What happens when you form learning communities among student teachers, university supervisors, and master teachers and challenge them to find new ways to teach with technology? This is precisely the question that project TALENT (Teaching And Leading for Educational Needs with Technology) has posed. TALENT is a 2000 Preparing Tomorrow's Teachers to Use Technology (PT3) grant funded by the U.S. Department of Education. The project’s overarching aim is to foster systematic changes that will enable teacher-candidates to complete their preparation programs with the knowledge and understanding to address the digital needs of diverse, limited English-speaking, high poverty, and rural students in the K-12 schools in which they intend to teach.

A key activity to foster the changes envisioned by TALENT personnel is the forging of links between university supervisors, K-12 master teachers, and teacher candidates to increase the quantity and quality of technology integration in student teaching experiences. The literature on teacher preparation consistently suggests that field experiences are particularly powerful and influential in the development of new teachers (PCAST, 1997) and that future educators need more opportunities to see the effective integration of technology in the field (Moursund & Bielefeldt, 1999; NCTAF, 1996). According to the President’s Committee of Advisors on Science and Technology, the field experience is a critical aspect of preservice technology preparation because it affords teacher candidates opportunities to observe the use of educational technology and to practice teaching with technology in K-12 schools (PCAST, 1997). However, a survey by the American Association of Colleges of Education on teacher preparation consistently suggests that field experiences are particularly powerful...
Teacher Education (AECT) found that almost one-third of the teacher candidates surveyed were not required to incorporate technology during their student teaching (Persichitte, Tharp, & Caffarella, 1997). The ability to provide preservice teachers with the support and guidance needed to see and implement effective technology-integrated lessons in the field requires an increased level of proficiency among all parties involved and an increased incidence of collaborative modeling.

To support necessary changes in the field experience, project TALENT is implementing a learning community model in which each participant shares strategies and ideas about teaching with technology with the other participants. Learning communities, or communities of practice, are not new notions. For example, Lave (1991) envisioned knowing, learning, and cognition as social constructions, expressed in actions of people interacting within communities of practice. Carroll (2000) considered schools as connected learning communities of teachers and students, in which some participants were expert learners and others were novice learners, sharing information, supporting one another’s learning processes, and constructing a common base of understanding and shared skills. Engestrom (1996, 1998) extended these viewpoints by envisioning communities of practice as “Activity Systems” in which individuals intentionally use tools (or technologies) to create or transform objects or concepts in order to bring about a desired outcome. Engestrom’s Activity Systems provide the conceptual framework for this article.

**Structure of TALENT Learning Communities**

The existing student teaching triad structure of student teacher, master teacher, and university supervisor serves as the foundation for the formation of learning communities. TALENT-supported communities differ from typical student teaching triads in their focus on technology and in the roles and responsibilities assumed by their members. Participants represent different levels of expertise, and any member, teacher candidate, master teacher, or university supervisor might be a “technology expert.” The configuration of a TALENT learning community is also flexible, depending on the context in which it operates. For example, a community could consist of a larger team of master teachers, supervisors, and teacher candidates at the same K-12 school, or could include other school support personnel such as the library-media specialist.

**TALENT Learning Communities as Activity Systems**

In an Activity System (Engestrom, 1996, 1998), any given individual’s actions take place within a sociocultural framework that includes the community of which the individual is a part, the norms of use of tools and technologies, and the social roles or division of labor that characterize individual actions within local collective activities. The basic difference between traditional social learning theory as characterized by Lave and Wenger (1991) and Engestrom is Activity Theory’s emphasis on the transformational nature of collaborative endeavors. “Activity theory suggests that collective developments occur when, through their actions, people reinterpret their environment, rebuild their activities, and reconceive of themselves (Blackler, Crump, & McDonald, 2000, p. 296).”

The collaborative endeavors in which TALENT learning community members participate suggest a striking parallel with Engestrom’s Activity System. In the learning communities, credential candidates and university supervisors engage in “boundary crossing actions” (i.e., they trade materials, ideas, or patterns of behavior across the boundaries that characterize and enclose the school of education and the partner school as separate but parallel activity systems). In addition, they depart from their typical roles of master teacher, student teacher, and university supervisor.

The goal of the learning communities is simultaneous professional development for all parties. In striving to reach this goal, the communities have the potential to accomplish several purposes: (a) support the improvement of K-12 master teachers’ knowledge and skills related to technology infusion; (b) enhance the development of technologically literate university supervisors who can support and evaluate student teachers’ efforts to design and implement effective technology-enhanced lessons; and (c) develop technology leadership abilities among newly credentialed teachers. In addition, the tasks and lessons developed by each community provide additional resources for faculty to use in credential courses. Since these activities take place within a sociocultural context, the outcomes - technology-infused instruction — generate a “ripple effect” within the Activity System (Fig. 1).

Introducing new tools and technologies. As typically takes place within an Activity System, TALENT introduces new tools to the K-12 master teachers to accomplish technology-infused lessons within the K-12 schools. Early in the semester, invitations to an orientation session are sent to master teachers and university supervisors. TALENT pays for half-day substitutes for the K-12 teachers, who are encouraged to bring their site administrator and student teacher. The purpose of the orientation session is to explain the structure of the communities, discuss some possibilities for projects, and to answer questions. Each learning community also has time to discuss its plans for the semester and to complete an information sheet articulating anticipated goals and activities.

**Continuing Support.** In an Activity System, for the individuals who become interested enough in the new tools to acquire more knowledge about their potential uses to enhance instruction and to make the decision...
to implement technology in the classroom, this is only the beginning. Each must go through a learning/adoption trajectory (Sherr, 1998) to gain the necessary comfort, confidence, and competence to effectively integrate technology. The need to navigate the learning/adoption trajectory is the purpose of the continuing technical and collegial support provided by TALENT to the learning communities. Each group selects a liaison who serves as the main communication link with the project. TALENT personnel work individually with each community to provide specific support, such as information to help implement a particular technology-rich task, or assistance learning a particular piece of software.

**Changing Norms**

Rules, norms, and beliefs define the culture of an Activity System. Rogers (1995) lists compatibility with potential adopters’ needs and values, relative simplicity, the ability to experiment with an innovation on a limited, risk-free basis, and relative advantage over the status quo as facilitators for innovative concepts, processes, and products.

TALENT learning communities are focused on the new norm of a greater focus on technology-infused, student-centered learning. The ability of each community to help determine what is appropriate and needed in their particular situation is a particularly important component of the communities. Each community, consulting with TALENT personnel, determines individual and group goals and outcomes. For example, one community created a series of hands-on lessons incorporating PowerPoint, Alpha Smarts and the Internet. Student teachers taught the lessons, which were videotaped. Additional learning community projects included:

- **Developing and implementing computer buddies** in which third grade students tutored first graders in the use of a computer-based reading program;
- **Teaching middle school students to use digital cameras and iPhoto** and developing ways to incorporate those activities into the school’s standards-based curriculum;
- **Creating a school newsletter** in which middle school students conducted interviews and used digital cameras and the computer;
- **Using a digital camera, digital music files, and captions** for a “media memory book” that was used a part of the sixth grade graduation ceremony.

Communities keep track of their work in a log and are responsible for documenting their project. Documentation might include lesson plans, resources, and videotaped lessons. Once a learning community has competed its project, each participant receives a small stipend.

**Changing Roles**

Its division of labor - the generally accepted roles of its members - defines the social structure of an Activity System. A sudden reversal of traditional roles can cause discomfort and a disturbance in an Activity System. According to Engestrom (2001), this discomfort can have a positive effect on learning.

In a typical student teaching triad the teacher, supervisor and student teacher have generally accepted roles, with the master teacher and supervisor generally considered experts and student teachers considered learners. The use of technology-focused learning communities might result in some role changes. In a learning community, each of the members is a co-learner and a co-contributor, constructing knowledge as a coherent team and serving as an interface between the university and the K-12 environment. In addition, forging the links needed to form learning communities can come from any source. The first method used by TALENT was to encourage university supervisors to form learning communities. These efforts, however, were met with limited success. Contacting K-12 master teachers generated much more interest. In fact, word spread among teachers in some schools, generating additional participation on the part of both K-12 teachers and university supervisors. In selected cases, student teachers were also approached and in fact, student teachers were responsible for the creation of two of the communities.

**Driving Change in Activity Systems**
An interesting research question emerges from studying TALENT learning communities: By what process does change in an Activity System take place? When this question was posed at the 2001 American Educational Research Association Annual Meeting, one of Engestrom’s peers (Sasha Barab) replied, “The direction of change depends on who holds the power.” Shifting the balance of power creates disturbances, and “As disturbances become evident within and between Activity Systems, participants may begin to address underlying issues and to create new learning.” (Blackler, Crump, & McDonald, 2000, p. 281). Thus, further investigation into this question revolves around empowering the agents within the Activity System, in this case all members of the TALENT learning communities, to drive change.

**CHALLENGES AND QUESTIONS**

There have been some logistical matters to consider as the learning communities project develops. Ensuring that student teachers are placed in classrooms of K-12 master teachers who want to participate in a TALENT learning community is an important consideration. This requires building and maintaining a database of “technology-friendly” master teachers. Another challenge is to encourage university supervisors to participate in the communities to a greater extent. We anticipate that as “early adopter” supervisors become more comfortable and proficient with technology, and as they experience success with their learning community projects, their enthusiasm will influence existing norms for the university supervisor’s role.

**CONCLUSIONS**

So, what happens when you form learning communities to promote technology integration? Preliminary data suggest quite a lot! While we still have much to learn about this process, learning community members have been enthusiastic about their participation. The following quotes from participating K-12 master teachers indicate they perceive the learning communities as a valuable experience:

- “It was a win-win situation. It made technology understandable for the classes, enhanced the student teacher’s own education in using technology and CSUF received a videotape to use for further educational purposes”.
- “This has been a wonderful experience for our students!”
- “I am motivated to integrate technology (I have done a vast amount more with technology this year than in my past 18 years)”

We are encouraged by their enthusiastic participation and look forward to gathering the evidence, including longitudinal data, which will enable us to better understand how this collaborative process drives change and to document the impact of this change on student learning.

**REFERENCES**


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