Characteristics of “Communities of Practice”
in a High School Economics Lesson Study Group

Steven Lonn
University of Michigan

Paper Presented at the 2006 Annual Meeting of the
American Educational Research Association
Abstract

Findings from a year-long study of a technology integration project where teachers and other educators collaborated in a lesson study group suggest that this group exhibited and was developing characteristics of communities of practice as outlined in current theory and research. In this paper, characteristics of communities of practice: collaboration, knowledge growth, trust, reflective inquiry, new identity construction, and the reproduction cycle are first compared with characteristics of lesson study groups as described by researchers. This comparison reveals similarities that are then compared with characteristics of the High School Economics lesson study group that was at the focus of this project. These findings suggest that further research on lesson study, as enacted in this project, may help in the development of cohesive and sustainable communities of practice in education.
Characteristics of “Communities of Practice” in a High School Economics Lesson Study Group

Steve Lonn
University of Michigan

Introduction

In 1991, Jean Lave and Etienne Wenger introduced a new term to describe a group of new and old professionals working together in their given trade: a community of practice. Over time, communities of practice have been proposed as a model for teachers' professional development (e.g. Borko, 2004; Grossman, Wineburg, & Woolworth, 2001; Palincsar, Magnusson, Marano, Ford, & Brown, 1998; R. T. Putnam & Borko, 2000; Schlager & Fusco, 2004; Wilson & Berne, 1999). Stigler and Hiebert (1999) introduced a model of teachers’ professional development, Japanese lesson study, to American audiences (e.g. Boss, 2001; Fernandez & Yoshida, 2000; Lewis, 2000; Rock & Wilson, 2005; Stepanek, 2001) that, as enacted in the case examined in this paper, exhibits characteristics of communities of practice.

This paper examines how a group of teachers, researchers, and others who used lesson study to engage in inquiry about curriculum design and technology integration in a High School Economics lesson study group exhibited characteristics of a community of practice. Findings suggest that this lesson study group had, to a degree, developed characteristics consistent with current descriptions of communities of practice. Findings also suggest that lesson study, as enacted in this project, may serve as one model for
establishing cohesive and sustainable communities of practice in education for professional development.

Despite its widespread use, some researchers argue that the term "community of practice" lacks a coherent definition in practical educational applications. Westheimer (1998) argues that, at best, the term "community" is ambiguous in its American context. Other researchers argue that there is no definite "criteria for what does and does not constitute (a) community; the term is too often employed as a slogan rather than as an analytical category" (Barab, Kling, & Gray, 2004, pp. 3). In this paper, I illustrate how the lesson study process can be adapted for professional development activities in the United States by identifying features of one particular lesson study group. I also argue that lesson study, as enacted in this instance, may be a more effective model for professional development than a model solely based on theories of communities of practice. A key component of this argument is that the teachers in this particular lesson study group were very enthusiastic about the project and willing to continue for another school year while teachers in traditional professional development programs solely based on theories of communities of practice rarely demonstrate such enthusiasm (e.g. Sumsion & Patterson, 2004).

I begin this paper by describing the project in which the case is situated. Next, characteristics of community of practice and lesson study are introduced and examples are drawn from the "High School Economics" case to illustrate the connections between communities of practice and lesson study. Finally, implications for future research are discussed.
The High School Economics Lesson Study Group

Research Design

Findings described in this paper are derived from a study that investigated lesson study where collaborators designed, implemented, and studied an issues-centered approach to high school economics that included the use of Texas Instruments (TI) technologies and other technologies intended to enhance students' understanding of difficult economics concepts.¹ The design of this project was informed by research on teacher education (Anderson, Smith, & Peasley, 2000; Banks & Parker, 1990; Darling-Hammond & Cobb, 1996; Lanier & Little, 1986) and teachers’ learning and professional development (Ball & Cohen, 1999; Grossman et al., 2001; R. T. Putnam & Borko, 2000; Sandholtz, Ringstaff, & Dwyer, 1997; Wilson & Berne, 1999). The design of this project was also informed by recent innovations in research methodologies, including those characterized as design experiments or design research (A. L. Brown, 1992).

The overall structure of the project was based on the Japanese lesson study process (Lewis, 2000; Stigler & Hiebert, 1999). The most common form of this process, the in-school research lesson, has teachers engaged in collaboratively planning a lesson, enacting and observing the lesson, evaluation and revision of the lesson, a second "round" of enacting and observing the revised lesson, and sharing the results of the entire process (Lewis & Tsuchida, 1997; Stigler & Hiebert, 1999). Some aspects of this process were changed in the case of the High School Economics lesson study group. As

¹ This project was partially funded by a grant from Texas Instruments and the College and University Faculty Assembly of the National Council for the Social Studies.
advocated in design research (A. L. Brown, 1992), the researchers in this project introduced interventions including innovative social studies instructional methods into the project design. A major focus of the project was the use of new technologies for teaching and learning economics that appeared to be an important reason why teachers agreed to participate. Also, instead of designing and implementing a single lesson, participants agreed to design a month-long unit to more fully investigate and assess students' understanding of difficult economic concepts. Finally, instead of in-person observations, the project design called for teachers' classrooms to be videotaped, edited, and shared over the Internet with other participants. Researchers have found that through video cases, teachers can review complex information quickly and easily and can also consider multiple perspectives of an event (R. T. Putnam & Borko, 2000; Sherin & Han, 2004).

The project design called for the integration of TI wireless and handheld technologies into teachers' economics instruction. Integration was limited to two teachers' classrooms, instead of all four teachers’ classrooms, due to an equipment shortage. Internet use for conducting research was also integrated into all teachers' instruction. In one instance, Classroom Performance System™ (CPS) technologies were integrated into one participant’s (a student teacher) economics instruction.

Participants
Participants in this project included three high school economics teachers (Sarah Woods, Nathaniel Smith, and Kathy Miller), one student teacher (Bill Green), two university professors (Rod Williams and Laura Wilcox), a graduate student researcher (Steve Lonn), a camera operator and editor (Paul Quincy), and two undergraduate student researchers (Sam Chang and Monica Lee). Bill's Cooperating Teacher (CT), Robert Brown, also participated in some of the initial group meetings. The schools where the teachers taught were all located on the urban fringe of a large Midwestern city.

_Economics Unit Overview and Enactment_

As part of this design experiment, researchers encouraged participating teachers to design an inquiry-based economics unit framed by _Teaching for Understanding_ (Wiske, 1998) and informed by an issues-centered approach to social studies (Evans & Saxe, 1996). The focus of this inquiry-based unit was the California electricity crisis of 2000-2001. As they investigated this topic, students were introduced to economics concepts including the law of demand, the law of supply, market equilibrium, surplus and shortage, and price floors and ceilings. Acting as various role groups (e.g. senior citizens, home owners, etc.), students presented evidence-based arguments on the regulation of the electricity market in their state. This culminating assignment was presented to teachers and administrators who played the role of state policy makers.

The unit was enacted in two "rounds." In the first round, Sarah taught the unit with the TI technologies while Kathy taught the unit without the technologies. In the

---

2 Pseudonyms are used for all participants except for the two researchers.
second round, Nathaniel taught the unit with the TI technologies and Bill taught the unit, at first with no technology, but later used CPS technology. While teachers were strongly encouraged to maintain an inquiry-oriented focus in their instruction, their personal teaching styles also influenced the unit's enactment. However, the lesson study process does not require teachers to mirror others’ teaching styles as lessons are enacted (Weeks, 2001). Teachers are instead encouraged to adapt the lesson for their particular students and share their diverse approaches with the whole group, which is what happened in this case.

Meetings and Teleconference Calls

There were three face-to-face meetings. The first two meetings were scheduled in the fall to facilitate the planning of the unit (October and November 2003). The third face-to-face meeting occurred in March 2004 between the two rounds of unit enactment. After discovering that online message boards were not eliciting communication among group members, participants met twice using teleconference calls during the second round of unit enactment in March and April 2004.

Characteristics of Communities of Practice and Lesson Study

Defining a Community of Practice
For the purposes of this paper, a community of practice is defined as a “set of relations among persons, activity, and world, over time and in relation with other tangential and overlapping communities of practice” (Lave & Wenger, 1991, pp. 98). Most researchers and theorists who have written about communities of practice start with this definition even though they may modify the definition to suit their particular purposes.

Although there is ambiguity about what defines a community of practice (Barab et al., 2004; Westheimer, 1998), I identify six key characteristics that are most common in the community of practice literature. As each of these characteristics are introduced, characteristics of lesson study groups, in general, as well as examples from the High School Economics project, in particular, are presented to illustrate how, in this instance, this lesson study group developed characteristics consistent with current descriptions of communities of practice.

Characteristic #1: Collaboration

Collaboration among members is a fundamentally important characteristic of communities of practice, so much so that some researchers list it first in their own inventories of characteristics (Sumson & Patterson, 2004; Westheimer, 1998). A requisite feature of communities of practice is "an interdependent system (in which) members can become part of something larger than themselves" (Barab & Duffy, 2000, pp. 11-12). For teachers, a good community of practice has a high level of "collegiality" (McLaughlin, 1993) and provides a setting for peer collaboration and engagement around
shared work (Bryk, Camburn, & Louis, 1999). High-quality professional development programs, particularly those that emphasize collaboration, can help teachers expand their knowledge and transform their teaching (Borko, 2004).

Just as communities of practice emphasize collaboration, the lesson study process also places a high degree of importance on ongoing collaborative activities (Fernandez, Cannon, & Chokshi, 2003). In lesson study, teachers are encouraged to share their ideas, opinions, and conclusions about the research lesson (Rock & Wilson, 2005). Over time, lesson study may resonate with teachers who feel less isolated in their classrooms and, instead, are better skilled at collaborating with colleagues (Boss, 2001). Thus, lesson study and communities of practice both share fundamental characteristics of collaboration among participants. In the next section, I discuss instances that illustrate how collaboration was essential for the success of the High School Economics project.

Collaboration in the High School Economics Group

In the case of the High School Economics lesson study group, collaboration between and among participants was essential to the success of the project. In this section, I present four instances that illustrate the importance of collaboration in a community of practice.

When project participants initially met in October 2003, one of the first goals was to decide what economic concepts the unit should emphasize.³ To begin, Rod, the project director and facilitator at this meeting, suggested focusing on concepts that students have difficulty understanding. Identifying concepts that are difficult for students is a common

³ The first and second face-to-face meetings were not recorded, but notes were taken.
and useful starting point in lesson study (Takahashi & Yoshida, 2004). Several group members made suggestions about which concepts to focus on. For example, Robert suggested elasticity while Nathaniel suggested scarcity, which he suggested is a fundamental concept in economics. As the conversation progressed, participants began building off of each-others' ideas. For example, Sarah suggested that the unit could focus on a "bundle of ideas that interrelate." Laura, an economics professor at the university where the project was conceived, built on Sarah's idea and proposed looking at the basic microeconomic concepts of supply and demand, which also encompassed Robert's suggestion of elasticity. While the group was very new, this first conversation demonstrates how participants began collaborating on ideas for the unit at their first face-to-face meeting. Subsequent meetings demonstrated further how this lesson study group was beginning to develop this fundamental characteristic of communities of practice.

At the second face-to-face meeting in November 2003, project participants continued to collaborate and build on their discussion from the first meeting. A major goal of this meeting was to come to consensus on the topic of the unit. Beginning with the instructional strategies derived from Issues-Centered Social Studies (Evans & Saxe, 1996), Rod proposed using case studies to contextualize the concepts of supply and demand. Laura, Bill, and Sarah suggested various case and conceptual ideas, but Rod continued to push the group to identify a "big issue" that could provide a context for the entire unit. As in the first meeting, the participants collectively built and expanded on Rod's suggestion before arriving at a consensus. In this instance, Laura proposed the Enron scandal as a possible central issue for the unit. Bill elaborated on Laura's idea, suggesting that various components of the Enron scandal could be presented as pieces of
the larger case as each concept was introduced. Sarah proposed expanding the scope of the issue to include the California electricity crisis of 2000-2001. Her reasoning, as she explained to the group, was to use events like the rolling California blackouts as a way to "hook" students and engage them in the issue for the month-long unit. This exchange of ideas provides further evidence that this group was developing collaborative skills and practices that are a fundamental characteristic of both lesson study and communities of practice.

Collaboration among group members continued to develop throughout the project. At various points, teacher participants collaborated more with the researchers than with other teachers. For example, Sarah, who volunteered to take the lead in planning the lessons for the unit, looked forward to collaborating with the other project participants, as expressed in her initial interview in November 2003:

I really like to collaborate with other people because they say something and it sparks a new idea in yourself. Of course what you end up with – your end result with two minds – is always better than what you came up with on your own.

Researchers hoped that teacher participants would continue to collaborate using Internet-based collaborative tools such as online message boards, and email, as work on the unit began in earnest. However, during this period (November 2003-January 2004) there was little ongoing collaboration. This lack of participation has several possible explanations. One of the tools that the researchers encouraged participants to use was the Collaborative Curriculum Design Tool (CCDT) (http://learnweb.harvard.edu/ccdt/) that allows users to collaboratively construct curricula framed by basic principles of Teaching for Understanding (TfU). Many of the participants were still very new to the language of TfU and may not have understood how the various components worked together. In
addition, the timing of the planning phase may have been problematic, as major holidays and the end of the schools' grading period coincided with the period of time that Sarah took the initiative to lead work on the unit plan. Teachers engaged in communities of practice often rely on support from other professionals who can provide suggestions and insight at critical moments (Gal, 1993). In the case of the High School Economics project, Rod and Steve provided this type of support when they met with Sarah and worked with her to construct lesson plans for the unit that were aligned with *Issues-Centered Social Studies* and that also integrated Texas Instruments technologies. Thus, the unit-writing phase of this project illustrates how a few members of the community can collaborate to accomplish necessary objectives. In this example, the support that Rod and Steve provided was critical to fostering and sustaining further collaboration among teachers.

Collaboration among all of the members in a community of practice is essential for success. In the case of the High School Economics lesson study group, the contributions of the two bright and motivated undergraduate researchers, Sam and Monica, were critical to the success of the project. After the first round of enactment of the unit, project participants agreed that high school students participating in the project needed help during the research process that informed the culminating project. Seeking a solution to this problem, participants in the lesson study group agreed that a "closed case," in which all of the research materials are provided for students was required. As economics majors, Sam and Monica were able to use their content knowledge to quickly search for and identify interest group-specific materials that were appropriate for student use. Steve was then able to organize these materials and provide web links to the
resources from one central website. Teachers had neither the time nor the skills necessary to complete these tasks. This episode illustrates how collaboration and contributions from all of the members in this community of practice was required to achieve success, and why the definition of a community of practice may need to be broadened to include a variety of individuals.

Collaboration, a characteristic of lesson study and communities of practice, emerged as an important feature of the High School Economics project. All of the teachers in this project cited the collaboration among and between participants as a valued component of the lesson study process, which is consistent with findings from other research projects (Fernandez et al., 2003; Perry, Lewis, & Akiba, 2002). Participant contributions during discussions, lesson writing, and other project activities illustrate how, in this instance, a lesson study group was developing collaborative practices, a characteristic consistent with current descriptions of communities of practice.

Characteristic #2: Contributing to the Knowledge Growth of the Community

Above, I introduced collaboration as a fundamental characteristic of communities of practice. I also described how collaboration is also a characteristic of participants engaged in lesson study, as evidenced in the High School Economics project. In this section, I discuss a second characteristic: contributing to the knowledge growth of the community.

Grossman and colleagues (2001) suggest that one of their "dimensions" of community is a shared responsibility for the community's knowledge growth and development. Given this responsibility, is it incumbent upon the community members to
contribute to the communal knowledge base to the best of their ability and not passively act as a recipient or consumer of the community's knowledge or services (Hunter, 2002; Palincsar et al., 1998). As communities of practice develop their collective knowledge base, individual members are increasingly "able to be involved in new activities, to perform new tasks and functions, (and) to master new understandings" (Lave & Wenger, 1991, pp. 53).

This characteristic is connected to research on distributed cognition (A. L. Brown et al., 1993; Pea, 1993). Brown and Campione (1994) argue that each member of a community has "ownership" of certain forms of expertise. Community members share the expertise they have or take the responsibility for finding knowledge needed by the group, but no one member has all of the knowledge. Community knowledge is thus not the product of one person's mind, but rather emerges from the discourse and dynamics of the group (Thomas, Wineburg, Grossman, Myhre, & Woolworth, 1998). Given this multiplicity of knowledge "ownership," the collective wisdom of a community of practice exceeds that of any one individual participant (Grossman et al., 2001).

Lesson study also relies on participants' contributions to the knowledge growth of the collaborative group in the process of designing, implementing, and improving instruction and student learning. In and of itself, lesson study is an "empty shell" that must be filled with the knowledge and skills of the participants (Fernandez & Yoshida, 2000). In Japan, lesson study is a collaborative, school-wide process, which means that improvement happens in multiple classrooms and teachers benefit from each other's knowledge and ideas (Stepanek, 2001). Through lesson study, teachers are provided with opportunities to learn from more knowledgeable peers. The overall process can also help
educators notice gaps in their own understanding and thus provide a motivating context for seeking deeper understandings (Lewis, 2002). Stigler and Hiebert (1999) suggest that the lesson study process not only encourages growth of the collective knowledge base, but that it also facilitates teachers' professionalism:

Through the process of improving lessons and sharing with colleagues the knowledge they acquire, something remarkable happens to teachers: they begin viewing themselves as true professionals. They see themselves as contributing to the knowledge base that defines the profession. And they see this as an integral part of what it means to be a teacher (Stigler & Hiebert, 1999, pp. 126-127).

The research suggests that both communities of practice and the lesson study process share the characteristic of participants' contributions to the knowledge growth of the entire community. In the next section, I illustrate how various members of the High School Economics project contributed to the growth of the community's knowledge base.

**Contributing to the Knowledge Growth of the Community in the High School Economics Project**

Each member of the High School Economics community entered the lesson study group with different levels of expertise in areas that were critical to the success of this project. Through interactions and observations, these areas of expertise contributed to the collective knowledge of this developing community. The following examples illustrate how the participants in this lesson study group contributed to the knowledge growth of the community, a common characteristic of the lesson study process and consistent with descriptions of communities of practice.
As an experienced social studies educator, Rod was able to contribute his insights about *Teaching for Understanding* (TfU), *Powerful and Authentic Social Studies* (PASS), and *Issues-Centered Social Studies* to the collective knowledge base. While several of the teachers had some prior knowledge and experience with TfU and PASS, *Issues-Centered Social Studies* was the least familiar to participants. For example, Sarah explained in her initial interview that while she had previously been exposed to *Issues-Centered Social Studies*, she really did not know what it looked like in practice.

I mean, we talk about issues-centered curriculum all the time and yet when I wanted to see an example of it to get an idea of what it would look like, I realized I’ve never really observed it. I’ve sort of interpreted it of how I think it might look like in my classroom but….

In order to facilitate the growth of the collective knowledge base about *Issues-Centered Social Studies*, Rod introduced the concept at the first face-to-face meeting and continually returned to the concept in the context of the California energy crisis in later face-to-face meetings, teleconference sessions, and in private conversations with group members. Rod’s prior experience with *Issues-Centered Social Studies* thus helped the community both design an inquiry-oriented economics curriculum and also revise it between the two rounds of enactment. This illustrates how one member of the High School Economics community contributed a unique perspective to the growth of the communal knowledge base.

Another example of how individual participants in this project contributed to the growth of the community's knowledge is how teachers shared economics content and pedagogical knowledge with other, less experienced members of the community. Sarah, in particular, as an experienced economics teacher was able to share her knowledge of
economics content and instructional strategies with the entire group. On the other hand, Rod and Steve began the project with very little knowledge of economics, coming to the project as researchers with diverse backgrounds. Rod talked about his increasing economics knowledge in a conversation during a teleconference meeting in March 2004:

…You know that I'm the non-economics person. And I'm learning though as we're going through this, so it's starting to dawn on me…. (Each economic) concept works differently with each case you apply it to. It's not like a stationary definition that you can just learn out of the textbook, which is how I was taught it.

Observing and talking with Sarah allowed Rod and Steve to learn more about the economics concepts and principles that were introduced in the unit. Sarah's knowledge of economics content and instructional strategies was also especially helpful for Bill, who had only minimal knowledge of economics, and for Kathy, who had only taught rigorously structured AP economics courses before this project. Sarah's interactions with these teachers allowed Kathy and Bill to gain a deeper understanding of economics concepts and instructional strategies used in a “regular” high school economics course. Participants’ contributions to the community knowledge base illustrate how this group functioned in ways that complemented theorists' ideas about communities of practice.

Another example of how participants contributed to the growth of the communal knowledge base is how they continually built a knowledge base about the Texas Instruments (TI) technologies that ultimately led to consensus decisions about these technologies and their role in economics teaching and learning. Much of the knowledge about the TI technologies generated by participants was anecdotal and achieved after several rounds of trial and error as they experimented with the technologies. Nearly all of the participants had previously used TI-83 (or similar) handhelds. Additionally, both Rod
and Kathy attended a weeklong training on TI technologies before the project began. None of the participants, however, had prior experience teaching social studies with the TI technologies or with its wireless components. When the technology first arrived in November 2003, Steve began learning about the various applications and functions. Steve and Rod then led a hands-on training workshop for preservice teachers, which Bill attended, as a way to practice using the technologies and to begin to understand its potential affordances. Steve also led separate training sessions with Sarah, Nathaniel, and Robert. Through these training sessions, Steve shared his knowledge of the technology with the other members of the community, although it was fairly limited as he was still learning about the technology himself. The communal knowledge base about the technology continued to develop as, later, Sarah shared her experiences about learning to use the technology and teaching with it in her classroom with the group. For example, when asked about her experience using the TI technologies during the third face-to-face meeting in March 2004, she replied:

Like the first time I introduced the technology I felt like a total idiot. Complete idiot. And I had come in and I had practiced by myself and I thought I had it down and I thought I just had to read the directions and then in real time, it was a disaster. I felt like I … I just felt like an idiot. But by the fourth class through, I knew what I was doing, so that was helpful. But the fourth class, that should have been what the first class was like. And it should have been able to take it a lot further.

Sarah's comments illustrate how through her experiences, she learned that the TI technologies required a great deal of time to learn and also that additional time needed to be allotted for enacting the lesson plans in case of technology problems. Based on knowledge and experience generated about the TI technologies, participants agreed that Learning Check, a quizzing program that utilized the TI wireless technologies, was the most powerful and had the greatest potential for teaching and learning economics.
concepts. During a face-to-face meeting in March 2004, the researchers encouraged Nathaniel, who would be the next teacher to teach the unit with the TI technologies, to use Learning Check as a way to monitor students' understanding of various topics and concepts and to facilitate discussion in his classroom. As he developed his own understanding of the affordances and constraints of TI technologies, Nathaniel also contributed to the collective knowledge base through his reflections and conversations with the community members. While Nathaniel was expanding the knowledge base about the TI technologies, Bill discovered that a Classroom Performance System (CPS) was available in his school. CPS technology is a wireless audience response system that uses handheld "clickers" to collect answers to multiple-choice items from students. Bill saw potential in this technology and mentioned it to Rod in early April 2004. Rod quickly persuaded Bill to use this technology in his instruction. Rod contacted the district technology coordinator, a friend of his, to train Bill, Steve and him on the use of CPS technology. As the researchers observed Bill's use of the CPS technology, they noted that in many ways, the CPS technology accomplished most of the same tasks that the TI Learning Check application accomplished, but was easier to use. In the end, community members decided that TI technologies were not appropriate for use in economics instruction and learning. The group agreed that CPS technology had much more potential for facilitating discussions than the TI technologies and further investigation would be worthwhile. This series of events illustrates how participants increased their knowledge of the technologies through trial and error and then expanded the community's knowledge base about different technologies for teaching and learning in high school economics and
ultimately arrived at a consensus about which technologies were appropriate for the purposes they had in mind.

As these examples demonstrate, the collective knowledge base is developed from participants' prior expertise as well as acts of sharing and collaborating among colleagues. In other words, the learning and knowledge growth of the community is situated in the practices of the participants (J. S. Brown, Collins, & Duguid, 1989; Cognition and Technology Group at Vanderbilt, 1990; Collins, Brown, & Newman, 1989; Lave & Wenger, 1991; Pea, 1993; R. T. Putnam & Borko, 2000). Through the practice of sharing and building knowledge together about social studies instructional methods, economics content, and TI and CPS technologies, a lesson study group, in this instance, was developing a collective knowledge base, a characteristic consistent with current descriptions of communities of practice.

Characteristic #3: Building Trust Among Community Members

In previous sections, I presented collaboration and participants' contributions to the growth of the communal knowledge base as characteristics of both communities of practice and lesson study and as key factors that contributed to the success of the High School Economics project. In this section, I introduce a third shared characteristic: Building trust among community members.

In their review of research on teachers’ professional development, Wilson and Berne (1999) identified several patterns in communities of teachers. Among these patterns is the finding that while teachers enjoy opportunities to talk about their work, they have very little experience engaging in a public and critical professional discourse.
In short, "it takes time to develop a community" and time to develop trust in that community (Wilson & Berne, 1999, pp. 181). Trust can be established in a community of practice if members acknowledge a shared responsibility for the growth of communal understanding, a characteristic identified in the previous sections of this paper (Palincsar et al., 1998). While it may take time to develop, trust enables communities to collaborate effectively, build knowledge collectively, and begin investigating the practice of the members:

Recent literature describes "teacher learning communities" as those in which teachers develop the capabilities to pose tough questions, challenge assumptions, and even disagree openly over matters of practice while cultivating trust and mutual support. Such capacities, it appears, develop only gradually (Little, Gearhart, Curry, & Kafka, 2003, pp. 187).

Robert Putnam (1995) uses the term "social capital" to describe the social networks, norms, and levels of trust that "facilitate" how well people cooperate and work together for their mutual benefit. In communities of practice, social capital can be difficult to build as the construction of a community depends on ongoing social negotiation among its members including regulation of group norms and social interaction (Grossman et al., 2001). However, once trust is established and teachers are able to open their practice to scrutiny, they are also empowered to ask questions about their own practice and view it more analytically, which helps facilitate the creation of a professional community (Bryk et al., 1999).

Just as it takes a significant amount of time to build trust in communities of practice (Wilson & Berne, 1999), it also takes time to develop a high level of trust in a lesson study group (Fernandez & Yoshida, 2000). Trust must be established before free exchange of ideas among participants around a shared, concrete lesson is possible (Lewis & Tsuchida, 1997). Lesson study researchers have also found that as trust among lesson
study participants evolves, there are gradual, incremental improvements in teaching over time (Rock and Wilson, 2005; Stigler and Hiebert, 1999).

**Building Trust Among Community Members in the High School Economics Project**

While the High School Economics group was actively engaged in lesson study activities for only eight months, there is evidence to suggest that trust was beginning to develop among various participants. This evidence is illustrated in the examples below, again demonstrating that this group was beginning to develop characteristics consistent with current descriptions of communities of practice.

Judith Little and colleagues (2003) suggest that open disagreement over matters of practice is a gradual process. In the case of the High School Economics group, teachers were seemingly hesitant to engage in open critique with their colleagues, but were willing to have these types of discussions with researchers. These dialogues would frequently take place immediately following a lesson that the researchers had observed, and ranged in topic from how best to weave the issue of the California electricity crisis into the introduction of microeconomics concepts to different ways to use the available technologies. An example of how one teacher valued these conversations is evidenced in her reflections in an email message in February 2004:

> In addition, Rod had some great ideas about incorporating the technology into this lesson. I suspect that adding more of this type of methodology would increase student interest.

In a related example, Kathy called on Rod and Steve for help when she became frustrated and uncertain about how to best scaffold the research process for her students as they worked on completing the culminating project. In email, telephone, and in-person conversations, Kathy demonstrated that she valued the researchers' opinion and she
sought out their ideas and feedback before proceeding with her lesson plan. For example, in one email message sent in March 2004 to Steve, Kathy asked, "What if I gave them pg 4-5 as their scaffolding task for tomorrow? What else would I want them to do FOR SURE for tomorrow?" These types of exchanges between teachers and researchers demonstrate how the members of the High School Economics lesson study group were beginning to develop a level of trust, although not necessarily to the same degree among all members.

The growth of trust among participants is further evidenced by teachers' reliance on Sarah for recommendations and advice. Katy, Bill, and Nathaniel all reported communicating with Sarah at least once about the instruction of the unit and (in Nathaniel's case) the TI technologies. For example, Kathy asked Sarah for her instructional materials and advice about how to introduce various economic concepts. The majority of these conversations took place unbeknownst to the researchers. Teachers' faith in Sarah's opinions is another example of how the participants in the High School Economics project were developing different levels of trust among members of the community.

In addition to taking time to develop trust in a community, teachers have very little experience engaging in public and critical discussions about their teaching (Wilson & Berne, 1999). It is significant, then, to note that as her practice was being videotaped and shared over the Internet, Sarah began to value feedback from other group members and solicit critique at face-to-face meetings. She encouraged her colleagues to review her reflections and practice and provide feedback on how she might improve her instruction. However, only Rod and Steve shared their opinions with Sarah. It is unclear if this lack of
critique was due to levels of trust, other participants' lack of opinion about Sarah's instruction, or other reasons. It is possible that participants may have maintained focus on the structure of the lessons and not specifically on Sarah's instruction (Stigler & Hiebert, 1999; Weeks, 2001). However, in varying degrees, participants in this project developed a level of trust in which practice could be openly discussed and debated.

Evidence suggests that levels of trust among participants in this community would likely have continued to grow and allowed for deeper discussions about instructional practice if resources had been available to continue the project. Just as it takes a long time to develop trust in communities of practice (Wilson & Berne, 1999) and lesson study (Fernandez & Yoshida, 2000), the example above illustrates how the participants in the High School Economics project were beginning to demonstrate varying degrees of trust.

Characteristic #4: Reflective Inquiry

Thus far, I have described three characteristics of communities of practice that are also characteristic of participants engaged in lesson study, as evidenced in the High School Economics project. In this section, I present another important characteristic: reflective inquiry.

Cochran-Smith & Lytle (1999) argue that a fundamental component of a teacher learning community is an acknowledgement that "inquiry is regarded as part of larger (community) efforts to transform teaching, learning, and schooling" (pp. 278). This transformation of teaching and learning occurs as teachers work in a community of
practice to inquire with other teachers about instructional aims, goals, procedures, and practices (Richardson, 1998).

Research on effective teaching practice indicates that collaborative reflection and revision of curricula are effective methods for facilitating pedagogical improvement (Loucks-Horsley & Matsumoto, 1999; Sprinthall, Reiman, & Thies-Sprinthall, 1996). Lave and Wenger (1991) posit that learning to support communal forms of memory and reflection is an important skill for newcomers in communities of practice.

Although collaborative inquiry into practice and student learning is atypical of professional talk amongst teachers (Little et al., 2003), "teaching needs to become an intellectual endeavor, one in which teachers and their students inquire deeply into the nature of knowing" (Nelson & Hammerman, 1996, pp. 4). The "intellectual endeavor" of inquiry includes "planning, enacting, and reflecting upon one's teaching" (Palincsar et al., 1998, pp. 10).

Lesson study is an inquiry model for teachers professional development (Rock & Wilson, 2005). It is a process for "creating deep and grounded reflection about the complex activities of teaching that can then be shared and discussed with other members of the profession" (Fernandez & Chokshi, 2002, pp. 131). Observation of the classroom lesson, followed by reflection about the lesson, can help teachers establish common understandings about how to improve the lesson (Perry et al., 2002). While this process requires substantial time and commitment, lesson study can serve as a catalyst to encourage teachers to become reflective practitioners that use what they have learned from research-based lessons to collegially revise and implement future lessons (Rock & Wilson, 2005).
Reflective Inquiry in the High School Economics Project

As illustrated in the literature, reflective inquiry is a key characteristic in both communities of practice and in lesson study. In this section, I present three different examples about how the High School Economics lesson study group was starting to develop reflective inquiry. These examples demonstrate that, in this instance, the lesson study group was developing characteristics consistent with descriptions of communities of practice.

During the two rounds of unit enactment in this project, the researchers asked the four participants teaching the unit to write daily reflections and share them with researchers and the whole group, if they so chose, through email. There was very little direction given to the instructors, just that they reflect on their instruction, the unit, and the technologies. Sarah was diligent in recording her reflections and commented on a range of topics. For example, in one message from March 2004, after their final presentations she reflected on students' understanding of basic economic concepts:

I believe most students have a good grasp of the basic economic concepts (supply, demand, price, shortage, surplus, ceiling, and floor). I believe there was hesitancy to explain the California case in detail, but most can do it in general terms. I believe they lack depth and details in explaining their assumed role's viewpoint.

Kathy also shared several reflections with the researchers. In the following example from March 2004, Kathy reflected on her instructional approach for preparing students for their final presentations:

I decided that I needed to step back and begin a new scaffolding approach. Apparently (the students) need more direction and step by step instruction than I thought they would.
They are juniors and seniors and I guess I am spoiled by the fact that all of the other times that I have taught econ I was dealing with AP students who didn't need much direction and they lived for the chance to go out and do research and make proposals.

Teachers' prior experience with teaching economics is evident in their reflections. And while Sarah and Nathaniel had greater experience teaching economics than Bill and Kathy, all of the teachers were conducting inquiry on Issues-Centered Social Studies instruction. Through their reflections over email and in person, teachers expressed their thoughts and feelings about the unit, their students, and the technology.

In another example of reflective inquiry, the researchers encouraged teacher participants to investigate students' learning and understanding of difficult economic concepts throughout enactment of the unit. A feature of a mature community of practice versus a developing community is an increased focus on student knowledge and understanding (Grossman et al., 2001; Palincsar et al., 1998; Sherin & Han, 2004). Lesson study also emphasizes learning goals for students and their understanding of difficult concepts (Fernandez & Yoshida, 2000; Hiebert & Stigler, 2000). In order to encourage reflection on students' learning and understanding, Rod specifically asked the instructors about their students, as evidenced in this example from a teleconference meeting during the second round of enactment in March 2004:

What do you think were the most difficult concepts for students to gain kind of an in-depth understanding of, as you taught that unit? … What, in particular, did more of your students have more trouble understanding and may have still been problematic by the end of the unit?

Although teachers' comments about students' learning and understanding were somewhat superficial during face-to-face and teleconference meetings, there was evidence that participants were starting to develop a deeper level of reflective inquiry about their
students. For example, in his final interview in May 2004, Nathaniel commented about why he thought his students were able to succeed in the final project:

…Our kids sometimes, they always seem to surprise you ‘cause, you know, when we were preparing for (the final project) and the preparation for that, I didn’t think some of them had a clue. But it was the leader from each group, I think, that pulled them through. And they seemed those leaders, the directors, seemed to have the concept of what was going on. Then it reflected when I was grading their peer grading sheets and all the directors were the ones that got the higher scores.

This quote demonstrates how Nathaniel was starting to develop an understanding of student knowledge, measured not only by achievement test scores, but is also evident in students' "performances of understanding". There is evidence that the other instructors were also developing this type of reflective inquiry, although not all to the same degree. For example, Bill said in his final interview in May 2004 that he thought that the inquiry-based approach had a great deal of potential, but his students were not used to learning in this way:

The other thing is that this kind of learning is not what these students are used to. They’re already in eleventh grade and they’re conditioned to read the sections in the book, take a quiz, and take a chapter test. So this was really hard work for them. There’s a lot of thinking they’re not used to doing. But I think the case study stuff works.

Another example of how this lesson study group was developing reflective inquiry is that the community was inquiring and learning about the California electricity crisis along with the students during the creation and enactment of the unit. For example, Kathy said that she did not have a deep understanding of the California electricity crisis in a reflection sent by email in February 2004:

I guess I am feeling inadequate. I don't know all that much about the crisis beyond the "basics" of the unit. I'm fearful that my students are going to want to ask a ton of questions that go much beyond the basics that I don't really know too much about.
However, after watching a Frontline video about the actors and the political environment surrounding the California electricity crisis with her students, Kathy expressed (through email in March 2004) how she finally understood how the various players in the unit interrelated as well as their economic stances concerning the market for electricity:

… Before you introduce the specifics of the California case and (students') investigations you HAVE to show that video! Admittedly I did not know as much as I should have about the electricity problems. This movie answered all of my questions and make me much more competent to help them.

In addition to learning about the California electricity case, all of the participants increased their understanding about how the market for electricity is different and more complex than markets for other goods given the various actors and government regulations that manipulate the price and supply of electricity. By sharing their insights and resources about the California electricity crisis, all of the lesson study participants were able to increase their content knowledge of economics (Lewis, 2000, 2002; Shulman, 1986).

Hill (1995) argues that reflective inquiry promotes careful analysis and critique of curricular and instructional issues:

Reflective practice is the cylinder that gives the learning community turbo power. When this cylinder is 'firing,' what results is an irresistible craving to discover ways to make teaching better. Teachers approach fundamental issues from new angles and relentlessly pursue questions that help them construct new meaning. … Reflective practice means putting minds together to examine and change curriculum and instruction issues. … It demands that people consistently set aside time to consider carefully the work of colleagues, criticize it candidly and specifically, and then offer suggestions. In essence, reflective practice means helping others recraft lessons, questions, assignments, visuals, and projects (pp. 133).

This type of reflection is also a characteristic of lesson study and communities of practice. In this section, examples about instruction, student learning and understanding,
and the California electricity crisis have illustrated how reflective inquiry practices had begun to develop in the High School Economics group.

**Characteristic #5: Construction of New Identities**

While collaboration, knowledge growth, trust, and reflective inquiry are important elements of communities of practice, the community must also maintain a focus "both on its own collective learning and on the social group as the crucible for individual change" (Grossman et al, 2001, pp. 275). In this section, I discuss the characteristic of *construction of new identities* and also discuss how it was evident in the High School Economics project.

Lave and Wenger (1991) suggest that a person is defined by, as well as defines relations with group members through activities, tasks, and functions. "To ignore this aspect of learning is to overlook the fact that learning involves the construction of identities" (pp. 53). The authors also describe how apprentices develop an identity as a full community member ("old-timer") through legitimate peripheral participation, defining identity as "the way a person understands himself, and is viewed by others" (pp. 81). Engaging in communal participation and work provides an opportunity and forum in which the development of individual identities within, and in relation to, the group is possible (Westheimer, 1998). In a community of practice, learning "is the vehicle for the evolution of practices and the inclusion of newcomers while also … the vehicle for the development and transformation of identities" (Wenger, 1998, pp. 13).

The lesson study process, by definition, requires a specific form of identity
change in individuals: the adoption of an identity as a researcher. However, this change may be hard for American teachers to make. In a recent study, researchers observed Japanese teachers encouraging the American teachers to see themselves as researchers conducting an empirical examination, organized around asking questions about practice and designing classroom experiments to explore these questions. ... However, the American teachers had much difficulty adopting and maintaining this researcher lens while conducting lesson study (Fernandez et al., 2003, pp. 173).

In Japan, teachers write about two-thirds of monographs and research articles about educational practice and student learning, thus producing more research articles than Japanese researchers (Fernandez & Chokshi, 2002). Teachers in the United States need to learn how to exercise their professional authority, enabling them to decide how group activities should progress and what issues to focus on (Linn, Lewis, Tsuchida, & Butler-Songer, 2000; Watanabe, 2002). Research lessons should emphasize the "central role of teachers" and their evolving identities as decision makers (Lewis, 2000).

**New Identity Construction in the High School Economics Project**

*Construction of new identities* is characteristic of both communities of practice and lesson study. In the case of the High School Economics lesson study group, there are several instances that illustrate how participants were constructing new identities. For instance, as Sarah participated in the lesson study group, she developed a new identity as an instructional leader. Although Sarah joined the High School Economics project with previous experience working with colleagues and administrators on the construction of an economics framework, and related benchmarks, for her school district, her practice
remained private and disconnected from other teachers in her school community (Little, 2002). With Sarah taking the lead, teachers in this project began enacting the inquiry-oriented unit on the California electricity crisis. At this point, the other instructors in the lesson study group began asking her for help. Kathy, for example, wrote an email message to Sarah in February 2004 in which she acknowledged Sarah’s leadership role: "... any help, guidance, advice, (and) suggestions you can give would be great!" At other points during the unit enactment, Nathaniel and Bill also reported that they had contacted Sarah for guidance and assistance with unit instruction. In other ways and at other times, teachers also affirmed Sarah's new identity as an instructional leader. For example, Kathy wrote the following email message to Steve and Rod in February 2004:

I would like to just comment on how awesome I think Sarah is. She has worked her butt off with little/no help (including a lack of help from me). If you have any extra funds left from the grant payments, I move that Sarah be given it for her efforts.

Sarah has also expanded her role of instructional leader beyond the scope of the lesson study community after the completion of the research project. She presented at workshops about the lesson study process in June 2004, mentored groups of preservice teachers in the autumn of 2004 and presented at a national conference in November 2004. Sarah's development as an instructional leader demonstrates how new identity construction was taking place within the context of the High School Economics project.

As a student teacher, Bill started this project in the role of an apprentice teacher, and demonstrated that he was moving toward a new identity as a full community participant. This development was similar to the process in which newcomers become full members of communities of practice through legitimate peripheral participation (Lave & Wenger, 1991). In the first few months of the project, Bill made tentative moves
toward the role of a full participant by participating in face-to-face meetings. For example, during the meeting in November 2003, he suggested various topics for the overarching issue and also helped expand the initial idea of Enron as a unit topic. During the enactment of the unit in March-May 2004, Bill had to negotiate the conflicting pedagogies of the lesson study group and those of his cooperating teacher, Robert. The lesson study group's unit emphasized *Issues-Centered Social Studies*, a kind of constructivist pedagogy. However, Robert emphasized textbook-oriented instruction, a common approach to economics instruction. Bill attempted to bridge these disparate pedagogies by presenting the California electricity case as an overarching context and also using mini-lectures, textbook reading assignments, and quizzes at the same time. Despite his mixed pedagogical approach, Bill did say in his final interview in May 2004 that he thought the *Issues-Centered Social Studies* approach was worthwhile.

I think the inquiry-based stuff is really powerful. Like I said, it helps if there’s something that can get the kids’ interest and, you know, that’s the answer for everything. So I really liked it and the unit chosen for this, I think was a lot of material. … There’s a lot of thinking (students are) not used to doing. But I think the case study stuff works.

In addition to his negotiation between conflicting pedagogies, Bill also had to develop his limited economics content knowledge, learn how to manage a classroom, and complete his teacher education courses during this project. Rod's guidance was instrumental in helping Bill begin to develop his identity as a full member of the lesson study group. During one face-to-face meeting in March 2004, Rod asked Bill to define substantive conversations, a subject Bill had studied in his teacher education courses. By having Bill present this concept, Rod encouraged the other group members to give Bill credibility and authority, furthering his development as a full participant in the lesson study community. As the lesson study process progressed, Bill showed signs that he was
beginning to discard his identity as an apprentice teacher and adopt a new identity as a full participant in the group.

Borko (2004) suggests that "some teachers change more than others through participation in professional development programs (pp. 6) The evidence indicates that Kathy and Nathaniel were moving, albeit tentatively, toward accepting lesson study as a preferred model of professional development, a stance that indicated some sort of change in identity. Kathy experienced difficulty enacting the inquiry-oriented unit and was clearly frustrated at several points in her instruction. She relied heavily on Sarah and the researchers to help her complete the unit. Nathaniel, on the other hand, did not express any frustration with the unit itself (although he did find the TI technologies problematic). Nathaniel said in his initial interview in November 2003 that he typically has students create a business in order to illustrate economics concepts and has also used other instructional methods in the past. Thus, his prior experience teaching economics may have allowed Nathaniel to be more flexible in his pedagogical approach, whereas Kathy had only prior experience teaching AP economics. In their final interviews in May 2004, both of these participants indicated that they might teach an Issues-Centered Social Studies unit again, but their support for the approach seemed tentative. However, Kathy and Nathaniel did claim that they enjoyed the lesson study process and would continue in another collaborative endeavor with economics teachers if the opportunity presented itself. These two teachers were tentatively moving toward accepting lesson study as a preferred model of professional development, and thus moving toward changing their teacher identities.

4 Kathy taught an elective economics course during the High School Economics project enactment. This course has a markedly different population than AP economics courses, which Kathy had taught prior to this project. The content of the AP economics course is tightly aligned with the AP economics test.
The researchers also developed new identities during this project. Rod became an advocate for lesson study and economics education and Steve developed a dual identity as a researcher and a technology support person for teachers. At the start of the project, Rod questioned whether economics, a rather complex subject, was really appropriate for high school students. By the end of the project, he began to suggest that economics was a worthwhile subject and could potentially integrate many areas of the social studies through issues-centered instruction (e.g. history, political science, and geography). Rod also became convinced that lesson study is an effective model for teachers’ professional development. In fact, he founded a state-wide organization whose purpose is to facilitate the lesson study process in different locales. Meanwhile, Steve developed his identity as a researcher by learning how to conduct interviews, record observations, and facilitating the lesson study process. He also began developing an identity as a technology support person for teachers, providing just-in-time support and helping teachers understand some of the affordances of the TI technologies. These examples are further evidence that identity construction was characteristic of the High School Economics lesson study group – not only among the teachers, but among the researchers as well.

Characteristic #6: Reproduction

A unique characteristic of a community of practice, distinguishing it from other forms of community, is its ability to reproduce its membership (Schlager & Fusco, 2004). In this section, I review the community of practice literature about reproduction and also
illustrate how this characteristic applies to the lesson study process, as evidenced by the High School Economics community.

Grossman and colleagues (2001) suggest that members of the same profession control the reproduction of the group by using selection procedures and socialization processes. The reproduction cycle is a "requisite" feature of communities of practice, "through which 'newcomers' can become 'old-timers; and through which the community can maintain itself" (Barab & Duffy, 2000, pp. 11-12). In short, "Communities of practice are engaged in the generative process of producing their own future" (Lave & Wenger, 1991, pp. 57-58).

While all lesson study groups do not necessarily reproduce membership in the same manner as suggested in the literature on communities of practice, lesson study is usually a long-term, continual process (Lewis, 1995; Stigler & Hiebert, 1999). The sustained nature of the lesson study process often leads participants to believe that their experience will have a lasting impact on their instructional practices (Rock & Wilson, 2005). Furthermore, teachers involved in lesson study collaborations often indicate a desire to continue in future collaborative endeavors (Perry et al., 2002). For example, Lewis (2002) quotes a teacher who commented that for her, "The research lesson is not over yet; it's not a one-time lesson; (It) gives me a chance to continue consulting with other teachers." (pp. 20) In the next section, I explain how participants in the High School Economics project evidenced their desire to continue the project and how their intentions are related to the characteristic of reproduction.
Reproduction in the High School Economics Project

Sarah’s actions particularly demonstrate a form of reproduction in the High School Economics case, in that she continued to develop and implement inquiry-oriented curricula in her classroom. She explained her new Issues-Centered units in an email to Steve in March 2005:

I have changed the electricity unit to "Is Fast food beneficial for our society." The final unit project asks if Congress should ban fast food advertising in public schools. … I have also created another unit around Outsourcing using the same sorts of ideas. … I can say that I enjoy teaching this way because it adds great depth to the content matter and it is very beneficial for students to be able to put these abstract economic concepts into context. They understand the ideas at a much greater level than if they were presented separately. There is always a temptation to just teach the concepts directly and move on because this method does require more time. … Overall, as long as I have the time to work on this I will continue to try to do this for my classes.

By continuing to explore, modify, and enact inquiry-oriented economics units, Sarah’s actions demonstrate how the High School Economics project had an ongoing impact on her teaching.

The High School Economics lesson study group, as a whole, did not continue past the grant-funded term (June, 2004). However, all of the teachers and the researchers expressed enthusiasm about the lesson study process and indicated that they were interested in continuing collaborative professional development for another school year, which could be interpreted as a kind of reproduction as some community members leave and newcomers join in future iterations. This type of enthusiasm for continuation is similar to teachers' comments in other lesson study research (Perry et al., 2002; Rock & Wilson, 2005). The will, if not the means, to continue the lesson study group was evident in participants' comments and reflections. The willingness of the participants to continue
this project into the next school year illustrates that, in this instance, a lesson study group is capable of reproducing, a characteristic consistent with descriptions of communities of practice. Furthermore, teachers' enthusiasm suggests that lesson study may be a more effective model for professional development than models solely based on theories of communities of practice, as such enthusiasm is rarely found among teachers engaged in professional development programs solely based on theories of communities of practice (e.g. Sumson & Patterson, 2004).

The sections above illustrate that, to varying degrees, the participants in the High School Economics project were developing characteristics consistent with descriptions of communities of practice and lesson study. Evidence also suggests that lesson study, as enacted in this project, serves as one promising model for the development and establishment of cohesive and sustainable communities of practice in education that serve professional development needs better than models based solely on theories of communities of practice. In the following sections, I will describe critical features that facilitated the creation of a community of practice in the High School Economics project and contrast them against an example of a lesson study group that was not a community of practice.

**Facilitating The Development of a Community of Practice in Lesson Study**

*Features of the High School Economics Project*
There were several features of the High School Economics project that facilitated the development of the characteristics consistent with descriptions of communities of practice. In this section, I identify six features of the High School Economics project that I believe were most pertinent to the development of a community of practice. The features described in this section include: Guidance and assistance from knowledgeable others; researchers' flexibility to modify design parameters; theoretical grounding; the participants not knowing each other; teachers' ideas driving the direction for the group; and efforts to integrate new technologies into instruction. It is important to describe these features if others plan to use this form of lesson study as a model for developing and establishing cohesive and sustainable communities of practice in education for the purposes of professional development.

An important feature that helped promote the development of this group as a community of practice was the guidance and assistance that the researchers, the undergraduate researchers, and others provided for the teachers as they planned, enacted, and reflected on the unit about the California electricity crisis. "In order to implement any educational innovation, teachers need support from other professionals who work in similar situations and whose collective experience can provide insight and helpful suggestions" (Gal, 1993, pp. 102-103). In the High School Economics project, Rod and Steve helped Sarah develop the lesson plans for the inquiry-oriented unit, and Rod also facilitated the face-to-face and teleconference sessions, guiding the community's reflective inquiry. The undergraduate researchers were also instrumental to the success of the project by searching and identifying resources that students could use as evidence in their arguments about regulation of their state's electricity market. Curriculum specialists,
district leaders, and others might be potential facilitators for teachers engaging in lesson study groups (Boss, 2001). In the High School Economics group, guidance and assistance for teachers was a key feature that facilitated the development of characteristics that are consistent with a community of practice.

A second feature that was a key factor in the success and development of this project as a community of practice was the researchers' flexibility to modify design parameters throughout the project. For example, when online message boards were unsuccessful in generating participation from the lesson study members, teleconference sessions were used instead. Bill shared his reflections on the teleconference meeting during his final interview in May 2004:

I found them helpful because I was able to focus a little more on the days after having the telephone conference after talking about what my experiences were. Actually, the telephone conferences seemed to have a free-er discussion than the face-to-face.

In another example of researchers' flexibility, when it was discovered that they would not be able to obtain enough TI technologies, the original design parameters were changed. Instead of all of the teachers integrating TI technologies in their instruction, two teachers in each round enacted the unit, one with technology, and the other without. In the end, this change resulted in a more robust research design, although Kathy initially expressed her disappointment at not being able to teach with the TI technologies. Later in the project when Bill discovered an available CPS unit in his district, the research design was again modified so that Bill could experiment with a technology that accomplished some of the same features of the TI technologies, but were easier to use. Overall, researchers' flexibility to modify design parameters throughout the project was an important feature that facilitated the development of a community of practice.
Another key feature that helped this lesson study group develop as a community of practice was the theoretical grounding established by the researchers at the start of the unit. As mentioned above, most of the teacher participants had prior experience with *Teaching for Understanding* (TfU) and *Powerful and Authentic Social Studies* (PASS), but the concept of *Issues-Centered Social Studies* was relatively unknown. By grounding the project in these theoretical concepts at the very first face-to-face meeting, the researchers' interventions were made very clear, as advocated by those who do design research (A. L. Brown, 1992). The obvious nature of these interventions also allowed teachers to understand what kind of instruction the researchers were advocating and begin to develop the understanding necessary to teach inquiry-oriented lessons effectively. Immediate and overt theoretical grounding was thus another important feature that facilitated the development of the High School Economics project as a community of practice.

A fourth feature of the lesson study project was that most of the participants did not previously know each other. Research lessons typically take place in a single school with teachers from that particular building (Lewis, 2000; Stigler & Hiebert, 1999). However, since economics is usually only taught by one or two teachers per high school in the United States, the researchers had to attract participants from different, and very diverse, schools. Although some of the participants had previously worked with Rod, most of the group members did not know each other before the project began. This actually worked to the group's advantage, as starting a community with a group of colleagues who have previously worked together may be a worse proposition (Grossman et al., 2001; Little, 2002) than starting with those who already know each other. Strangers...
do not carry the baggage of school politics and gossip and are able to begin collaborating with each other with a clean slate. The fact that most of the participants did not previously know each other was an important feature that facilitated the development of a community of practice.

A fifth feature that contributed to the development of the High School Economics group as a community of practice was that teachers' ideas (not researchers) often drove much of the direction for the group. Particularly in the design of the unit, researchers intentionally encouraged teachers to voice their ideas as a way to facilitate teachers' adoption of new instructional practices. This practice also served to encourage the teachers to use their professional authority (Linn et al., 2000; Watanabe, 2002). For example, a strategy used in Sarah's previous economics instruction was adapted for the California electricity crisis unit so that students built their own demand curve based on the market for extra credit points when the price was the number of pushups they could complete. While students in the four teachers’ classrooms were engaged in this lesson strategy somewhat differently, all four teachers acknowledged activity’s success in demonstrating the law of demand effectively. Empowering teachers in such a way as to have them drive the unit design and other elements of the project was a key feature that facilitated the development of a community of practice.

A sixth feature that helped lead to the success and development of a community of practice was the effort to integrate new technologies into instruction. The allure of technology was a useful recruiting tool for the researchers to find teachers willing to participate in this project. Beyond this allure, the collaboration of the participants was essential in determining that the TI technologies were not particularly suited for use in
social studies classrooms. Future lesson study groups can also use technology integration as a way to motivate teachers and students to explore new technologies for teaching and learning. The feature of technology integration was therefore another instance of facilitating the development of the High School Economics group as a community of practice.

The features described in this section may help others in the future use this model of lesson study as a way to establish cohesive and sustainable communities of practice. In addition to the six features that I have identified, there may be others that can facilitate the success of project that use this model or other models based on lesson study for professional development.

*When Lesson Study Is Not a Community of Practice*

In the previous section, I described a variety of features that facilitated the development of a lesson study group as a community of practice. However, not all lesson study groups are necessarily communities of practice as illustrated in the following section.

As lesson study is adapted for use in the United States, a variety of features may need to be changed to match the school cultures prevalent in this country. While Fernandez and Chokshi (2002) suggest that there is no single "correct" approach for lesson study integration in American schools, changes in various aspects of the lesson study process could inhibit the development of a community of practice.
In a recent research study that compared the lesson study process with a different process termed "learning study," researchers investigated students' understanding of the incidence of sales tax (Pang & Marton, 2003). By definition, lesson study includes a post-lesson discussion in which participants engage in critical reflection (Watanabe, 2002). While teachers in Pang and Marton's lesson study group met three times to plan their lesson, they did not observe or view videotape of each other's teaching nor did the teachers discuss the results of the enactment or how to improve it. Thus, in this instance, the lesson study group initially demonstrated collaboration, but there was a lack of reflective inquiry, reproduction, and other characteristics consistent with descriptions of communities of practice. Thus, the lesson study group in Pang and Marton’s study did not develop into a community of practice.

Conclusion

For nearly fifteen years, researchers and theorists have debated and speculated about how to create and sustain communities of practice in education. Despite these efforts, there is no clear sense of what a community of practice is or how to best develop and establish such a group for purposes of professional development (Barab et al., 2004; Westheimer, 1998). Various researchers have established communities of practice for purposes of professional development as part of large grant-funded research projects (e.g. Barab, MaKinster, Moore, & Cunningham, 2001; Grossman et al., 2001; Palincsar et al., 1998). Yet, these communities often wither as soon as the research grants end. In this paper, I have demonstrated that the model of lesson study used in the High School Economics project, a relatively modest research study in terms of grant funding,
facilitated an environment where participants developed, or were in the process of developing, characteristics consistent with descriptions of communities of practice in the span of only eight months. All of the participants valued their involvement in the project and enthusiastically embraced the idea of participating in another year of this kind of collaborative professional development.

Lesson study, as enacted in this instance, is a more effective model for professional development than a model solely based on theories of communities of practice. Professional development models based on theories of communities of practice only generally emphasize teacher learning (e.g. Grossman et al., 2001; Little, 2002) or student learning (e.g. Palincsar et al., 1998; Scardamalia & Bereiter, 1991). Lesson study, on the other hand, has a long and highly regarded history in Japan for improving both teachers' instruction and students' learning (Lewis, 1995, 2000; Stigler & Hiebert, 1999). Furthermore, the features of the High School Economics group described above illustrate how the lesson study process can be adapted and modified to best fit for those whom the professional development is intended. As lesson study is adapted for use in the United States, other research studies may build on the findings described in this paper to investigate how lesson study may help in the development and establishment of cohesive and sustainable communities of practice in education and whether and how this model might scale across school district or state boundaries.
References


