP ingredients are already in place in many teacher education departments/programs, but they are trapped within traditional academic paradigms.

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## **Appendix A: Wenger's (1998) Indicators of CoP**

Here is a summary of Wenger's (1998) list of indicators that the three main elements of CoP are present:

- 1) sustained mutual relationships – harmonious or conflictual
- 2) shared ways of engaging in doing things together; mutually defining identities
- 3) absence of introductory preambles; very quick setup of a problem to be discussed
- 4) substantial overlap in participants' descriptions of who belongs
- 5) knowing what others know and can do, and how they can contribute to an enterprise
- 6) specific tools, representations, and other artifacts
- 7) local lore, shared stories, certain styles recognized as displaying membership
- 8) jargon and shortcuts to communication as well as the ease of producing new ones
- 9) a shared discourse reflecting a certain perspective on the world. (p. 125)

Wenger recognizes a more global view which he calls **constellations** of communities of practice; a university of several colleges or a college of several departments exemplifies this concept.

Constellations are characterized by:

- 1) sharing historical roots
- 2) having related enterprises; serving a cause or belonging to an institution
- 3) facing similar conditions; having members in common; having overlapping styles or discourses; sharing artifacts; competing for the same resources.
- 4) having geographical relations of proximity or interaction (p. 127)

**Appendix B: Hung's (2001) Seven Principles of Vygotskian Thought:**

1. Learning is demand driven and dependent on engagement in practice.
2. Learning is a social act where construction of knowledge is mediated by language, signs, genres, and tools.
3. Learning is identity formation, an act of membership encultuated within stipulated ZPDs (Zones of Proximal Development)
4. Learning is reflective and metacognitive, internalized from social to individual
5. Learning is embedded in rich cultural and social contexts- acquiring both implicit and explicit knowledge.
6. Learning is socially distributed between persons, rules, and tools.
7. Learning involves the transfer of knowledge from one situation to another, discovering relational and associated meanings in concepts. (p. 36)

### Appendix C: Wenger's Participation/Reification principles of CoP

Wenger, 1998, pages 63 and 105

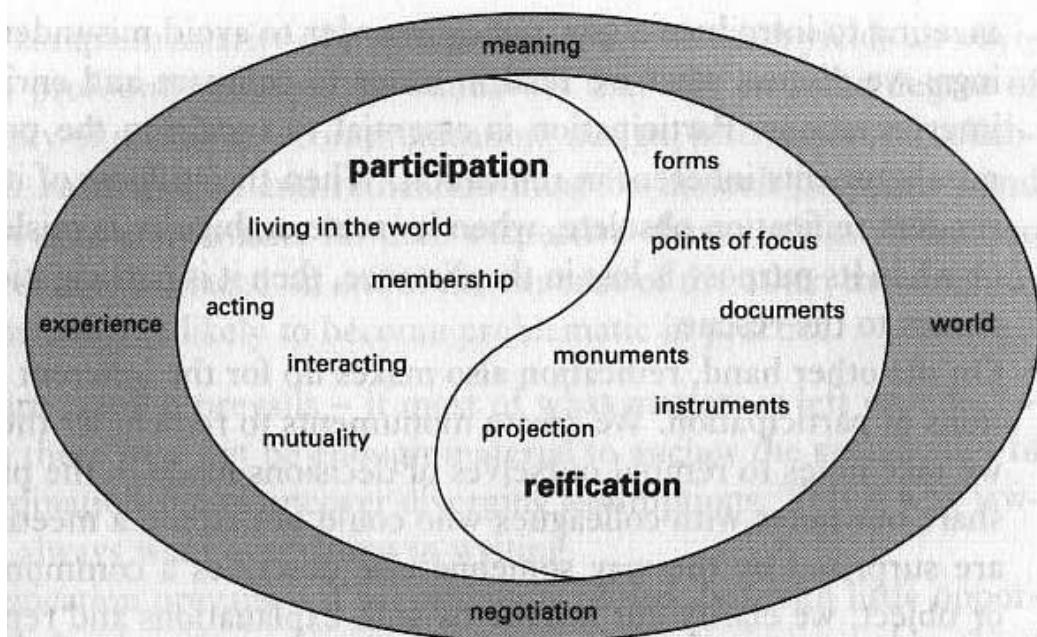


Figure 1.1. The duality of participation and reification.

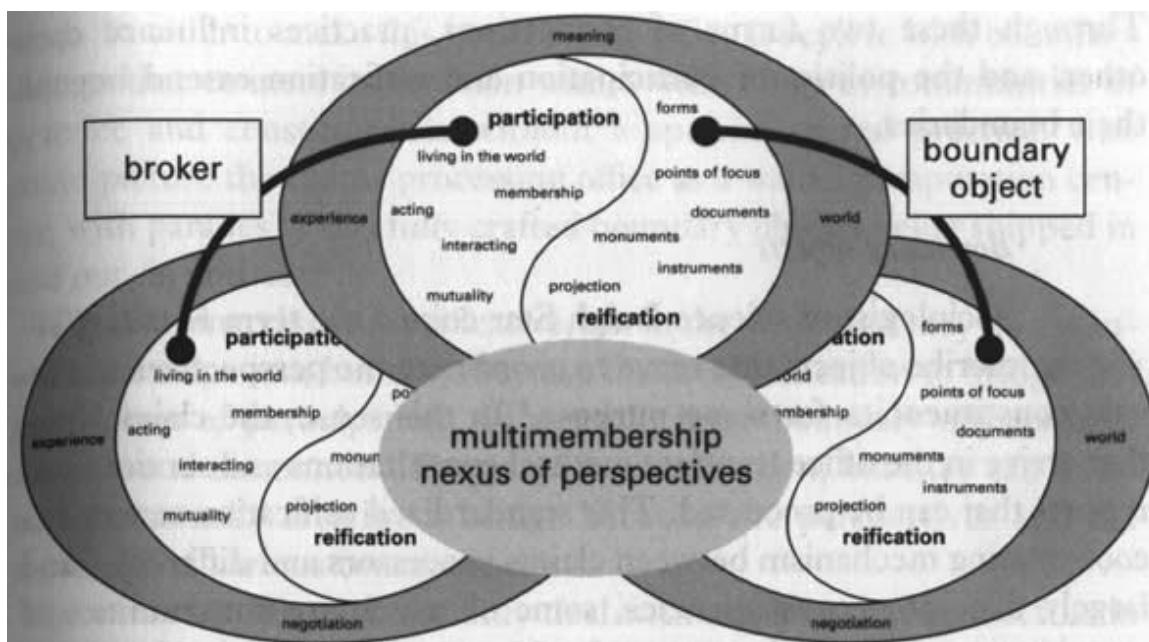
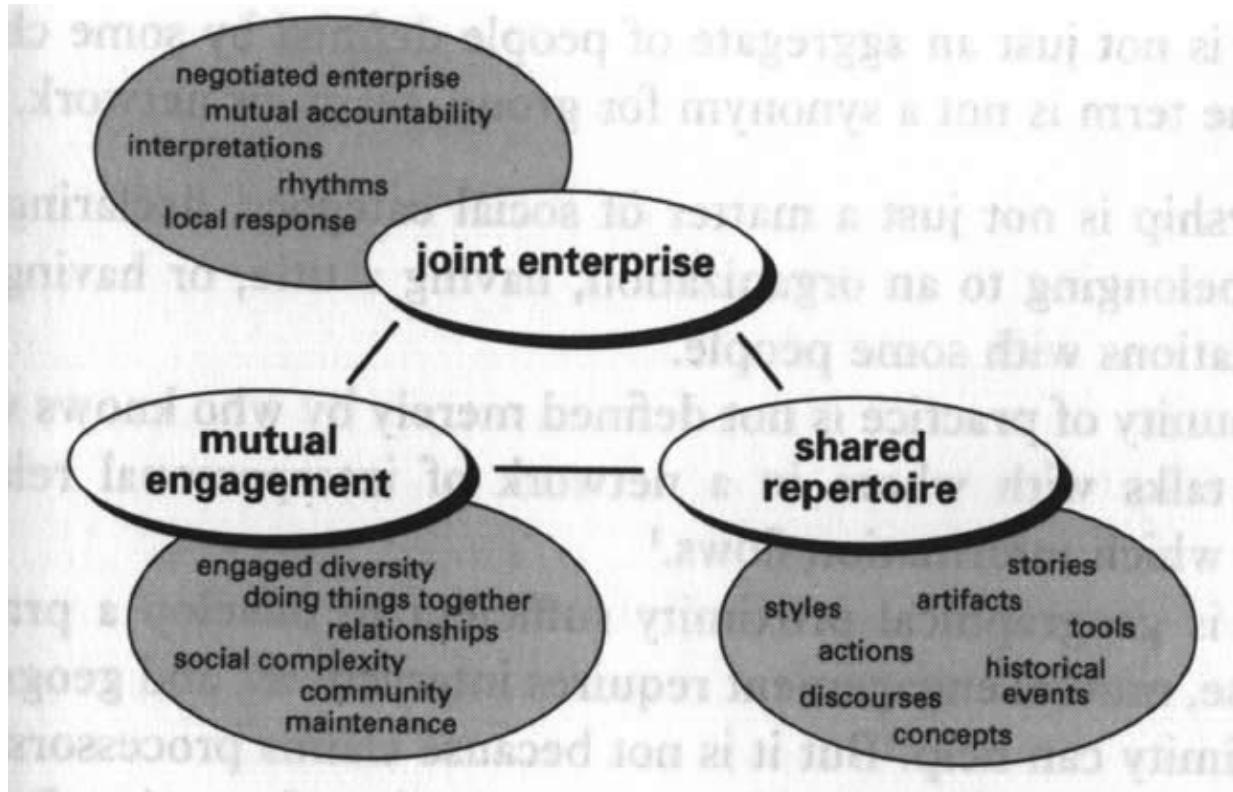


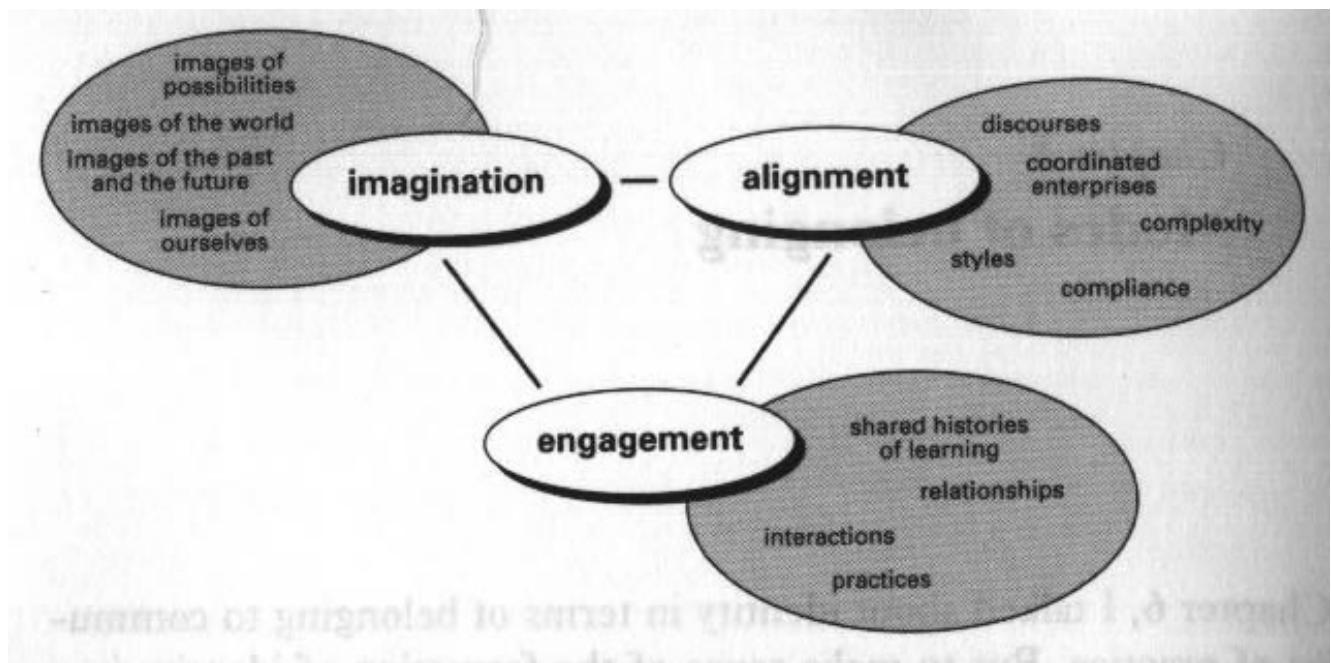
Figure 4.1. Participation and reification as connections.

## Appendix D: Wenger's (1998) CoP Dimensions and Modes of Belonging

### Dimensions of CoP, page 73

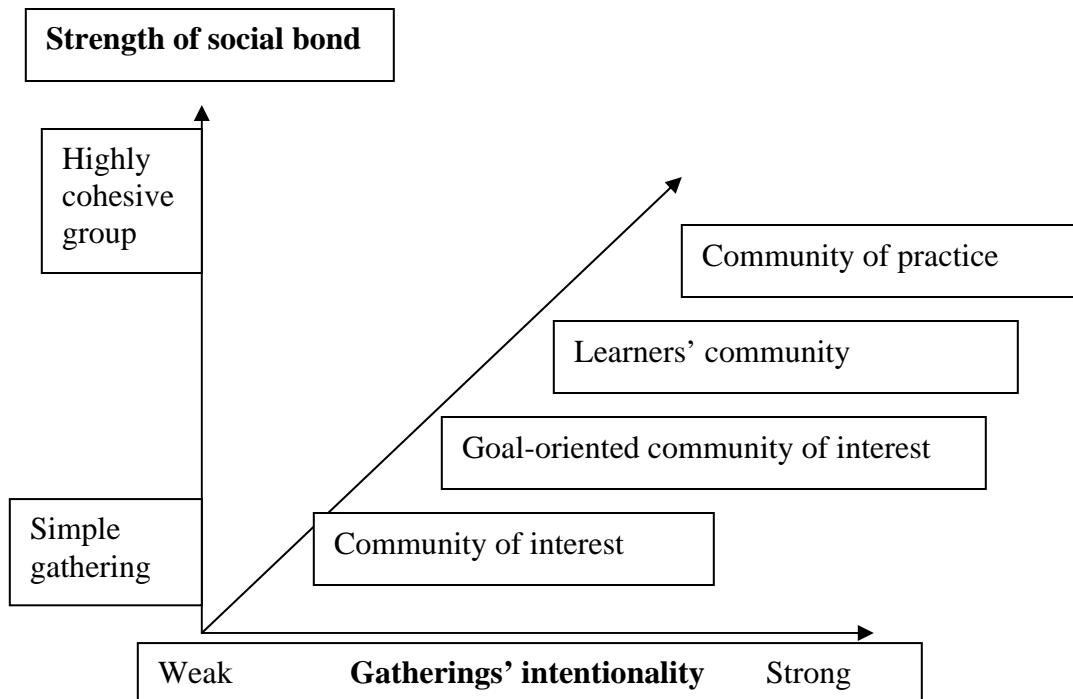


### Modes of Belonging, p. 174



## Appendix E: Henri and Pudelko's (2003) Learning Communities

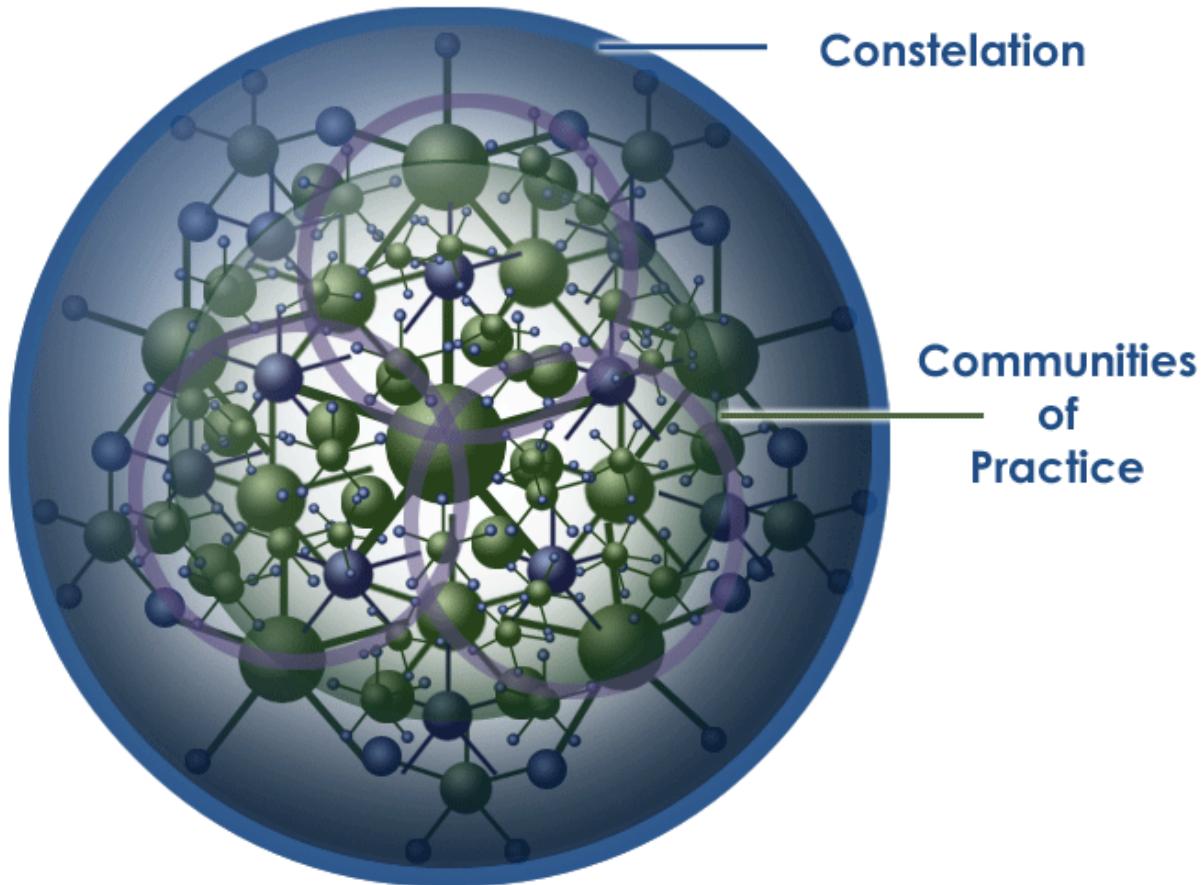
Context of Emergence, adapted from page 476



Principle descriptors of four types of virtual communities, replicated from page 485

	Community of interest	Goal-oriented community	Learners' community	Community of Practice
<b>Social context of emergence</b>	Gathering around a common topic of interest.	Created to carry out a specific mandate.	Pedagogical activity proposed by the instructor	Stems from an existing, real community of practice
<b>Activity</b>	Information exchange.	Sharing of diverse perspectives and production of objects commissioned by the mandate	Participation to the realization of a collective project	Professional practice development through sharing knowledge among members
<b>Learning</b>	Knowledge construction for individual use.	Knowledge construction from diverse knowledge systems towards collective use	Knowledge construction by carrying out social situated activities	Appropriation of new practices and development of involvement

## APPENDIX F: CONSTELLATION OF COMMUNITIES OF PRACTICE



This component represents the focus that remains on the individual learner, presented at different magnifications to represent the different roles the learner may have in the various forms of community in which he or she may take part, the larger green dots being leaders or brokers of the CoP.



All of the lines represent connections, mutual engagement, between people, the green dots, and various repertoires, the blue dots. The three interconnected, purple circles represent sub communities such as learners' communities (Henri & Pudelko, 2003) or task-based communities (Riel & Polin, 2004) within the CoP framework. Though only one CoP is represented here for illustrative purposes, there would be several in a constellation.

**Appendix G: Online Facilities for CoP - Wenger, McDermott, and Snyder (2002)**

- A home page to assert their existence and describe their domain and activities
- A conversation space for online discussions.
- A repository for their documents, including research reports, best practices, and standards.
- A good search engine to find things in their knowledge base.
- A directory of membership with some information about members' areas of expertise in the domain.
- In some cases, a shared workspace for synchronous electronic collaboration, or to enhance teleconferences with visuals.
- Community management tools, mostly for the coordinator but sometimes also for the community at large. These might include the ability to know who is participating actively, which documents are downloaded, and how much traffic there is, which documents need updating, and so forth.

## Appendix H: Summary Table of Design Principles and Strategies

Design Principle	Strategy
<b>Joint Enterprise (negotiated activity and purpose)</b>	
<p><b>Define and articulate purpose</b> – (Kim, 1998; Wenger, 1998)</p> <p><b>Support social negotiation and construction of knowledge and purpose</b> (Gunawardena, 1999; Herrington &amp; Oliver, 2000; Palloff &amp; Pratt, 1999; Wenger, 1998)</p> <p><b>Opportunity for ongoing reflection on purpose and practice, trajectories and histories</b> (Wenger, 1998) <b>and technology to maintain it</b> (Wasko &amp; Faraj, 2000)</p> <p><b>Design for adaptation:</b> (Jonassen et al., 1999)</p> <p><b>Learner self-selection; learner accountability/responsibility</b> (Palloff &amp; Pratt, 2002)</p> <p><b>Encourage ownership and accountability to community</b> (Grunberg &amp; Armellini, 2004; Hammond, 1999; Kolikant &amp; Pollack, 2004; Millen &amp; Fontaine, 2003; Parr, 1999; Pearson, 1999; Riel &amp; Becker, 2000; Rogers, 2000; Seels et al., 2003; Wenger, 1998)</p>	<p><b>Must meet participants' authentic activity needs, how knowledge will be used in real life</b> (Jonassen et al., 1999; Kolikant &amp; Pollack, 2004; McAndrew et al., 2004; Sachs, 1995; Sherer et al., 2003)</p> <p><b>Occasions for applying skills, devising solutions to authentic problems</b> (Jonassen, 2005, Wenger, 1998)</p> <p><b>Support every day practices</b> (McAndrew et al., 2004), the utility of innovations and advances in practice</p> <p><b>Common ground of mutual purpose or neutral activity</b> – (Olson &amp; Olson, 2000; Smith &amp; Fiore, 2001; Spring &amp; Vathanophas, 2003)</p> <p><b>Permeate expression of vision</b> (Kim, 1998)</p> <p><b>Organizational charts, process transparency; stories, examples, long-term trajectories, alternative scenarios, pushing boundaries</b> (Wenger, 1998)</p> <p><b>Instructor willingness to surrender some control over class design and teaching style</b> (Palloff &amp; Pratt, 2002)</p> <p><b>Direct discussion of the course process and product</b> (Palloff &amp; Pratt, 1999)</p> <p><b>Participant advisory board</b> (Moore &amp; Barab, 2002)</p> <p><b>Participation requirements/guidelines vs. flexibilities</b> (Duemer et al., 2002; Hammond, 1999; McAndrew et al., 2004; McConnell, 2002; Olson &amp; Olson, 2000; Palloff &amp; Pratt, 1999)</p>

## Appendix H Continued – Mutuality

<b>Design Principle</b>	<b>Strategy</b>
<b>Mutuality (community, interaction, relations, roles)</b>	
<b>Support networking with peers/colleagues, establish critical dialogue and reflection</b> (Barab, MaKinster et al., 2004; Bray, 2002; Harris & Higgison, 2003; Hawkes & Romiszowski, 2001; Jonassen et al., 1999; Pearson, 1999; Wang et al., 2003 )	<b>Make the private public</b> (Grunberg and Armellini, 2004; Kolicant & Pollack, 2004; McAndrew et al., 2004)  <b>Publication peer reviewed/ peer commentary and note taking; Participants ask questions for readers' thoughts on their contributions</b> (McAndrew et al., 2004; Moore & Barab, 2002; Pearson, 1999; Scardamalia & Bereiter, 1996; Wenger, 1998)
<b>Establish trust</b> (Barab, MaKinster et al., 2004; Hawkes & Romiszowski, 2001; Millen & Fontaine, 2003; Pearson, 1999; Seels et al., 2003)	<b>Cooperative/collaborative work</b> (Harris & Higgison, 2003; Kolikant & Pollack, 2004; Palloff & Pratt, 2002; Seels et al., 2003; Uribe et al., 2003; Wenger, 1998)  <b>Multiple forms of feedback, formal and informal</b> (Jonassen et al., 1999)
<b>Negotiate different styles of communication</b> (Pearson, 1999; Wegerif 1998) and <b>conflicts of cross purposes</b> (Derry et al., 2004); <b>flexibility and positive attention to differences</b> (Jonassen et al., 1999)	<b>Models and representations of patterns; facilities for comparisons with other practices</b> (Wenger, 1998)  <b>Clarity and centrality of expectations to participate</b> (Breuleux et al., 1998) <b>direct discussion of participation issues</b> (Hammond (1999) <b>reduce authority/deadlines</b> (Duemer et al., 2002)
<b>Membership identity and multiplicity; design for evolving roles and flexible leadership roles</b> (Kim, 1998; Schlager & Fusco, 2004; Wenger, 1998)	<b>Provide for learner leadership and other roles, i.e. devil's advocates or synthesizers</b> (Bonk et al., 1998; M. C. Smith et al., 2003; Wegerif 1998) <b>report from other discussions</b> (Breuleux et al., 1998)  <b>Acknowledging leaders</b> (Wasko & Faraj, 2000)  <b>Mentoring or more formal peer support</b> (Hammond, 1999)  <b>Ask students to become experts on a topic and then present</b> (Palloff & Pratt, 2002)

## Appendix H Continued – Mutuality

<b>Design Principle</b>	<b>Strategy</b>
<b>Mutuality (community, interaction, relations, roles)</b>	
<b>Interactional facilities:</b> physical and virtual spaces; interactive technologies and communication facilities that extend mutual access in time and space (Wenger, 1998)	<b>Extensible/flexible gathering places</b> (Kim, 1998; Schlager & Fusco, 2004)
<b>Co-presence or support smaller groups</b> (Barab, MaKinster et al., 2004; Hammond, 1999; Kling & Courtright, 2004; M. C. Smith, Diaz, & Strbich, 2003)	<b>Online discussion/physical meetings</b> (Kibble et al., 2001; Moore & Barab, 2002; Olson & Olson, 2000; Selinger, 1998; Smith et al., 2003)
<b>Multiple entry points for various ability levels</b> (Scardamalia & Bereiter, 1996; Lave & Wenger, 1991; Wenger, 1998)	<b>Elimination of teacher directed turn taking:</b> (Scardamalia & Bereiter, 1996) <b>Faculty release managing role and collaborate with learners</b> (Pallof & Pratt, 2002) <b>Multiple communication modes / cumulative and progressive</b> (Scardamalia & Bereiter, 1996) <b>Allow member creation and management of subgroups</b> (Kim, 1998; Moore & Barab, 2002) <b>Opportunity for social dialogue</b> (Hammond, 1999; Olson & Olson, 2000; Rheingold, 1998; Seels, Campbell, & Talsma, 2003; Wang et al., 2003) <b>“coffee house” area</b> (Pallof & Pratt, 1999) <b>Synchronous activity</b> (Branon & Essex, 2001; Harris & Higgison, 2003; Nardi et al., 2000; Shearer & Rose, 1998) <b>Informality- distance from professional identities</b> (Hammond, 1999; Wegerif, 1998)

## Appendix H Continued - Repertoire

<b>Design Principle</b>	<b>Strategy</b>
<b>Repertoire (technology, tools, artifacts, concepts, styles)</b>	
<b>Unrestricted access to multiple sources of information</b> (Jonassen et al., 1999; Palloff & Pratt, 2002, Wenger, 1998)	<b>Course web pages-Learner papers posted to the course site</b> (Grunberg & Armellini, 2004; Palloff & Pratt, 2002; Selinger, 1998)
<b>Shared tools, artifact, and places</b> (Schlager & Fusco, 2004; Wenger, 1998)	<b>Production of valuable, reusable knowledge artifact</b> (Harris & Higgison, 2003; Kolikant & Pollack, 2004; Millen & Fontaine, 2003; Rogers, 2000; Sherer et al., 2003)
<b>Shared Culture</b> (Jonnasen et al., 1999; Schlager & Fusco, 2004) <b>cyclical events, ritual</b> (Kim, 1998)	<b>Modeling “transitional objects”: symbolic objects produced in physical settings and then put online</b> (Breuleux et al., 1998; Pawłowski et al., 2000)
<b>Repositories of information, documentation, and tracking; retrieval mechanisms</b> (Wenger, 1998)	<b>Initial structure</b> (Kirby, 1999; Wegerif 1998)
<b>Coordination/communication/interaction protocols</b> (Smith, M.C. et al., 2003; Branion & Essex, 2001; Wenger, 1998)	<b>Initial play and practice with technology</b> (Grunberg & Armellini, 2004; Harris & Higgison, 2003; Olson & Olson, 2000)
<b>Synchronous and asynchronous channels</b> (Branon & Essex, 2001; Harris & Higgison, 2003; Nardi, Whittaker, & Bradner, 2000; Nicholson, 2002; Shearer & Rose, 1998; Shotsberger, 2000)	<b>Allow for social context to influences technology use</b> (M. A. Smith & Fiore, 2001; Spring & Vathanophas, 2003)
	<b>Visualization Tools</b> (Smith & Fiore, 2001; Wenger, 1998)
	<b>Plans, schedules, division of labor</b> (Wenger, 1998)
	<b>Facilities for awareness information on activities and availability</b> (Dourish and Belotti 1992; Spring & Vathanophas, 2003)
	<b>Channel exclusive to students</b> (Nicholson, 2002)
	<b>Cooperative projects and authoring and publishing of knowledge artifact</b> (Kimbler et al., 2001; Harris & Higgison, 2003)

### Appendix I: Harris and Niven's (2002) evaluation table (p. 245)

<b>Dimension / Feature</b>	<b>Characteristics</b>	<b>Evidence</b>
Joint enterprise / Shared purpose	Mutual accountability / Shared ownership	The development process of the VLS involved close consultation with the prospective community membership.
	Negotiation	Although the purpose of the VLS is clearly stated as exchanging experience about the application of C&IT to teaching and learning. Other than online polls, there has not been any recent formal community negotiation regarding the future direction for the community.
Mutual engagement / People who interact socially	Doing things together	Since the OTiS workshop, shared and open online synchronous chats have been a key feature of the VLS. Some of these have attracted upwards of 30 participants from around the world.
	Relationships / Effective communication - Personal presence	To encourage the development of relationships, the VLS includes facilities for members to post online profiles, and to link with others via shared interests. Communication (via text) is central to the VLS, as this is the main means of exchange.
Shared repertoire / Policies that guide people's interactions	Styles	This is partially achieved through common terminology, but also supported by the informal and supportive stance of community facilitators. Clearly defined privacy and copyright statements also underpinned a shared 'style'.
	Concepts	Over the last 12 months, the VLS has developed an approach to gaining knowledge from experts through a process of online chats and asynchronous discussion events. These focus on particular areas of interest and are known as topics of the month.
Historical events		The OTiS e-workshop provides a key historical event within the development of the VLS. Even so, only a small proportion (~5%) of the current membership took part in the actual event.

## Appendix I Cont.

Rogers (2000, p. 389) results table, demonstrating quantification of posting based on percentages that related to Wenger's (1998) three elements, based on non-equivelant pattern matching

- Mutual engagement
  - Maintaining ID 6
  - Relationships form 15
- Joint Enterprise
  - Different from original 34
  - Disagreement 3
  - Mutual accountability 23
- Shared repertoire
  - Shared points of reference 57
  - New ideas created 34
- Not coded 38

According to Rogers, a whopping 57% embodied shared knowledge, underlining the importance of convergence on key knowledge. 34% of postings support the divergence and renewal cycles of a CP through exposure to different perspectives and creation of new knowledge, also 34%; learning occurs. And 23% of postings are connected to accountability and ownership, the support of each other with answers to peer inquiries for example.

**Appendix J: Wenger's (1998) CoP Design Matrix (p. 240)**

**240      *Epilogue: Design***

	<b>engagement</b>	<b>imagination</b>	<b>alignment</b>
<b>participation/reification</b>	combining them meaningfully in actions, interactions and the creation of shared histories	stories, playing with forms, recombinations, assumptions	styles and discourses
<b>designed/emergent</b>	situated improvisation within a regime of accountability	scenarios, possible worlds, simulations, perceiving new broad patterns	communication, feedback, coordination, renegotiation, realignment
<b>local/global</b>	multimembership, brokering, peripherality, conversations	models, maps, representations, visits, tours	standards, shared infrastructures, centers of authority
<b>identification/negotiability</b>	mutuality through shared action, situated negotiation, marginalization	new trajectories, empathy, stereotypes, explanations	inspiration, field of influence, reciprocity of power relations

Figure 10.3. Articulating components and dimensions.

## Appendix K: Sakai

“Sakai is a new integrated learning, collaboration, and research support system. This system, with its capabilities of project site creation and resource sharing, will consolidate the functions of a course management system like Blackboard with research and collaboration features, all coupled with an enhanced ePortfolio.” Also see <http://www.sakaiproject.org/index.php>

- Schedule Course activities, community events, group meetings
- Discussion Forums for special topics in the course, special interest areas for the participants, special problems faced in work settings.
- Modules Mini-lessons designed by/for colleagues, students, and parents (this tool was removed early on)
- Announcements On new content added to the site, newly scheduled events
- Chat Room For online group meetings.
- E-mail Archive Course listserv communication.
- Resources Where a great deal of content will reside, as provided by both researchers and reading specialist participants

Note: The “What goes here?” links were customizable links included to initiate discussionon what links the participants want or need in the menu.

## Appendix L: CoP elements tied to research questions and evidence

<b>Dimension / Characteristics</b>	<b>Research Question</b>	<b>Evidence</b>
Joint enterprise  Mutual-accountability Shared ownership Negotiation Different from original	#s 1, 2, 6, 7	<ul style="list-style-type: none"> <li>• Beginning course syllabus</li> <li>• First focus group session</li> <li>• Memos that document negotiation of activities both in class and online</li> <li>• Questionnaires: 14-21</li> <li>• Interviews: Qs 1,2, 5</li> </ul>
Mutual engagement  Doing things together Relationships Good communication Personal presence Maintaining Identity	#s 2, 3, 4, 5	<ul style="list-style-type: none"> <li>• Statistical comparison of most Qs on questionnaire; Q 34 &amp; 35</li> <li>• Activity within Sakai, extent of cooperation- chat, discussion forum, artifact shared</li> <li>• Interviews: Qs 1, 3, 4</li> </ul>
Shared repertoire  usability Shared... Styles Reference points Artifact Concepts Historical Events New Ideas created	#s 1, 6	<ul style="list-style-type: none"> <li>• Protocols for sharing artifact via Sakai</li> <li>• Communication protocols that develop in Sakai</li> <li>• Questionnaires: 22-24, 27-31, 36</li> <li>• Interviews: Qs 6, 7</li> </ul>

### Research Questions Key:

#### The Activities

1. What activities emerge for the use of technology?
2. How do they emerge?
3. Which are more supportive of CoP? The least? Why?

#### The Participants

4. What changes occur with individual's perceptions of their community participation?
5. What changes occur in observed individual community oriented behaviors?

#### 6. The CoP

7. How do online activities contribute to overall changes in community practice?
8. What concerns do participants have about the future of their CoP? Why?

### Appendix M: Sense of Community Questionnaire

Thank you for your participation in the study. I appreciate your thoughtful responses to the following questions. Remember that only I will have access to your answers, and I will keep them confidential.

Your Name:

Your pseudonym for the study:

Age:

Years of experience as an educator:

Current job title and role:

Grades and special subjects you currently teach:

Peers in this course with whom you share the same workplace:

Peers in this course with whom you have the most contact outside of class:

Type of internet connection you have at home:

none  dial-up  DSL  Cable  other:

Describe your access to a computer and to the internet throughout your workday.

Amount of time in a typical day you use the internet:

Amount of time in a typical day you use a computer:

For the following statements, please indicate your level of agreement or disagreement:

- 1.** People in this program do not share the same values.  
 Strongly Disagree  
 Disagree  
 Agree  
 Strongly Agree
- 2.** I think this program is a good place for me to be.
- 3.** The people in this program and I want the same things from this program.
- 4.** I consider all my peers to be friends.
- 5.** I feel at home in this program.
- 6.** The people in my program do not know me well.
- 7.** I care about what the people in my program think about my actions.
- 8.** I have no influence over what this program is like.
- 9.** If there is a problem in this program, the people here can get it solved.
- 10.** It is very important to me to be in this particular program.
- 11.** People in this program generally don't get along with each other.
- 12.** I would recommend this program to others.
- 13.** I expect to be professionally involved with my peers 2 years from now.
- 14.** My peers and I would benefit from greater collaboration with each other.
- 15.** I am content with my current teaching resources.
- 16.** I am content with my current teaching practices.
- 17.** I learn best by working independently.
- 18.** I have the liberty to change and develop my lesson plans and activities.
- 19.** I can effectively share my resources with others, even educators whom I don't know well
- 20.** Colleagues influence my methods and lessons.

- 21.** I need better ways to communicate with educators using computers.
- 22.** I can obtain resources from fellow educators that can help me do my job.
- 23.** I learn best in cooperation with peers.

**Please respond to the following frequency questions as accurately as you can.**

How often do you use an internet resource directly for teaching material?

- Never or almost never
- Less than monthly
- Less than weekly
- Once a week
- A few times a week
- Every day
- Several times a day

How often do you receive help from fellow educators with teaching methods or other professional issues?

How often do you assist fellow educators with teaching methods or other professional issues?

How often do you introduce innovations to your own teaching practices and lessons?

How often do you communicate with program peers about non-work issues using the Internet (such as email, listserv, IM/chat...)?

How often do you communicate with program peers about work issues using the Internet.

How often do you share a physical teaching resource with a peer?

How often do you share an electronic resource with one peer?

How often do you publish or distribute an electronic resource to multiple peers?

---

**Open-ended questions:**

Please describe the nature of the *professional* interactions you have with your peers on a weekly basis, outside of class. With whom? Amount of time? By telephone, email...?

Likewise, describe the *social* interactions you have with your peers outside of class.

What percentage of your own work since starting in the program have you shared with one or more peers? Do you think this amount is large or small? Why?

What percentage of your work to date in the program would you be willing to share with all of your peers? Explain.

What activities or communication technologies would enhance professional community in your program?

## Appendix N: Sample Interview Questions

**Interview questions will depend highly on the activities that develop and participant response to them during the semester, but some general planned questions follow:**

1. This semester, what technology use was most supportive of cooperative work? The least?
2. What online tool or activity presented the greatest learning opportunity? The least?
3. How did you feel about making more of your work public, sharing it with everyone?
4. Explain how the greater accessibility of your peers' work was an influence.
5. How do you think the online technology and activities will affect future relations with your peers, socially and professionally?
6. What did you think of the course portal? What about it was most helpful? Most annoying?
7. What do you recommend for future efforts at supporting extended learning community with technology?

### Appendix O: Questionnaire Data – Attitude Questions

Key: strongly disagree = 4; disagree = 3; agree = 2; strongly agree = 1

<b>Question</b>	<b>Questionnaire One</b>		<b>Questionnaire Two</b>	
	<b>Mean</b>	<b>SD</b>	<b>Mean</b>	<b>SD</b>
1. People in this program do not share the same values	3.4	0.7	3.4	0.5
2. I think this program is a good place for me to be	1.6	0.7	1.8	0.7
3. We all want the same things from this program	2.2	0.8	1.9	0.4
4. I consider all my peers to be friends	2.3	0.5	2.4	0.7
5. I feel at home in this program	1.4	0.5	1.5	0.5
6. The people in my program do not know me well	3.1	0.6	3.3	0.5
7. I care about what the people in my program think about my actions	1.8	0.4	2	0
8. I have no influence over what this program is like	3.2	0.4	3	0.5
9. If there is a problem in this program, the people here can get it solved	1.5	0.5	1.8	0.7
10. It is very important to me to be in this particular program	2	0.7	2.1	0.6
11. People in this program generally don't get along with each other	3.7	0.5	3.6	0.5
12. I would recommend this program to others	1.7	0.5	1.9	0.6
13. I expect to be professionally involved with my peers 2 years from now	1.9	0.6	2.1	0.4
14. We would benefit from greater collaboration with each other	2	0.5	1.9	0.4
15. I am content with my current teaching resources	2.5	0.5	2	0
16. I am content with my current teaching practices	2.1	0.7	2	0
17. I learn best by working independently	3	0.7	3.3	0.9
18. I have the liberty to change and develop my lesson plans and activities	1.5	0.5	1.5	0.5
19. I can share my resources with others, even those I don't know well	2	0.5	1.9	0.4
20. Colleagues influence my methods and lessons	2.3	0.7	2.1	0.6
21. I need better ways to communicate with educators using computers	2.4	0.5	2.4	0.5
22. I can obtain resources from fellow educators that can help me do my job	1.7	0.5	1.8	0.5
23. I learn best in cooperation with peers	1.6	0.6	1.8	0.9

## Appendix P: Questionnaire Data - Frequencies

-Never or almost never	7
-Less than monthly	6
-Less than weekly	5
-Once a week	4
-A few times a week	3
-Every day	2
-Several times a day	1

Question – How often do you...	Q One			Q Two						
	Mean	SD	Mean	SD	Mean	SD				
1. Use an internet resource directly for teaching material?	4.5	1.1	3.6	1.5						
2. Receive help from fellow educators with teaching methods or other professional issues?	3.7	1.2	4.3	1.8						
3. Assist fellow educators with teaching methods or other professional issues?	3.1	.8	3.4	1.8						
4. Introduce innovations to your own teaching practices and lessons?	4	.7	4.1	1.4						
5. Communicate with program peers about non-work issues using the Internet?	5.9	.6	5.5	1.4						
6. Communicate with program peers about work issues using the Internet.	5.2	.6	4.9	1.8						
7. Share a physical teaching resource with a peer?	3.9	1.3	4.3	1.8						
8. Share an electronic resource with one peer?	4.5	1.1	4.4	1.3						
9. Publish or distribute an electronic resource to multiple peers?	5.2	.6	5	1.7						
<b>Yellow = negative change    Blue = positive change</b>										
Question:	1	2	3	4	5	6	7	8	9	Mean
Sally	5 5	5 5	5 5	5 5	7 4	5 6	6	7 6	7 6	5.6 5.3
Ann	4 3	3 4	3 3	5 3	7 6	5 5	4 4	5 5	5 6	4.4 4.1
Rose	2 2	2 2	2 2	3 5	6 7	6 6	3 3	3 3	3 6	3.3 3.7
Stella	6 4	4 5	4 5	5 5	7 5	7 5	6 5	5 4	6 7	5.6 4.9
Amber	3 3	5 5	2 3	3 3	5 6	3 7	2 3	3 4	3 2	3.1 4.1
Instructor	6 5	7 6	7 5	6 6	7 6	7 3	7 7	4 4	7 5	6.4 5.4
Helen	5 5	5 5	2 3	3 4	6 5	5 5	5 5	6 6	5 6	4.7 4.8
Sheila	5 2	2 2	2 1	5 2	3 5	6 2	4 1	6 2	3 2	4.1 2
Jane Kayla	3 6	2 2	2 2	2 3	6 5	2 6	2 2	3 3	7 6	2.7 3.4

## Appendix Q: Questionnaire One – Open-Ended Questions

**Please describe the nature of the *professional* interactions you have with your peers on a weekly basis, outside of class. With whom? Amount of time? By telephone, email...?**

Sally	I am assuming you mean my peers in the program?? I usually talk with [Rose] once or twice a week about our homework for night class. Or we will share teaching ideas once or twice a month at work. We email and call each other about these issues as well about once or twice week. The amount of time is probably once 20 minutes. If we have a big project due it is more time.
Ann	I have only had 2 class meetings with the people in this program so far, so the only interactions I have had outside of class were with the other two group members that I am working on a Powerpoint project with. We e-mailed what we have done so far with the Powerpoint.
Rose	We have grade level meetings once a week, staff meetings once a week, daily interactions with grade level members involving planning and sharing of resources. Peers and I e-mail resources frequently and share many things through e-mail.
Stella	So far I have only communicated with Aaron Powell and the instructor outside of class and I have done this via email. The nature of the emails were to get clarification on a question or to respond that I have received emails and understand the material being sent by attachment. I'd say this has occurred less than 10 times in 3 weeks.
Amber	I interact with the program peers from my school on a daily basis. One is my principle and the other is our reading specialist who teaches the same grade as myself. Therefore, we work together regularly.
Kayla	Weekly with teachers within my school setting. Usually in person but sometimes via internet or phone. We all have multiply websites which we offer current events in our own lives and this kind of serves as our own technology community.
Instructor	I communicate with my peers (who aren't the students in this program) exclusively in person or by email. [Amber] interact on a daily basis as we both are teaching in the same grade level. I have a casual interaction with Jeanine. We have discussions before or after school concerning instructional strategies, etc. [Sheila] is the principal so I have contact with her on a daily basis. As the English Coordinator for our school, I have to confer with her concerning projects or school-wide projects that I develop.
Helen	I have professional dialogue daily with [Helen, Amber, and Jane] through emails, face-to-face conversations, telephone, and meetings. The average amount of time would be 5%.
Sheila	I talk with the teachers from my school everyday.
Jane	

**Likewise, describe the social interactions you have with your peers outside of class.**

Sally	I chat with [Rose] at work socially several days a week for a few minutes each day. We also carpool to class on Thurs. so we chat all the way there and back 25 minutes each way.
Ann	I have only had 2 class meetings with the people in this program, so I don't really contact them socially at this time.
Rose	Chatting in the hallways before, during, and after school.
Stella	None thus far.
Amber	These interactions normally occur at work.
Kayla	Basically the same answer as above.
Instructor	I have a lunch or dinner with a peer (not someone in this class) once or twice a week. I visit with my peers about non-work issues away from the office occassionally by email. [Sheila] has been a personal friend for over 15 years, prior to her becoming the principal. We meet about once a month for dinner or coffee with other friends the two of us share. I really don't have social interactions with the others in the class.
Helen	The social interaction consists of dining, shopping, and going to a movie or visiting. This takes place less than 1% of the time.
Sheila	I do not interact with my peers outside of class in a social setting unless they are the teachers from my school.
Jane	

## Appendix Q Cont.: Questionnaire One – Open-Ended Questions

**What percentage of your own work since starting in the program have you shared with one or more peers? Do you think this amount is large or small? Why?**

Sally	The peers in my program have heard about 75% of my work, I think this is a large amount because I have never had to present every project I do to my peers before (in undergrad for example).
Ann	I am not in the reading specialist program. I am taking this as a doctorate class.
Rose	
Stella	0% I haven't shared anything yet. I have shared a large amount. We commonly discuss ideas or strategies we come across in our reading. During this technology course, we do not feel like we are learning much about teaching reading. I think it will improve as the semester continues.
Amber	Since enrolling in the masters programs I have shared any and all resources that I have found useful. Generally I give it a trial run and then share my findings. In the Sakai community I have shared just a little but I feel we are just getting into new things that I will be able to use.
Kayla	None. What i do in my own classes is basically personal. With my colleagues, there are lots of whole program issues that need to be addressed on a regular basis, and when we communicate in person or via email, it is generally about whole program issues (and usually the elementary program). We don't talk about or share what we are doing in our own classes often.
Instructor	I have shared some of my work with [Sheila], to receive her input. I would say maybe 10%. About 90% of the work has been shared with [Stella] and [Sally] because we are working in the same group.
Helen	I have shared 90% of my work with the people in the class. I believe this to be a large percent and I was able to do that through Sakai
Sheila	
Jane	Large.

**What percentage of your work to date in the program would you be willing to share with all of your peers? Explain.**

Sally	I would be willing to share all of it.
Ann	I am not in the reading specialist program, but I would be willing to share any resources and materials that I have.
Rose	100%. I don't feel that we, as teachers should ever "recreate the wheel". We have so much on our plates as it is, we should be helping each other all that we can.
Stella	ALL of it. 100% I am here to learn from others and share information of my own.
Amber	I would be willing to share all of it.
Kayla	So far none as I feel that they are works in progress. If you are referring to the masters' program I share anything that I have tried and found to be successful. I also share research that contradicts our current teaching practices.
Instructor	I would be willing to share anything I've done in the reading program with my peers, if they wanted to know about it. 100%
Helen	Now that I have a command of creating powerpoint presentations, I would be willing to share 100% of the work to this point.
Sheila	I would be willing to share all my work.
Jane	I have enjoyed my classes and I have a desire to share what I have learned with other younger teachers.

## Appendix Q Cont.: Questionnaire One – Open-Ended Questions

### **What activities or communication technologies would enhance professional community in your program?**

- Sally I guess the website we are going to build together would be a chance to enhance our community. Having a chance to discuss the resources we put on the web site and have a chance see what they have to offer and how educators use them in their classroom would be very helpful.
- Ann I think the Sakai website will be helpful. Perhaps more training would be good for those who do not feel comfortable uploading and downloading materials. Also, Portaportal.com is an easy website to use and would be great to have a class portal to share resources. I know Sakai can do that, but Portaportal is easier to navigate.
- Rose The chat room on the Open Book is a good resource for all of us to be able to "talk" at once about any issues we might be dealing with.
- Stella
- Amber Sometimes it is hard to get help with technology issues when they arrise. Over the course of the past year I have had several questions regarding my Hokie Spa account, etc. and when I call no one can answer my questions.
- Kayla In my school, our internet is not completely reliable. Also, I feel like I could do so much more if I had a pc instead of an Apple based system. If I had more time I'm sure that I would find the Apple computers to be beneficial as well. Our actual computer lab needs to be completely updated so that all students are using beneficial materials at the same time. Half our computers are as old as I am (literally).
- Instructor I don't know how to answer this. I think we have already discovered some new methods of communicating with what we have learned in the Open Book so far with the resources, announcements, and chat. I think we can learn to use the discussion forum as we go along.
- Helen We have so much access to forms of technology that are available in the school setting. Central Office personnel are always willing to supply web sites and other faculty members also share web sites. Our school technology coordinator is most helpful in providing us with sites and technology activities.
- Sheila Having updated hardware, programs, staff development, and time implement the resources would most definitely enhance the professional program.
- Jane An open environment creates good communication.

## Appendix R: Questionnaire Two – Open-Ended Questions

**Compared to previous semesters in this program, or past higher ed experience in general, how do you think the use of Sakai affected your learning, particularly through interactions with your peers and their work?**

- Sally I think Sakai affected my learning in a positive manner. I was able to put work on Sakai that I could then add to my peers work, so that saved time. I could also access their work and benefit from it.
- Sheila Sakai gave me another avenue to communicate with peers.
- Ann I do not think Sakai had much of an effect on my learning. I did like the ability to save group projects in Sakai so that everyone in the group could access the project and work on it at their convenience.
- Amber I do not know if it affected my learning at all. It increased the discussion among peers.
- Stella Sakai didn't really affect my interactions with my peers and their work.
- Rose We were able to post items onto the internet to share with each other. It could have been lessons that had really worked for us or websites that we would like to share.
- Helen I definately used technology more this semester, as was expected. The use of Sakai taught me that there are ways to share resources and communicate with peers other than traditional ways, such as telephone, person to person, or researching written materials on my own. Sakai helps keep me aware that I can share resources, sometimes I forget that things can be shared through Sakai.

**Compared to past professional development activities, how do you feel about the use of Sakai? Is it a viable alternative?**

- Sally I think Sakai is a great place to post work and activities and a place to go and learn new ones. However I am a people person and I would rather learn from people talking to me than from a computer.
- Sheila Sakai needs to be made "user friendly".
- Ann I like that resources are available after the class is over, and can be shared/viewed by everyone in the class. So many class projects for other classes are turned in to the professor, or shared briefly with the class, but not able to be seen in their entirety. In that sense, it is a viable alternative to use Sakai. However, Sakai often seems slow, cumbersome, and frustrating to find certain things.
- Amber No, I think it is too hard to use for many teachers, especially ones that are afraid to use technology. I do think teachers like myself who enjoy technology could use it to exchange ideas.
- Stella If people "got the hang of it", then I beleive that it is.
- Rose I feel that because I was in this class, I am able to use it but other professionals would have difficulty maneuvering around it.
- Helen I do think Sakai is an alternative for sharing resources. This is the first time in my professional development that I have used a resource such as Sakai. I have used Blackboard in the past, but I think I could use Sakai more effectively.

**What do you recommend to ensure continued and increased contribution to Sakai by you and your peers/colleagues, outside course/program activities?**

- Sally I guess we could make an agreement to post something from our classroom teaching experience or from staff dev. each semester that might benefit our peers.
- Sheila Make sure that when something is added to Sakai, an e-mail notification is sent so that colleagues are aware of new resources.
- Ann Make Sakai available through other courses that educators may be involved in.
- Amber N/A
- Stella An increased use of Sakai will be somewhat difficult to continue to deveop because of time management issues and the fact that there are numerous activities and lesson plans already available online. Why reinvent the wheel?
- Rose
- Helen

## Appendix R Cont.: Questionnaire Two - Open-Ended Questions - Instructor

**Compared to previous semesters in this program, or past higher ed experience in general, how do you think the use of Sakai affected your learning, particularly through interactions with your peers and their work?**

First, I should say that I can't remember whether or not I answered these questions previously, but they don't really work very well for me. As I read them, when I come to the word "peers," I am usually thinking of my own VT peers, and not the students in this program. I mean, they are my peers, but I am the program leader for their program and their professor, and clearly, my thoughts on the program are not coming from the place of being their "peer," although I view us all as learning collaboratively. My thoughts about how Sakai affected my learning are similarly unlike what the students might think. I saw Sakai as a marvelous new tool to use in this and future courses, and I found it to be MUCH PREFERABLE to Blackboard. I think the use of Sakai was essential to the learning experience over the semester and really don't have any idea how we would have pulled off the creation of a web site without it. While it supported interactions with peers in the class, the most important interactions were the face to face interactions in class. But this may have been "my fault" in that I am a very face to face person, and I have made limited use of technology resources in my classes.

**Compared to past professional development activities, how do you feel about the use of Sakai? Is it a viable alternative?**

I consider Sakai a great alternative to Blackboard. It looks better, it is "friendlier" and more accessible, and I think it has more possibilities for enhancing instruction. I never used the discussion and when I tried to read the discussion threads, I always had problems following them until the very end of the semester when Aaron taught it to us a second time. I found it bothersome that people appeared to be in "chat" but weren't really there, and this continues to be a problem. One of my students thought I was there and wrote me a question and was disappointed that I was sitting right there and didn't reply to here. I am using Sakai for both of my courses this summer. However, my use of Sakai is still quite limited. I have not required discussion and no students have used it to date. The main thing students are doing is downloading my powerpoint presentations and other resources, and they are uploading some of their assignments. So the only thing that is "new" here is that, rather than emailing things to me and having me upload them to Blackboard, they are uploading things themselves. The students like the idea that they will be able to go to the Sakai site later, after the semester is over, to access this information. I managed to make alterations on the websites so that I got rid of all of the resources I didn't want, and I made all of the students "instructors" so that they could work freely with the site. They are only doing what I have told them to do. One of the "difficulties" here is that this is summer school. I have 12 students, I think, who are in both classes, so they have me in class from 1-7 every Tuesday, Wednesday, and Thursday, and they have lots of assignments to complete. I think they probably feel that they have too much to do too fast, and they don't have time to get creative with Sakai or start discussions. This leads me to the notion that I still need to know a lot more about technology and I need to learn how to effectively integrate it in my teaching rather than just using it as a storage place for my students and I to place information to share with the group. I need to learn to think about technology like Sakai and its possibilities when I am planning my courses and write it into the syllabus.

**What do you recommend to ensure continued and increased contribution to Sakai by you and your peers/colleagues, outside course/program activities?**

I think faculty in the School of Education need to have several opportunities to attend information sessions about using Sakai to support learning in graduate school courses in education. I know that I am just barely scratching the surface here. It would be helpful for someone to demonstrate various methods of using Sakai to enhance the learning experience, perhaps with some examples. In the reading program, I am just curious to see what will happen. I feel sure that [the next professor] will give it a shot with the students later this summer, but don't know what [another professor] will do in the fall. I do think that session to train faculty in using Sakai would be helpful. If we all got training and could talk as a program faculty about the possibilities, it would be helpful.

## **Appendix S: Summary of Focus Group Two A Context for the Course Project**

It was Kayla who first suggested, “instead of having links to webpages, maybe we should have leveled links,” the main navigation/organization scheme being grade level. This idea gradually took hold. The group discussed how so many sites are packed with dense, scrolling information, which could be intimidating even for a well educated parent, and there was general agreement that we needed to keep the site simple. The group started talking about details of literacy and development of reading skills and began organizing work into specific tasks with a timeline for the rest of the term to get the project done.

Helen reflected on the past few weeks and how they had not really known what they were doing, comments she echoes even at the last class. There seemed to be a general feeling of accomplishment as we progressed in this forum, but I explained to them there was still much left to determine. I asked about the sublinks of the site, content areas they had discussed, and whether they were the same for every main, grade level link. There was more discussion on content, Helen suggesting a professional vocabulary list, such as *phonemic awareness*, which some felt might to be “too big” for the site. The instructor suggested a list of defined acronyms, i.e. SOL or IEP or LD. Kayla brought the discussion back to the grade levels and suggested we consider the important functions for each. She went up to the white board and began mapping it out. This was an important step, as it got the group focused on the concrete organization of the site and the major links to content areas.

They decided to start with the inclusion of a pre-kindergarten (pre-k) level. Helen suggested the exercise of *reading-aloud* for all grade levels. The instructor challenged this; the discussion continued with a lot of long pauses; the first time they were thinking deeply about what the project really entails. There was more talk about levels; for example, Helen observed 1<sup>st</sup> grade to be where sentences start and stop, and 2<sup>nd</sup> and 3<sup>rd</sup> grade to have more of a focus on vocabulary. Amber steered the discussion toward recommendations of a reading activities, such as helping the reader with identifying, making connections, by questioning children about the reading. The instructor responded that this is “a very big activity”; Sally further explained that the questioning about reading should occur before, during, and after the reading

At this point there is general acknowledgement that this is hard work. There are then more deliberations about activities, discussion of “thinking about the reading,” which I offered as “critical thinking.” I interrupted by asking about the categories discussed at the start: book lists, websites,

and the like, and whether these were sublinks - content to be considered for each main grade level links. There was a long silence, and the instructor chimed in by observing that we're going to have to narrow this. Amber jumps in with observing the NEA website and how they survey teachers for a top 100 list of books. Angela suggests that is too much. I explain that one of the main goals is to digest all the information for parents into an easier package to swallow, for parents to avoid being overwhelmed by all the informational sites available; they need only visit our site, "the one-stop-shop." I suggest again how perhaps there was a way to consolidate the content categories, such as *phonics*, into sublinks like *activities* that all grade levels share. Helen reinforces the need to define the reading levels. Ann agrees that it should explain what a child should be doing at a particular stage of development. They come to terms with level home pages and sublinks, and there seems to be a sigh of relief that they are getting close. There was some discussion of a local resources page. I then sense there is still some confusion on the sublinks, so I further clarify the navigation scheme; we leave it open, but it seems they are beginning to understand my points about its importance.

There is little data from this discussion to directly analyze in terms of the CoP elements. However, overall, the discussion illustrates the groups coming to terms with the specifics of their joint enterprise, the design of the website. The discussion illustrates considerable mutual engagement with the use of a common repertoire of professional knowledge to negotiate the content and organization of the site. Through moments of frustration, the group was able to dig deeper and work cooperatively on the task at hand

## Appendix T: Screenshots of Sakai

There have been some revisions of this instance of Sakai, which cause some shifting of some menu items. They are not exactly how they were during the course. The first screenshot of the Resources section, however, depicts exactly how the space looked at the end of the term. The last folder was created by Ann; her real name has been blocked out. The other folders were created by me, either at the start of the term or early into the term. The second screenshot depicts the discussion forum.

The Open Book Resources / Literacies and Technology

Title	Access	Created By	Modified	Size
Literacies and Technology	Add Actions	Aaron Powell	Jul 6, 2007 8:25 pm	3 items
Book Reviews	Add Actions	Aaron Powell	Jul 6, 2007 8:25 pm	7 items
Literacies and Technology	Add Actions	Aaron Powell	Jul 6, 2007 8:25 pm	4 items
Online Technology	Add Actions	Aaron Powell	Jul 6, 2007 8:25 pm	11 items
People/Portfolios	Add Actions	Aaron Powell	Jul 6, 2007 8:26 pm	9 items
Roanoke Reads	Add Actions	Aaron Powell	Jul 6, 2007 8:26 pm	9 items
Websites and Activities	Add Actions	Aaron Powell	Jul 6, 2007 8:26 pm	9 items

The Open Book Discussion

Add Topic Add Category Expand All Permissions

View: Column Layout

- Instructional Strategies
  - Grouping (11 responses) Aaron Powell Feb 2, 2006 4:44 PM EST
- NCLB Schools
  - Baltimore Schools (2 responses)
- Roanoke Reads
  - What info. is most impt. to you? (2 responses)
  - Links (2 responses)
  - HOME Aaron Powell Mar 2, 2006 6:09 PM EST
  - Book List (5 responses)
  - resources page (1 response)
  - Survey (1 response)
  - Scholar
  - Technology Skills
  - pre K - K

Done