Strengthening Learning Communities by Promoting Social Skill Development

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Abstract: There are many documented efforts of designers creating community environments to enable improved student learning. Many of these efforts involve giving students the opportunity to participate in interesting settings with novel, educationally beneficial roles. Sometimes, these roles can be complex, and students can find themselves without the social skills to participate effectively. When widespread, social deficiencies can interfere with the functioning of a learning environment, and reduce the overall effectiveness of the environment for promoting student learning. While many successful learning community designs have been documented, there is not a lot of literature discussing what to do to strengthen weak implementations. This paper attempts to contribute to the literature by describing the effect of one approach to addressing this kind of problem. It describes the design and outcomes of an intervention to strengthen a sub-optimally functioning learning community by promoting social skill development.

Introduction

There are many documented efforts of designers creating community environments to enable improved student learning. In school situations for example, there are learning communities that support the learning of science (e.g., Brown & Campione, 1994; Scardamalia & Bereiter, 1994), mathematics (e.g., Cobb, 1993; Lampert, 1986), and reading (e.g., Palincsar & Brown, 1985). In outside-of-school settings, there are examples of communities where students learn to use technology in a variety of ways including computer programming, graphic design, and other media construction activities (e.g., Brown & Cole, 1997; Bruckman, 1997; Resnick, Rusk, & Cooke, 1998).

Many of these efforts involve giving students the opportunity to participate in interesting settings with novel, educationally beneficial roles. For example, some of the roles in the literature include the following:

Artifact/product producers (Brown and Campione, 1994; Resnick, Rusk, & Cooke, 1998)
Project managers (Bruckman, 1997; Roth, 1996)
Idea discussants (Hatano and Inagaki, 1991; Palincsar & Brown, 1985; Riel, 1998)
Knowledge sharers (Lampert, 1986; Rogoff, 1994; Scardamalia & Bereiter, 1994)

Sometimes, these roles can be complex, and students can find themselves without the social skills to participate effectively. For example, Cohen (1986) claims that most children have not experienced "constructive collegial interactions" and need to learn how to offer advice or help, allow others to contribute, solicit information, and assess group processes. Children can have trouble with shared decision-making (Patterson & Roberts, 1982) and coordinating joint efforts (Ellis & Gauvain, 1992), which is sometimes crucial for accomplishing interdependent community tasks.

When widespread, social deficiencies can interfere with the functioning of a learning environment, and reduce the overall effectiveness of the environment for promoting student learning.

Efforts to create communities for challenging academic learning can and have been successful, but when problems emerge during implementation efforts (whether at the beginning or somewhere in the middle), there is not a lot of literature documenting what to do to strengthen those weak implementations. This paper attempts to contribute to the literature by describing the effect of one approach to addressing this kind of problem. It describes the design and outcomes of an intervention to promote social skill development in a sub-optimally functioning learning community.

Theoretical Background and Setting

Communities of Practice Perspective

One useful perspective for analyzing the functioning of learning communities is the "community of practice perspective". The term community of practice was first introduced by Lave and Wenger (1991). The perspective is considered useful for both (a) attempting to explain how people learn and work in existing situations (e.g., Roth, 1995; Wenger, 1998), and (b) providing direction for designing new situations for work and learning (e.g., McDermott 1999; Palincsar, Magnusson, Marano, Ford & Brown, 1998). Examples of its use can be found in both education and industry.

A community of practice is any group of people who share a common interest in a topic or area, and work together to accomplish something—their practice. A community of practice is thought to be characterized by the common task(s) in which its members engage and by some set of shared practices, traditions, resources, or culture (Roth, 1996). It can be very large and span great distances, or it can be very small and include only a few people focused on a very local concern (Riel, 1998). For example, a group of applied mathematicians working across various universities can be a community of practice. A local carpenter's guild can be a community of practice. A group of students in a chess club or a computer club can be a community of practice.

In any community, those who have been in it for a while, are highly skilled, and help keep the community functioning, can be considered "oldtimers" or "core participants" (Lave, 1991). Newcomers "participate in the periphery" by watching oldtimers and sometimes taking part in legitimate practices; they may help with easier tasks or they may participate with the assistance of another member. This peripheral participation helps them learn and gradually enables them to participate more fully. As they increase in skill, they are often given greater responsibility, and they engage even more fully in practices central to the community. At some point, they themselves become "oldtimers" or "core participants" helping the community persist for another generation. The apprenticeship relationship between novice and master in some trade like carpentry or blacksmithing often demonstrates this dynamic.

Characteristics of Stronger Communities

Not all communities function equally well. Some communities seem to work better than others in terms of helping members learn and in terms of carrying forward the practice of the community. A community that "works better" and is "more together" can be said to have greater *coherence* as a community of practice.

Wenger (1998) claims that there are three dimensions by which practice generates this sense of coherence in a community of practice: (1) mutual engagement, (2) a joint enterprise, and (3) a shared repertoire. *Joint enterprise* refers to the common task being performed or common product being created. There is an outcome that is being pursued together with each member making a contribution, and the choice of this outcome is a result of a "collective process of negotiation" among members. *Mutual engagement* refers to the state of many members being interested in, committed to, and engaged in a common task—they find the group's practice to be meaningful and joint experience to be important. *Shared repertoire* refers to the set of common resources shared by community members. These can be tangible tools like computers or needle-and-thread, or less tangible practices like ways of talking or common methods for accomplishing certain tasks.

Thinking of communities in this manner, communities where students do not participate in productive ways (for lack of skill or desire), can be thought of as having a weak *shared repertoire*. Therefore, one tactic to help such a community is to promote the social skill development of members. This should then lead to better social practices within the community (stronger shared repertoire) which should then lead to the community functioning more effectively (greater community *coherence*). With the community functioning more effectively, we should then be able to see improved overall learning outcomes. This line of reasoning explains our conjecture that communities can be strengthened by promoting social skill development.

Setting

The setting of this work was an after-school technology-enrichment program being developed at an urban high school in a large Midwestern city. The program was called NU-PEAK, and in brief, its goal was to bring access to new and emerging technological tools to under-served populations like those from urban high school settings, by focusing on design activities with technology. Students were to learn skills by participating in the building of computer artifacts around themes of interest that they had chosen.

The host school had a total enrollment of about 2000 students, and the student demographics were 85% Hispanic, 7% White, 5% Asian/Pacific Islander, and 3% Black. The school was not in a wealthy neighborhood and it would not have been considered an academically elite school. 24% of the students were deemed to have limited English proficiency and 93% were from low-income families. The school's graduation rate was 78% and it was on academic probation (a warning status within the district for schools with low test scores) till just a couple years prior to the formation of the NU-PEAK program. Also, by student accounts, the high school was not well equipped with modern computing facilities and did not have many enrichment programs.

NU-PEAK provided a small sample of the school's population, with an opportunity to work with new computers, software, and computer peripherals, in a supervised setting every day, during periods near the end of the school day and after-school. Students were to learn how to use various computer-based tools provided by the program, by participating in group activities, experimenting on their own, and interacting with other people in the lab.

It was similar in many ways to other technology enrichment programs like the Boston computer club (Resnick, Rusk, & Cooke, 1998), but a similarly strong community dynamic did not emerge. Student social practices in NU-PEAK were sub-optimal, and learning outcomes in many cases were extremely poor. For example, we observed students spending an entire year in the program, still being unable to independently open and save files in appropriate folders. Also, very few students took advantage of the after-school lab opportunities, which would have helped them progress technically. In interviews during this period though, almost every student said they found the main activities of the program to be interesting. This curious combination of expressed interest, but poor outcomes, led us to think that the *joint enterprise* and *mutual engagement* of members was not as problematic as the weak *shared repertoire* of the group. Viewing the community as a whole, there were (a) problems with access and resource use, (b) problems with individual skill development, and (c) problems with over-dependence on staff.

The Intervention

Promoting social skill development, was seen as being more than just providing a few additional activities to teach certain social skills. Such instruction could result in inert and unused knowledge, with students not using the new skills in the already existing everyday program context. Instead, it seemed to make sense that a concurrent attempt be made to alter the context as well, creating new long-term sanctioned roles in the community that would require the use of the better social skills we were hoping to promote.

An attempt was made to do this through the intervention design. We tried to (a) alter the community to create roles in smaller settings for which certain social skills were considered important; (b) provide instruction and support for learning the social skills for those settings; and (c) leverage regular mechanisms of a "community of practice" to spread these skills to the entire community (from core to peripheral members).

The three main components of the intervention were as follows:

1. Participation Structures

   Create formal participation structures to (a) establish productive social roles for students in a smaller setting; (b) explicitly guide how they interact in formal situations; and (c) suggest how they ought to interact in informal situations.
2. Summer Expertise Seeding

   Seed expertise in a small group of students over the summer, to enable them to become the first group of expert "core members" or "old-timers" who could help spread skills to the rest of the NU-PEAK community.
3. Auxiliary Technology Resource Enhancements

   A few auxiliary technology resource enhancements seemed helpful and appropriate.

1. New Construction Tool
   Students already possessed certain roles (or "social status") within the community that were partially defined by their proficiency with the existing tools. There were "web experts" who commanded lots of computer time and "web novices" who deferred to the experts. A new tool would help in the establishment of new student roles as every member, with regards to the new tool, would start over as a novice. In addition, the new tool could help make sure advanced students continued to come to NU-PEAK and have interesting and challenging things to learn.
2. Tool Related Resources
   To accommodate a new tool, some additional resources including computers with more memory and faster processors were needed. In addition, tool-related manuals were made available.

The four participation structures that were used were:
1. Group Design Projects
2. Seminars
3. Community Meetings
4. Artifact Demonstrations

In *group design projects*, students would work on building a common artifact around a theme of interest. *Seminars* were for helping students learn various technical skills in short 30 minutes sessions in a small 2-4 student setting. *Community meetings* were large group gatherings to take care of community-wide administrative issues. *Artifact demonstrations* were events where all members of the community would get a chance to show their work to others and get feedback. In addition to establishing productive social roles for students, the hope was that these participation structures would guide *formal* student interaction in the short term, and provide a *model* for *informal* student interaction in the long term. For example, it was hoped that students would participate in seminars first as learners, then as seminar assistants, and eventually seminar leaders. Then it was hoped that students would use the interaction patterns learned in seminars in other informal settings.

With the implementation of this intervention, there were several predicted outcomes. Primarily, it was anticipated that we would see better peer-to-peer social behavior, better use of resources, and better student learning. More specifically, we expected to see the following:

Increased frequency of students helping other students learn.
Student members being more involved in the management of project work progress.
Members using non-computer time to do other productive design activities—instead of simply leaving when no computer stations were available.
Student members on average attaining a higher level of technical skill development.

Methods

For this work, the most important indicators of progress should have been apparent in the following three areas:

Student behavior
Student work artifacts
Student attitudes and opinions

An attempt was made to collect salient data about these areas using multiple overlapping data-gathering methods. Collectively, the various methods attempted to both (a) capture external indicators of students' experiences and (b) offer examinations of student interpretations of their experience. The specific methods used in this work were as follows:

Ethnographic observations
Videography
Student project artifact analysis
Surveys
Individual and group interviews

The observational work was carried out by three researchers over the course of one school year. The program was in session every day during the periods near the end of the school day and after-school from

October to May. The researchers played varying roles throughout a typical program day, thereby providing different perspectives on the same events. There were standard protocols established to help assure consistent data collection.

Results and Discussion

Implementation Overview

Expertise seeding with a small group of students was attempted over one summer for a period of 10 weeks. Three students agreed to participate in summer sessions where they learned to work with the various participation structures and with the new computer tools. They completed two group design projects, participated in numerous seminars, and practiced demonstrating their work to others.

With the beginning of the school year, NU-PEAK was re-formed with 12 returning student members and 8 new student members. (The size had to be limited because of a limited number of computers. Only five were made available to the program initially, with two laptops being borrowed for certain periods of time during the year.) Through a series of beginning *community meetings*, program goals and rules were explained, project groups were formed, and initial seminars were scheduled.

Three project groups were formed based on student input and student-staff discussions.

1. Teenage Pregnancy Prevention Group
   This group would attempt to address what was perceived to be a growing problem among students at the school. The group had existed the previous year, and was continuing this year.
2. Games Group
   This group was interested in attempting to build computer games. This was a new group that was formed in response to repeated requests from students about this topic.
3. School Publicity Group
   This group wanted to create a school web site that was meant to highlight the positive features of their school with the purpose of affirming the choice of the high school for current and incoming students. The group had existed the previous year, and was continuing this year.

The *projects groups* were scheduled to meet formally for project planning meetings on either a weekly or bi-weekly basis (this was similar to what had been done in previous years). They were led initially by adult staff members with students being given roles of increasing responsibility within the project groups (explicit attention to students roles was new for the intervention year). When projects were completed, students were given the opportunity to start new projects. Technical *seminars* were scheduled throughout the school year on a regular basis with students signing up for sessions they found interesting. Seminar topics were based on general student skill levels initially, and also based on requests. They were led by adults at first with advanced students being asked to serve as seminar assistants, and then later, students themselves led some of the seminars. Artifact *demonstrations* were scheduled for the entire group at the end of each semester. Smaller project groups held more frequent demonstrations on their own to show the progress of their work. Other unscheduled times were for students to work on anything of their choosing (although project work was encouraged) in the NU-PEAK computer lab. Members were allowed to bring friends as guests to NU-PEAK, and these guests were also allowed to use NU-PEAK equipment. All participation was voluntary, and students had the opportunity to stay as late as 5 PM when they wanted to do so.

Outcomes

By the end of the school year, our data seemed to show the following:
Better social practices in formal settings
Transfer of positive formal social interaction patterns from formal settings to informal settings
Increased after-school attendance
Increased overall technical skill development
Variations in social and technical skill development that seemed to be a function of (a) student attendance patterns and (b) student project group affiliation (which influenced the level of interaction with students in whom expertise had been seeded in the summer).

1. Better social practices in formal settings. Over the course of the year, students became more skilled as participants in the various formal structures. In *project groups*, students became more involved in the management and planning of project artifacts, and acted conscientiously in roles with greater responsibility. One group in particular completed two sophisticated group artifacts—the previous year, none of the groups had fully completed even one. Students kept track of each other's progress and formed teams that worked on sub-sections of their artifact. As necessary, more skilled students helped the less skilled team members learn technical skills, even offering to run informal seminars of their own. In interviews, students revealed that there was a lot of pride associated with this kind of supportive peer role. In formal *seminar* sessions, students started as expected primarily as participants. Some then participated as seminar assistants. Eventually there were several students who were able and willing to be seminar leaders on their own. Large group *demonstrations* also were a setting where students' participation skills grew. At first, participation was timid and students were somewhat shy about showing their work. As time progressed, students showed greater skill and confidence during demonstrations, and also learned to be good audience members, making constructive comments and asking appropriate questions as modeled by adults and the summer students.

2. Transfer of positive formal social interaction patterns from formal settings to informal settings. The transfer of positive formal social interaction patterns to informal settings was very visible. For example, students mimicked formal seminar and demonstration practices in private informal settings. There were numerous instances of students offering to help their friends learn new skills through informal seminar-like sessions. Within the project groups, smaller work group leaders used self-organized demonstration sessions to keep track of each other's progress and to provide constructive comments for improving each other's work.

The altered social behavior was even quantifiable. From observations and student interview responses the previous year, it was estimated that approximately 10% of what students learned, they learned from other students, and another 10% they learned through personal experimentation. When asked to estimate their learning sources for the intervention year, students estimated that approximately 22% of what they learned, they learned from other students and 23% they learned through personal experimentation.

3. Increased after-school attendance. The previous year, after-school attendance was poor with only two or three students taking advantage of after-school lab time on occasion. During the intervention, voluntary after-school attendance started low—identical to how things were the previous year—but progressively grew from month to month (see Figure 1). There was a slight lowering toward the end of the year when various factors including warmer weather and the reduction of computer station numbers affected attendance, but overall, attendance remained strong considering only five computer stations were regularly available for use in the lab.

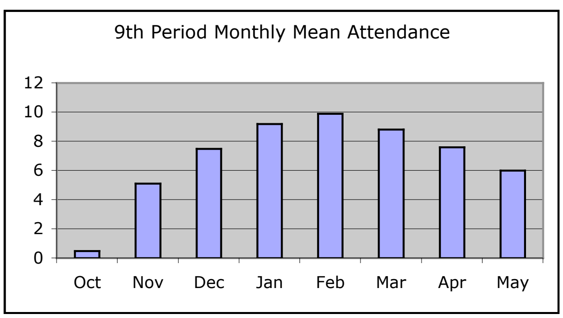


Figure 1. After-school monthly attendance mean.

4. Increased overall technical skill development. The previous year, students worked exclusively on web site development. Based on the artifacts they were able to create, students were given a technical skill level score on a scale of 1 to 7. A text-only web page was a level 1 artifact. A web page with formatted text, graphics, and hyperlinks was a level 4 artifact. Building level 7 artifacts required proficiency with lists, tables, frames, and programmed functionality. The average skill level of students the previous year was 2.5. During the intervention year, students created both web and Director artifacts (Director is a media creation tool produced by the company Macromedia). The level of sophistication displayed through web artifacts was higher than the previous year for both new students (3.8) and returning students (4.5). The level of sophistication displayed through Director artifacts was also high for both new students (4.2) and returning students (4.6). Figure 2 shows the distribution of students at the various skill levels for the previous year and the intervention year.

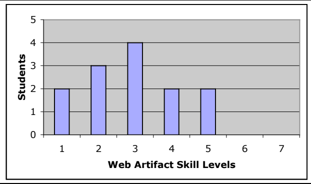
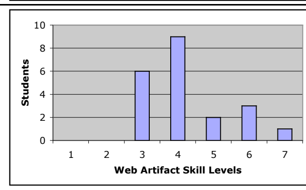
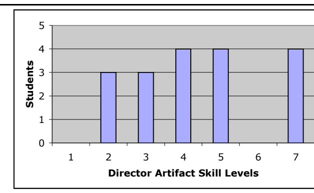
	Web Artifact Skill Levels	Director Artifact Skill Levels
Pre-Intervention		(N / A)
Post-Intervention		

Figure 2. Graphs of the skill level distribution of students.

5. Variations in social and technical skill development that seemed to be a function of (a) student attendance patterns and (b) student project group affiliation. Observations of students, student interview comments, and student attendance records, were used to generate frequency scores of certain productive social practices like peer-to-peer knowledge sharing, participation in group management, and use of after-school time. Similarly, scores of technical skill development were generated based on the sophistication of student artifacts. These sets of scores seemed to show that those students with better attendance, and those who were socially affiliated with summer students (by being in the same project group for example), tended to have higher social practice and technical skill scores. This is an important observation when considering alternative explanations to the improvement of this particular learning community. Two of the stronger alternative explanations for the data were as follows:

1. New technology tools caused more the positive community effect.
2. Outcomes were more of an "adult effect" with improved adults' interactions with students having the greatest impact on student learning and community change.

All students had equal access to the new technology, so any technology effect would tend to not favor any particular group of students. Adult interactions with students were fairly uniform as well and not a good predictor of skill development. In fact, the project group supervised during the school year by the most senior researcher (who developed most of the seminars and worked intensively with the summer student seeding program) did not show greater technical or social skill development.

As far as why more contact with the summer students helped, student responses to interview questions were illuminating. For example, when asked questions about peers during interviews, students often talked specifically and appreciatively about the summer students.

RESEARCHER: [Regarding two students who were just mentioned]…what do they do?

STUDENT1: Diana helps me whenever I get into a problem of what to do. Vanessa the same thing.

STUDENT2: Cause she's like always telling you that, "You can do really cool stuff in Director" … and I really want to learn how to do that, and she's like, "Do it, do it, try it, you'll like it!"

Conclusion

Successful student learning communities can be designed and implemented. There are many factors that contribute to the functioning of these learning communities and so any number of problems can occur. With children, social skill deficiencies can cause a learning environment to function sub-optimally. In this study, an attempt was made to strengthen a student learning community by promoting social skill development. The outcomes of this work suggest that the targeting of social skills was appropriate and effective. Improved student social practices were observed along with overall improved student technical learning. The patterns of improvement suggest that the outcomes were not merely a result of new technology tools or better adult instruction. The positive impact of better student-to-student social interactions was apparent in the data. This work provides a case study of how to strengthen weak community implementations. It suggests the importance of a healthy social culture in enabling the proper functioning of community learning environments, and provides an example of how to promote social skill development in community learning environments.

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