

Teachers' Professional Growth:
The Blending of Technology, Pedagogy and Content

by

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ABSTRACT

The integration of technology into content area teaching while taking into account state standards is a continuing challenge for secondary teachers. To address this challenge, six high school teachers participated in one-on-one tutoring sessions conducted by the researcher. The Technological Pedagogical Content Knowledge (TPACK), which posits that teachers add technology into their practice by blending it with content and pedagogy, served as the theoretical framework and guided implementation of the project. During the one-on-one tutoring sessions, which occurred weekly in hour-long sessions for a five- to eight-week period, teachers selected the focus of the training sessions.

To assess teacher perceptions of efficacy quantitative data were gathered prior to and following the intervention using an on-line survey tool. Although pre- to post-intervention scores on the survey increased, the difference was not significant.

With respect to the qualitative data four themes emerged. First, there were specific processes and patterns that emerged within the sessions related to the TPACK framework. Teachers selected either technology or content to initiate sessions. Teachers did not begin sessions with high yield pedagogical strategies as a focus. Second, one-on-one tutoring fostered an initial sense of community, and as the project progressed, a community of practice emerged. Third, challenges emerged related to technology and high yield pedagogical strategies. At times technology did not work or teachers expressed there was too much to grasp and apply to their practice. Additionally, the appropriate applications of high yield instructional strategies also presented challenges to participants. Fourth, based on

their participation in the project, teachers expressed an increased sense of efficacy with respect to conducting their work. The discussion was focused on how teachers created a community of practice to support their professional growth, which influenced efficacy for teaching as they became increasingly effective in blending technology, pedagogy and content.

I dedicate this to my loving husband Mark. You are the best thing I've ever found in the library.

To our children, Max and Amanda. You really are the best and we couldn't ask for more.

To my family, thank you for your loving support along this journey.

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Chapter 1 Context of Study

There was a time when teaching meant leading a classroom of pupils in a one-room school house in America. Students were trained in their alphabet, spelling, basic reading, and mathematics. Everyone was content to call this learning. Laura Ingalls Wilder recalls her years of learning and teaching on the prairie, and it seemed very uncomplicated. The ingredients for teaching and learning were clear: a classroom of students, an all-knowing, caring teacher, several books, an ink well, and a chalk board. It is hard to imagine the quantum leap that occurred a little over one hundred years later. Much of the landscape of teaching and learning has been transformed because of the Internet. Things will never be the same.

One of the biggest implications of using the Internet is the teacher is no longer the wisest “being” in the room. There is always some new technological advancement that can be used to search for an answer that was formerly reserved for the sage. This is a dynamic shift from the times on the prairie and requires that teachers and students view schools and learning in new ways. Along with the Internet, technological tools are being designed at speeds with which few can keep up, and these tools are either being brought to school or infused into the school setting. Importantly, they offer new opportunities to enhance planning, instruction, and assessment. It is as if a great teacher can be compared to the master painter. Imagine Leonardo da Vinci today with new tools. What would Mona Lisa look today as a piece of graphic art? Would the piece be better than before, have little effect, or damage the beauty of the painting all together?

Teachers often feel this way when they are provided with new technology items or web tools as part of their teaching repertoire. Will the learning in their classroom be affected by using technology? What is the curve for their learning? Will they embarrass themselves in the process? Even Leonardo da Vinci might struggle to learn to paint using a mouse.

With respect to context, the current work has its roots with a group of teachers and me, a district technology curriculum writer and trainer who also serves as an Assistant Principal at a high school. The local school district passed a bond and set aside funds to train small groups of teachers in new technology tools and instructional integration. The district, which was comprised of twenty-eight elementary and middle schools and five high schools, initially allowed up to two teachers per site to attend the technology classes each semester. The teachers were willing to participate because they got new technology tools for their classroom such as document cameras, digital cameras, SmartBoards™, and AirLiners™. In addition, participants received professional development hours which allowed them to advance their position on the salary schedule. In return, teachers were challenged to create engaging, integrated units of learning for their students employing these new devices, but only when they enhanced learning. Finally, participants presented these new learning units to others in the class. The units were evaluated with rubrics as participants presented them to their peers.

Participating teachers loved their new technology gadgets, but making decisions about integrating instruction with technology was another matter. Teachers at the local school knew that there was a technology trainer on site and

kept coming to me with questions and products wanting feedback or lessons prior to class. When I asked them why they were coming to me there were several common threads. “When I get whole group instruction with technology, sometimes I forget things and need a refresher.” “I need specialized help after whole group instruction, especially with technology.” “This is new to me and I need personal assistance in my learning.” Whatever the case was for each teacher, they were all seeking out the technology trainer and individualized tutoring sessions were initiated.

The foundation for the study began to take shape. Perhaps, technology is like what is observed with students during mathematics lessons. The teacher presents the material, and the class practices together. Still, after the lesson is completed, many students desire one-on-one sessions with the mathematics teacher or another student who understands the material well. When students feel confident, they release the tutor and work independently.

The teachers in the technology classes were asked to evaluate their teaching practice while integrating technology. The required level of reflection and transparency of their thinking, and the effort exerted in constructing their work could make them vulnerable in front of their peers. This perceived vulnerability may have contributed to the requests for on-site, one-on-one tutoring sessions.

Teachers using technology have new, exciting and challenging decisions to make in the twenty-first century about technology and how this affects their daily practices. Each day they make important content, pedagogy, and technology

decisions when logging onto the Internet, teaching courses online, or employing a new piece of equipment. The teacher continues to question the use of technology until (a) they are proficient in its use and (b) they observe for themselves that the use of technology enhances learning for their students. As one who prepares teachers to incorporate technology into instruction, the critical question is: ‘Are the best methods to train teachers in this quickly changing and vast area of technology readily available for teachers?’ This study explored one model and sought to evaluate its effectiveness.

Context and Overview of the Innovation

This action research study took place in a suburban school district in north Phoenix, Arizona. The study was conducted in a single Title I eligible high school in a school district comprised of twenty-eight elementary schools or middle schools and five high schools. This district had eight qualifying Title I schools and dedicated the majority of these funds to the elementary setting. The taxpayers in this district supported a technology override. Funds from the override were dedicated to purchasing new technological equipment for classrooms and training teachers in its use, which was blended with learning high-yield instructional practices as defined in *Classroom Instruction that Works* (Marzano, Pickering, & Pollack, 2001). The trainers for the classroom teachers were paid with Title II funds. At each of the twenty-eight schools, there was a selection process, and up to three teachers annually were chosen to attend this blended training program, which was offered in three tiers. Each tier included 30 seat hours of training, which teachers used for professional growth movement on the salary schedule or

for the professional responsibility effort for 301 monies earmarked for salary enhancement. At each tier, teachers received new technology items and training on how to use the new items. The teachers also received information about how to best use these technology items for optimum learning in their classrooms. The required artifacts for teachers in the tiered trainings were: (a) unit planning using backwards design, (b) lesson plans with high-yield instructional strategies embedded, and (c) teacher video tapes of instruction and reflection conferences. Teachers often attended with the expectation the course was only about technology, and they were resistant to blending content and pedagogy outcomes with technology as they prepared lessons. When participants were surveyed at the end of each course, they often commented they would prefer training that focused only on technology.

The innovation in this study was to offer one-on-one tutoring sessions to teachers who were in the process of receiving training or who had completed the district training sessions. These sessions focused on blending technology with the nine high-yield instructional strategies presented in tiered training classes. The nine strategies are: (a) identifying similarities and differences, (b) summarizing and note taking, (c) reinforcing effort and providing recognition, (d) homework and practice, (e) nonlinguistic representations, (f) cooperative learning, (g) setting objectives and providing feedback, (h) generating and testing hypotheses, and (i) cues, questions and advance organizers. Within the sessions, discussions and planning using the Arizona State Standards or English Language Learning Standards for the content strand of TPACK (Mishra & Koehler, 2006) were

evident. The content was embedded within technology or used in concert with technology or a specific pedagogical practice. The teacher selected the topic for the tutoring session and set the weekly appointment for the one-on-one session.

The research sought to address the specific research question: How does one-on-one tutoring following technology professional development affect teachers' perceptions of efficacy?

Chapter 2 Theoretical Perspective and Research Guiding the Study

Three theoretical frameworks guided the conduct of this action research project. In the following sections, each of those frameworks is described. The three perspectives are: constructivism based on Vygotsky's (1978) socio-cultural theory, Technological Pedagogical Content Knowledge (TPACK) espoused by Mishra and Koehler (2006, 2009), and the work related to formal and informal teacher learning.

Constructivism. The constructivist perspective posits that learning is an active process in which people create their own subjective view of objective reality. In the constructivist paradigm, new information is attached to prior knowledge and creates an individualized version of a representation of the combined knowledge. Constructivism is based in socio-cultural theory which originated with the Russian psychologist, Lev Vygotsky (1978). Vygotsky asserted that social interaction plays a critical role in cognition and learning. For example, Vygotsky suggested children's cognitive development is preceded by and based on social interaction with adults or older children. Vygotsky cogently argued children first developed socially with others, in what he called interpsychological development and then within themselves, intrapsychological development (Vygotsky, 1978).

To further clarify the importance of older, more capable individuals and their influence on development and learning, Vygotsky articulated the concept of a "More Knowledgeable Other" (MKO). A MKO is a person with more highly developed abilities or a greater level of understanding. This could be a coach,

teacher, or tutor who is more skilled at a particular task. Moreover, the MKO shares information or knowledge with less knowledgeable individuals to facilitate learning by the less knowledgeable person. Another component of Vygotsky's socio-cultural framework is the Zone of Proximal Development (ZPD). This is the difference between the child's ability to do something independently as compared to doing the same thing with the help of a more knowledgeable adult. According to Vygotsky, the most rapid learning occurs in this zone.

In this study, teacher participants selected the work with which they needed help and from which they might benefit from working with a more capable colleague. Time was limited to thirty minutes per week; therefore teacher participants were induced to optimize their tutoring time with items for which they sought guidance or for which they could not complete independently.

Technological Pedagogical Content Knowledge: A Theoretical Framework

Before technology was readily available to teachers, they had to consider two basic issues during lesson planning and teaching: which content to teach and how to teach it. These decisions may have been made in concert or separately. Shulman (1986) affirmed this point of view when he noted teacher decision making primarily consisted of considering both content and pedagogy and how they worked together. Content and pedagogy constituted the first two components of the theoretical framework of Technological Pedagogical Content Knowledge (TPACK, Mishra & Koehler, 2006). With technology being incorporated into the modern classroom, Mishra and Koehler added one additional component: technology, forming a three part model connecting pedagogy, content and

technology (see Figure 1). Further, Mishra and Koehler (2009) suggest that to effectively teach specific subject matter with technology involves a unique understanding of the association between all three components: technology, pedagogy, and content. Over time, teachers develop capabilities to coordinate these relationships and develop expertise in using these components.

All three components work together, and as Mishra (2009) notes, this is not a clean process. By this he means teachers have many things to consider including pedagogy, content, and technology.

In the TPACK framework, Mishra and Koehler (2006) also suggest that at times teachers are addressing only portions of the framework. For example, for planning or instructional purposes, the teacher may only blend content and technology. At other moments, teachers may focus on technology and pedagogical practices to best serve their needs or their learners' needs. Moreover, there are times when technology does not enrich a lesson and may not be necessary; teachers may only focus on content and pedagogy. In the TPACK framework, there is fluidity for the teacher to select and blend the three in various ways to best meet the needs of their learners.

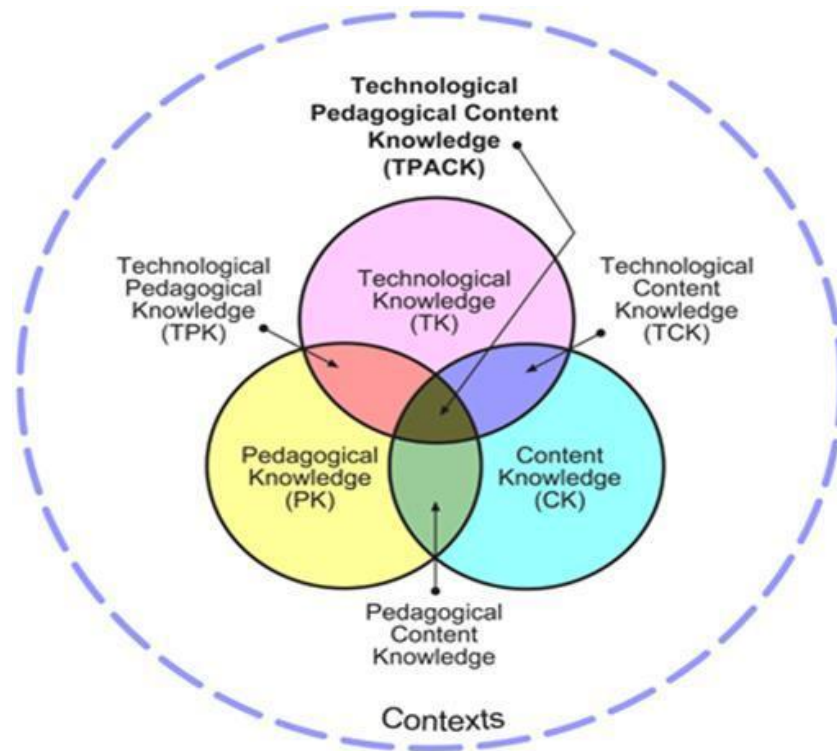


Figure 1

Technological Pedagogical Content Knowledge (TPACK) Model

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Technology. In this study, the teachers received technology equipment which was distributed to them at intervals. As they participated in the first tier, they obtained technology items like a document camera for their classroom that allowed them to put their textbook or paper under the camera and to project it on a screen. They also had students show their personal work with this camera. Teachers also received a digital camera and video camera with a feed line that allowed them to make and edit videos of their teaching. As they moved to the second tier, they received a Flip™ Camera that allowed them to take pictures and

short videos and import them directly into their computer. They also created accounts using multiple Web 2.0 tools like Glogster, iGoogle, Google Docs, Wikispaces, and other media that supported learning in the classroom. In the last tier, teachers received a SmartBoard™ with an AirLiner™ so that the board could be manipulated from any position in the classroom. Professional development sessions for all of these technological tools were presented in ways that participants learned to blend technology use with content and pedagogical high yield strategies.

Pedagogy. Pedagogy within the context of this study is defined as the nine high yield teaching skills taught to the teachers in their blended technology classes and reinforced in the tutoring sessions. The teachers were directly trained in the nine high-yield strategies based on the book *Classroom Instruction That Works*, by Marzano et al. (2001). Marzano defines high-yield strategies as “instructional strategies that have a high probability of enhancing student achievement for all students in all subject areas at all grade levels” (Marzano et al., 2001, p. 7). The teachers in this study were familiar with these strategies because they were evaluated in their school district using terms and descriptors from *Classroom Instruction That Works*. During the tutoring sessions the participants discussed any of the nine strategies, asked for clarification of the strategies based upon the research presented in the text, or planned lessons with a pedagogical strategy. Due to the constructivist nature of the study and their prior exposure to the nine strategies, variation in the implementation of the skills was permitted.

Content. For the purposes of this study, content was narrowed in focus. Further, content was taken from the Arizona State Standards and the Arizona Standards for English Language Learners. To develop individual lessons, content was focused even more narrowly on particular standards articulated by the state and the local school district. These standards are measured using the Arizona's Instrument to Measurement Standards (AIMS). To illustrate the degree of focus, consider for example, seniors in Arizona are required to analyze British literature. As a result, in the discussion about a Hamlet unit, textbook and Internet related items connected to the articulated standards could be employed. There was also discussion about specific high-yield pedagogical strategies related to the content as well as best concurrent use of technology equipment, for example, use of a webcam, which is aligned with the TPACK framework (Mishra & Koehler, 2006).

Teacher Learning with One-on-one Tutoring. One-on-one tutoring was the innovation used in this action research study. Tutoring was often structured so that when sessions first began there was an effort to build a positive relationship and to "roam around the known" (Pinnell, Deford & Lyons, 1988, p. 10 -11). This approach reinforced the notion that for self-efficacy to develop there must be academic success (Chapman & Turnner, 2003). After success had been established, the tutor accompanied the tutee into areas where they may not be as skilled while maintaining the relationship first established. This whole process was consistent with Vygotsky's MKO (1978). The MKO, the tutor, extended the skills of the tutee by working at the higher end of the tutee's zone of proximal

development. The tutee and the tutor selected work the tutee would not be able to complete independently. Together they worked so the tutee developed her skill base and could eventually complete the work without the tutor's assistance.

Teaching is a profession which requires on-going development. Sometimes this is due to personal choice; at other times teachers choose to grow professionally to receive incremental pay increases. Teachers also grow to meet state certification requirements to keep their certification current. One important way that teachers learn is through self assessment, monitoring and adjusting practices based upon reflection. Wilson, Shulman, and Richert (1987) refer to the practice as pedagogical reasoning. As teachers gain knowledge about their school, students, curriculum and methods of instruction, they engage in practical experiments within the context of their work (Dewey, 1963; Schon, 1983). These experiments are conducted to foster higher levels of learning.

Teachers also learn formally and informally from one another (Lave & Wenger, 1991). In the most formal sense an experienced teacher, the tutor, takes a new teacher, the tutee, into a mentor-mentee relationship and guides them for an amount of time on a series of topics. On the other end of the continuum, teachers informally learn from one another in line at the copy machine, in the lunch room and standing in the hallways monitoring students. Between these two examples of learning lie many other layers of teacher learning from one another: on common preparation periods, in release time together, and in summer workshops.

Another way that teachers learn is through consultant services. Perhaps there is a trainer for Web 2.0 integration services, and teachers with an interest in

the area select this training setting to meet their needs. Often these services are content specific and driven by pedagogical interests. Continuing education through colleges and universities also provides an avenue of learning for teachers. Frequently, teachers engage in this kind of learning to meet the requirement of a Master's Degree as set forth in law in their state for certification purposes (Renyi, 1996).

Teachers also learn professionally relevant skills by taking on other roles within the context of their lives including, serving as a parent, scout master, or soccer coach (Lucido, 1988). Life experiences contribute and blend in as the teacher works with students in the classroom.

Chapter 3 Methods

Data were collected using both quantitative and qualitative methods. A researcher-revised survey comprised of thirteen items based on the Teacher Proficiency Self-Assessment (Ropp, 1999) was given at both the beginning and the end of the study. The revision updated the items for alignment with current technologies and the focus of the study. Qualitative data collection was two-fold. Pre- and post-intervention interviews were conducted with participants just prior to beginning the tutoring sessions and following the five weeks or more of tutoring. Field notes were also collected from tutoring sessions using a field note collection tool and were evaluated for emerging themes. The tutoring sessions were transcribed from each tutoring session. Along with the field notes these were organized into themes and coded. Teachers received a copy of the field note form from each session that reminded them of what was discussed in the session. This became an artifact for the study and provided the teacher guidance from session to session. These were organized and coded according to themes and topics that materialized through analysis of the tutor/tutee field notes (see Appendix C).

Setting and Participants

Participants volunteered to take in part in the study yet met specific criteria. The participants in the study were all from one school in a local school district in North Phoenix. Participants ranged in age from twenty-two to sixty-eight and all had technology training offered by the local school district ranging from fifteen hours to fifty hours or more. Participants had four years of teaching experience to over twenty years of experience.

After the participants volunteered they were screened and selected because they had received at least fifteen hours or more of technology training and desired to participate in one-on-one tutoring as follow up to their initial training. An email was sent to the staff offering to participate in the study and a response indicated the teacher wanted to be part of the tutoring sessions. If the participant qualified tutoring sessions were scheduled along with pre- and post-intervention interview times. The pre-interviews were scheduled first and then the tutoring sessions were scheduled for five weeks or longer on a nearly weekly basis depending on the school calendar. Six teachers participated in the study and the tutor/ tutee sessions were staggered over a semester. The participants could chose at any time to have more than one tutoring session in a week or stop their participation in the study. The study closed with the final post-intervention interview.

Instruments

One instrument was a survey based upon the Teacher Proficiency Self-Assessment (TPSA, Ropp, 1999). The TPSA is comprised of a twenty-item set of questions first created by a team of educators at the University of Michigan. This self assessment was developed so teachers could evaluate their own proficiencies on four constructs: email, the World Wide Web, integration of applications and integration of technology into teaching. Each construct had four questions. In the current study, the focus was on construct four, integrating technology into teaching. Teachers were asked to rate their responses based on their confidence with respect to the item using a six-point Likert scale with one representing *strongly agree*; two, *mildly agree*; three, *agree*; four, *mildly disagree*; five,

disagree; and six, *strongly disagree*. To illustrate the content of the items, two examples are presented. In one item, respondents rated their confidence for the following statement, "...create a lesson or unit that incorporates Web based tools as an integral part." A second asked, "...design a rubric that evaluates my teaching with technology for implementation of high yield strategies." These items were revisions on the original instruments to reflect the current technologies in which the teachers were being trained. See Appendix A for the complete survey. Several additional questions were added to support the TPACK framework along with demographic information (Mishra & Koehler, 2006). A final set of questions were added to determine each teacher's level of leadership with respect to technology use on their own campus. This was an open-ended set of questions which allowed teachers to write responses.

Another instrument employed was a semi-structured pre- and post-intervention interview. In this interview, nine open-ended questions were asked of the participants at the beginning of the study and again at the conclusion of the study. Two additional items were added to the interview conducted at the end of the study. The questions focused on the process the teacher was undertaking in thoughtfully adding technology to their practice. Two sample questions were: "Describe what's happening in your teaching right now." and a second was, "Do you find blending content with technology and high yield strategies an easy process? Talk about it." The complete set of questions is presented in Appendix B. Later, added questions included, "As the study progressed, what actions did you take beyond the one-on-one tutoring sessions to supplement your

understanding and use of technology?”

The last method of data collection was transcripts based on audio tapes of the one-on-one tutoring sessions. The transcripts were used in subsequent analysis for developing codes and identifying emerging themes. In addition one brief form was constructed for each tutoring session (see Appendix C). The form was used to record information regarding the content the teacher was currently addressing in their lesson plans, the high yield strategies they thought would complement their lessons during the tutoring session and any technologies discussed in the session. The tutee was given a copy of the form at the end of each session.

Intervention

The intervention consisted of offering one-on-one tutoring sessions for one-half hour over a five-week or longer period. The teacher selected the topics for the sessions and the researcher prepared for the tutoring sessions prior to the teacher's arrival. The tutee emailed the tutor prior to the session or told the tutor about the nature of the work in the next session at the end of the previous session or in passing. The researcher often needed to prepare a specific technology skill regarding the use of equipment and planned the next tutoring session on campus where the equipment was available. The tutor may also have read a chapter from *Classroom Instruction That Works* (Marzano et al., 2001) to prepare for the tutoring sessions. At other times, the tutor read the Arizona State Standards in an area in which she was less familiar to guide the teacher in the blending of content, pedagogy and technology during the next tutoring session.

During the tutoring sessions, the tutor and tutee worked together on the topic or topics for which the teacher requested assistance for the session. The tutor listened and guided the tutee towards the blending of technology, pedagogy and content. The tutor and tutee practiced the pedagogical strategies together simulating the classroom setting or tried out the technological tool embedding the pedagogical high yield strategy together within the tutoring session.

Also within the session, the teacher and researcher discussed how the strategies from the last session worked and whether to continue using these strategies, whether to add new strategies, or modify ones already selected. Reflective questions were asked by the tutor or reflective thoughts were offered by the tutee in regards to prior lessons to drive future lessons. This led to discussion in the one-on-one sessions.

Data Collection

The revised TPSA (Ropp, 1999) was given to the teachers at the beginning of the study. The teachers who experienced the intervention during the five week or longer tutoring sessions took the revised TPSA as prompted by their course instructor using an on-line tool, SurveyGizmo. The prompt was sent electronically before the study began and at the end of the study requesting their responses. Consistent with the format of SurveyGizmo, all responses were anonymous.

The interview (Appendix B) took place prior to tutoring sessions and following the tutoring sessions. The first interview was held within a seven- day window before the tutoring began, and the last interview was within a seven day window of the last tutoring session. The interview took place in the office of the

tutor in a one-on-one setting using a tape recorder to record the responses that resulted from using the semi-structured interview questions.

The descriptive field note collection occurred during each of the one-on-one tutoring sessions. Field notes included dates, times of meetings, along with pertinent information from the tutoring session. Field notes also recorded the events for both the tutor and tutee to keep continuity from session to session and guide the tutee when the session was over. One copy of these notes was kept for the tutee for recording purposes for the study and another copy was provided to the tutee. Tutoring sessions were audio taped and transcribed. These notes and transcripts were evaluated and coded.

Procedure

After the participants were selected, the interview occurred one-on-one in the office of the tutor and was audio taped. The interview lasted about 30 minutes for the pre-interview and about 35 minutes for the post-intervention interview. The questions were asked by the tutor of the tutee and the tutee provided responses. These responses were transcribed and evaluated for common codes and emerging themes.

For each tutoring session, descriptive field notes were recorded for the teachers so that they could recall the direction of the discussion and items determined for future lessons. Recording the date and time documented a chronological sequence for the teacher since there were five or more tutoring sessions spread over time. These were provided to the teacher and an additional copy was kept for the study. Additionally, the sessions were audio taped and

transcribed for subsequent analysis. The field notes were later organized and coded for common initial codes and emerging themes. Table 1 presents the procedures used in the study.

Table 1

Procedures for the Study

Survey	Applied to those who have the treatment at the beginning of the five or more weeks	Applied to those who have the treatment at the end of the five or more weeks
Interview	Pre-interview prior to study	Post-interview following the five or more weeks of tutoring
Field Notes	Field Note Collection Tool 1	Form for taking notes: organizing ideas from tutoring for tutor and tutee
Transcripts	Audio taped one-on-one sessions	Verbatim content of session

Data Analysis

Quantitative Data Analysis. Quantitative data were analyzed in the following way. Means and standard deviations for the revised survey for the participants were presented and the data were described. The data were presented to describe the changes that occurred during the course of the project. Further, the data were examined to determine whether there were increases in the scores across the course of the project.

Qualitative Data Analysis. Qualitative data including interview data and descriptive field notes were analyzed to determine emerging themes using the constant comparative method (Strauss & Corbin, 1998). In this procedure, open

and axial coding were used to initially identify concepts and then develop subsequent categories that represented phenomena related to the data. After a theme was identified, quotes from the field notes and interviews were used to substantiate and support the theme. These qualitative data were used to augment and support the quantitative data.

Chapter 4 Results

Results from the study are presented in two sections. In the first section, results from the quantitative data are presented. Following the results for the quantitative data, results for qualitative data are presented. For the qualitative data, assertions are presented and supported through theme-related components and quotes from participants connected with those theme-related components. Prior to presenting the results, a brief section outlining the data sources and data collection procedures is presented to provide some context for the presentation of the results.

Quantitative data were collected on a questionnaire consisting of eight Likert items. The quantitative data were collected at the beginning of the study in August and at the conclusion in October. This pre- and post-intervention assessment process allowed for the examination of change over the course of the sessions. Quantitative data from the questionnaire were analyzed using descriptive statistical procedures.

Qualitative data gathered for the study included transcriptions of audio tapes of over thirty professional development sessions. Field notes related to these sessions were collected on Field Note Collection Tool One (see Appendix C). Additional qualitative data included recorded and transcribed interviews with the participants at the beginning and conclusion of the project.

The qualitative data were analyzed using the constant comparative method (Strauss & Corbin, 1998). In that procedure, open coding was initially conducted to identify ideas and concepts from the transcripts of the professional

development sessions, the Field Note Collection Tool and from the interviews. Those open codes were gathered into larger categories using axial coding. Those larger categories led to theme-related concepts that suggested themes, which emerged from the data. The themes and theme-related components were examined and assertions were developed.

Results for Quantitative Data

Likert items were scaled so that when data were entered strongly agree = 6 and strongly disagree = 1 (see Appendix A). Results indicated a modest increase in confidence of 0.63 points on a 6 point scale. In the pre-survey the mean score was 4.66 with a standard deviation of 0.81 and post-survey the mean score was 5.29 with a standard deviation of 0.31. Although this increase is not statistically significant, the gain represents a modest increment on the six point scale.

Results for Qualitative Data

Table 2 presents the themes, theme-related components and assertions from the qualitative data from the project.

Table 2

*Themes, Theme-related Components, and Assertions
Based on Qualitative Data Analysis*

Themes	Theme-related Components	Assertion
Processes during tutoring sessions	<p>Specific patterns emerged for sessions.</p> <p>Constructivist sessions started with content or technology.</p> <p>High yield pedagogical strategies were woven into sessions, which never started with pedagogy from TPACK framework.</p>	<p>A pattern, which guided the tutoring sessions, emerged and was based on the TPACK framework.</p>
Collaboration	<p>Tutor-tutee pairs conducted lesson planning.</p> <p>Pairs created common assessment tools.</p> <p>Tutor and tutee discussed standards-based grading issues.</p>	<p>One-on-one tutoring fostered an initial sense of community and a Community of Practice emerged as the study progressed.</p>
Challenges	<p>Technology items did not work during and after sessions.</p> <p>Technology changed quickly and it was difficult to keep up with updates and new tools.</p> <p>Teachers struggled to employ high yield pedagogy strategies.</p>	<p>Teachers faced challenges with the use of technology and high yield pedagogical strategies (HYPS).</p>
Efficacy	<p>Teachers articulated they could do their work better.</p> <p>Teachers stated they felt fewer concerns about the quality of their work.</p> <p>Teachers stated they were striving and could meet established benchmarks of excellence.</p>	<p>Teachers developed a greater sense of efficacy for doing their work as a result of the project.</p>

Processes during tutoring sessions--Assertion 1. A pattern, which guided the tutoring sessions, emerged and was consistent with the TPACK model. In the TPACK model, the contention is that teachers blend technology, high yield pedagogical strategies (HYPS), and content in a constant interactive relationship. Within the context of this study, teachers were asked to direct the work for the tutoring sessions by selecting a pedagogical, technological, or content matter to discuss, which served as the focus to begin the session. A typical session began with a teacher reporting what they wanted to work on for the session. What followed during the session, took one of two patterns. In the first, content was discussed prior to the discussion of and practice with technology. In the second pattern, technology was discussed and practiced before the discussion about content occurred.

Later in the session the tutor would offer information about pedagogy, Marzano's high yield strategies, and clarify high yield pedagogical strategies (HYPS). This focus on HYPS lasted as long as needed and then the session moved back to the topic at hand.

Table 3 presents the two distinct patterns that emerged within the sessions.

Table 3

Tutoring Session Patterns

Pattern 1	Pattern 2
Opening of Session	Opening of Session
Content Discussion (State Standards)	Technology Discussion/Practice
Technology Discussion/Practice	Content Discussion (State Standards)
HYPS	HYPS
Technology Discussion/Practice	Technology Discussion/Practice
Recap Learning	Recap Learning
Close Session	Close Session

An example of a session starting where a teacher selected content is recorded,

Tutor: “What are you working on that you want us to work on? Let me get my field notes form.”

Teacher 4: “One thing that I would like to get some more ideas on is....how can I make learning all of the new vocabulary in Geometry a little bit easier for my kids? I’ve been doing some activities with them.

Any ideas that would help with new vocabulary and new ways of writing them would be awesome.” (Tutoring session, August 31)

Another session also began with a focus on content using a short story she would be teaching in the near future.

Tutor: “What are we working on this week?”

Teacher 5: “I’m starting a short story unit this week. The first story we are going to work with is the “Most Dangerous Game”... the story itself is about an island...” (Tutoring session, August 28)

By comparison, some sessions began with teachers immediately identifying the technology they wanted to work on at the beginning of the session. The following example illustrates a teacher who wants help with her SmartBoard™ and how to apply it in a meaningful way with content standards.

Teacher 1: “Smart Board connection. Last time you helped me to set it up. When the installers came they assumed I knew how to do the SmartBoard™... I want to be able to do things on the SmartBoard, use the SmartBoard in a way that’s different than I use the LCD Projector. I use the LCD Projector every day in class. I don’t want the kids to say “Oh you got a SmartBoard™ but nothing has changed.” (Tutoring session, August 28)

Another teacher started her session wanting help with a set of response clickers that had been purchased, but she needed help in getting them to work for her and her students.

Teacher 6: “Exciting news: Response clickers are in.”

“Clickers are in. I’ve opened them up & everything is there. Just pulled out directions and need to read directions and learn how to use them.

That’s the next thing I want to do in the classroom and I think it would be fabulous for a warm up then the kids really have no excuse that they don’t

have paper, etc. If I click on this and they give me a response if I do a multiple choice, or whatever I can do. I have to learn what I can and can't do with them.” (Tutoring session, October 10)

All of these excerpts were examples of the patterns observed within the study. Thus, usually one of two prototypes was exhibited in the sessions between the tutor and tutee. As each session evolved HYPS became a topic typically presented by the tutor. Sometimes the tutee would ask if there was a HYPS connection that would facilitate the blending of content and technology or vice-versa.

Adding high yield pedagogical strategies within the sessions. Typically, sessions were well under way before HYPS were added, yet each session had some form of high yield focus. Data also suggested HYPS was evident throughout the study, yet not sequentially dominant (see Table 2).

As a session progressed HYPS were added to support the idea of how to use the response clickers:

Tutor: “Remember you are going to use clickers and they will have multiple choices. You and I both know they can use multiple high yield strategies. They can still find similarities and differences but they can only pick one choice. It's not any different than Aspire [a district assessment]. It's the same concept. Or even like that note taking strategy that's in here where you note take (sic) and take something away.”

Teacher 6: “Like what should go in the place of this?”

Tutor: “Yes, or what could it replace? Remember the note taking strategy where they recommend removing something vs. adding?”

Teacher 6: “Kind of like taking what is already there and summarizing it, picking out the important pieces?”

Tutor: Well it’s the opposite of that actually. It might not even be that helpful for you except for in mathematics sometimes there is stuff there you don’t need in solving proofs... some of them are the reflexive property, the associative property, the distributive property, they are not going to use all of those. The problem is they don’t know the properties. They don’t know what property they are going to use so they can’t do it by the process of elimination. With the clickers they could all click in and say which one would you immediately eliminate?”

Teacher 6: “Okay, so instead of choosing the right one you are going to choose one to get rid of to narrow down your choices.”

Tutor: “Because that’s a test taking strategy. That’s a summarizing and note taking strategy that he talks about here ... [reference to book made at this point]... ”Verbatim note taking is the least effective...is the note taking where you highlight and there’s an elimination strategy ...Teach them how to eliminate it so only the good stuff is left.” (Tutoring session, October 10)

Another session reflected how HYPS were used to support content strands for English language learners.

Tutor: “I made a table of four. I pictured four. I am kind of making a chart here on the sheet and I want you to take notes so you have them. What are the three or four centers?”

Teacher 2: “Listening Center, Reading, Writing, and Technology. It provides another opportunity to do something different.”

Tutor: “Right, or another avenue to do listening, reading or writing via technology.”

Teacher 2:” Right.”

Tutor: “Is one of the things you want to accomplish today is norms? (sic)

No matter what center you are at, those are the norms?”

Teacher 2: “Yes.”

Tutor: “First thing we are going to do is go to Marzano and read what he says about cooperative learning. Basically these centers are cooperative learning so that’s where we are heading first.” (Tutoring session, August 28)

This teacher added cooperative learning to her classroom and later in the session the attributes of strong cooperative groups were discussed. Another teacher added a social networking feature, Edmodo, to her practice and a discussion took place about the Edmodo features and whether it met the HYPS requirements under effort and achievement in a session.

Tutor: “We were just talking about this. They Facebook (sic) each other all this stuff. This is a feature of going to Facebook and Twitter.”

Teacher 3: “They answer each other. They talk to each other.

Demonstrations were given.”

Tutor: “I totally agree with you. They can track their own practice. Now, I can talk a high yield strategy. Tracking their progress, especially

remember[ing] effort and achievement ... It worries me there are zeros in your grade book. Effort needs to be applied academically.”

Teacher 3: “Effort is one of the things that several of us have been getting on them about because we are seeing a definite lack of effort there. “

Tutor: “People attribute effort to any of their....There are four causes why people achieve: ability, effort, other people and luck. They really think, they may start to think they are just being unlucky in your class and you have to really start the drive theory...

Tutor: “I agree. Edmodo gives you the ability to be able to see progress and the grade book only gives you mass. It just looks like a little picture shot.”

Teacher 3: “Well it doesn’t categorize it for them. I can look them up by category but then I can’t see it by category. I need to see that they can see by category or eventually by standard.” (Tutoring session, September 18)

Another teacher looks to HYPS to support concepts her students struggle to understand including vocabulary they need for geometry for the whole year.

Teacher 3: “...I keep stressing vocabulary; but, it’s one of those things that if they can get the vocabulary down right from the start it makes their life so much easier for them through the whole year.”...

Teacher 3: “Actually angle is good because they have to learn the angle so naming is good. Segments – they have to name those also. Rays and lines and planes they have to name also. They kind of have an idea what they are; but, we are going deeper. The other things are words like

perpendicular, which they actually have a hard time with. Bisect, adjacent, complementary, supplementary, and vertical - those are the biggest ones. I could say acute, obtuse, straight, but they kind of already know those. These are the ones they really need to know and they have a hard time remembering. It's stuff we use all year long."

Tutor: "I was looking right away at similarities and differences because we know that's the highest yield strategy; but, he's calling it effect size now. Look at that list and see if there is any way to sort them on how they are alike and different."

Tutor: "...I only asked you that because I wonder if there would be value in them doing an activity of sorting them by how they are alike and how they are different."

Tutor: "...Do you think that they have a strong enough understanding of them that in pairs you could put these terms on little note cards and sort them into categories. It's not right or wrong per say, it's that they put them into categories and then they defend their categories as an activity - if they do the work, versus you leading them in it?"

Teacher 3: "It's always better when they do it." (Tutoring session, August 31)

In all cases within the context of this project, the pattern emerged that HYPs were proposed within the tutoring sessions long after the session began. HYPs were never a topic used by a teacher to initiate a tutoring session.

Collaboration--Assertion 2. One-on-one tutoring fostered an initial sense of community and a community of practice (CoP) emerged as the study progressed. Data from both tutoring sessions and post-intervention interviews indicated the participants in this study valued collaboration. They stated that a sense of community was fostered by creating items (lesson plans, activities, etc.) together that supported their professional repertoire. They found creating and evaluating standards as they developed artifacts like common lesson plans and assessment tools cultivated a feeling of a common purpose. The teachers naturally joined together and created times when they could meet to accomplish activities that served a common purpose. Sometimes this was within the tutoring sessions and they would request common sessions. In other instances, they set up time to work together outside of the sessions and then extended the learning from the CoP into their tutoring sessions. Transcripts from both tutoring sessions and interviews clearly reflected these characteristics of a CoP.

In this particular excerpt, two teachers are discussing with the tutor nuances of the state standards and assessing students using the standards-based grading system. Both teachers teach the same content area, but at different levels. As the conversation progresses, the teachers realize they have the same issues regarding assessment. The teachers realize they can help one another by collaborating.

Teacher 1: “The sophomores had said, oh, since this doesn’t count for a grade we aren’t motivated to do it.”

Teacher 5: “Right.”

Teacher 1 responds: “Oh, my gosh. I was so upset. Then I came back and I tried to make an analogy with it.....ok, how many of you guys are in sports? A lot of them are, whether it’s for school or whatever. So it’s like, why do you go to practice? Why do you practice? Do you get a grade for practice?”

Tutor & Teacher 5: “Good...”

Teacher 1: “No, you go to practice to get better. They came up with all these reasons. It’s fun, etc. So, I’m saying, Ok, you aren’t getting where I’m going with this...you go to practice so you are ready for game day. The summative is game day.”

Teacher 5: “Yes. Did they ever end up...”

Teacher 1: “Well then I gave them back the work. It was work that if I had been there they would have done... I told them I gave you the respect, I trusted you...”

Teacher 5: “That’s a good idea. So they could see. Exactly. I would love that if you don’t mind sharing that with me.” (Tutoring session, September 18)

Post-intervention interview data provided information from teachers regarding collaboration. Teacher 2 stated in the post-intervention interview,

“I find the one-on-one quite valuable and reinforcing. But also, I think it’s important that we develop a collaborative team of learners, because the range of knowledge in the technological world and application of

technology, and application of high yield strategies, is so broad...” (Post-intervention interview, October 4)

Teacher 2 reflected on the value of learning from others and called it, “a collaborative team of learners.” Teacher 3 discussed how she had taken her skills from the study and was working to create a CoP within the school where she worked as well as in the feeder school to benefit students.

“I think I led the way in a lot of it in, that now like Edmodo, finding Edmodo, and putting it together. ...I made, uh, great headway using it, and, then, excited other teachers about it, and, and it’s gone beyond the study. I mean I involved other members in my department. But then other departments find [found] out, like, I spent an entire day with the French and Spanish teachers, and the World Language teachers last year, teaching them how to do some of these things... I was contacted by a teacher at Paseo Hills Elementary School and asked if they could use some of my things, because they were getting it from my freshmen students...” (Post-intervention interview, October 2)

Another teacher collaborated with the other teachers in her content area who were participating in the study and with colleagues in her department by sharing artifacts from the project. Teacher 6 confirmed,

“...the best part of the study, as far as I was concerned, was when I would come for my tutoring time, and I would have spoken to at least two, if maybe not three other teachers that were here. So, being able to work with them... Also, discussing our lesson plans and making sure that our lesson

plans were aligned and creating some common assessments. And, um, also just having the camaraderie of knowing, that as teachers, we can not only share, but we can all be that much better.” (Post-intervention interview, October 15)

Challenges--Assertion 3. Teachers faced challenges with the use of technology and high yield pedagogical strategies (HYPS). Technology hardware and software items were either hard to learn, were difficult to install or improperly installed, did not work at inopportune times or did not have the security features teachers wanted for themselves or their students. This became evident in the tutoring sessions. Additionally, teachers struggled to use the vocabulary or define the attributes of HYPS. Teachers repeatedly referenced the high yield textbook in the sessions to discuss HYPS. The struggle with the nine HYPS was expressed by the teachers in their post-intervention interviews.

Teacher 6 discussed her frustration that there was always more technology than she could keep up with and she was not sure if she had it loaded correctly or if she was using the technology correctly. She stated,

“...And I think that technology is something that holds me back too. I think I’m doing just fine and then all of a sudden something comes out of the blue, where there’s something new, and I’m thinking “I didn’t know that.” I don’t know what I don’t know about all the technology that’s out there. I know pieces, and I had to figure out how to use them, all these pieces, and put them together. But I know there’s gotta be more things. And maybe there is something else out there that I need to know that

would work better than what technology I now have. Or I'm currently using." (Post-intervention interview, October 15)

Another example illustrated the struggle a teacher had with cooperative learning and recognizing and understanding the attributes of the HYPS. There was a need to reference the text during the one-on-one tutoring session to clarify the HYPS. This is the second consecutive session where the same HYPS, cooperative learning was discussed.

Tutor: "...you want lots of success at your centers..."

Teacher 2: "That will be very new for them..."

Tutor: "Exactly, so say that – say – When you are in this Center a lot of this is listening; but, a lot of it is thinking about it and A & B are going to work together and C & D are going to work together..."

Teacher 2: "That's so cool."

Tutor: "Why not, I didn't care if they read ahead. I would still create questions that they didn't come up with."

(Explanation was given on how to motivate students to create questions.)

(Both the tutor and tutee read Marzano's cooperative learning section of required attributes. Discussion took place. Chapter 7, page 85.)

Tutor: "Bottom line is that everyone has to be on task all the time. You have to have the positive interdependence and everybody with individual and equal accountability."

Teacher 2: "And that's what the pairing up is?" (Tutoring session, August 21)

In the example above regarding setting up literacy centers, the teacher was struggling to manage all of the nuances of cooperative learning in the design of her centers. She had stated she would start the centers a week earlier, but wanted more assistance in putting the HYPS into practice.

When asked in the post-intervention interview which high HYPS they were most successful with and why the participants struggled to answer using HYPS terminology and attributes. Some respondents made comments acknowledging that they were still challenged in this area.

Teacher 1 responded,

“Gee, right now, the only two that I can, OK. See, I wanna say, um, even though I don’t feel 100% successful with this, but I’m leaning towards cooperative learning...Similarities and differences, I mean, yeah, that’s, at the senior level, it’s a small component of something much larger. You know? This is relatively like a simple task? So, I don’t know. I wish there were three or four popping up in my head right now. I can’t think of anything.” (Post-intervention interview, October 28)

Teacher 3 stated a strategy that is not specifically listed as one of the nine HYPS, but is a small subsection of reinforcing effort and providing recognition.

“Well right now, immediate feedback, giving feedback is probably my most successful one. Because of Edmodo, I’m able to give it very quickly. ...sometimes they’d see the feedback, and sometimes they wouldn’t. And, so now, they see it immediately and they can go back and recheck it when they’re doing their next one...” (Post-intervention interview, October 2)

The use of technology and the deployment HYPS presented challenges for the teachers in this study. At times these challenges were simultaneous and at others they were separate, but these issues were apparent throughout the project.

Efficacy--Assertion 4. Teachers developed a greater sense of efficacy for teaching as a result of the project. Efficacy is defined as the perceived ability to produce a desired result. In the post-intervention interviews teachers expressed that they could conduct their work better and felt less concern about the quality of their work. Teachers also stated they were striving for excellence and felt that they could meet established benchmarks of excellence. Teachers affirmed that the tutoring sessions had helped define the attributes of quality teaching and learning and in turn this helped them better understand the aspects for best teaching practices.

One teacher expressed during her tutoring session how from one session to the next she was seeing personal growth.

Tutor: “Last time we were together we were working a lot on procedures and setting up”.

Teacher 5: “It went much better than expected. I found I was able to get much more organized than what I had originally thought...”

Tutor: “Right, and we sent you the student contact sheet...”

Teacher 5: “Amazing how a year makes a difference. My goodness... I was looking at myself thinking – I just must have been petrified last year. I can tell the difference walking in now. It’s like this is my classroom so therefore I need certain behaviors. It’s not like there aren’t a few behaviors

that have already shown up; but, somehow I'm more able to deal with them rather than becoming nervous that I might not be able to get them under control and have good class management. I don't have that fear in comparison this year. That's making a lot of difference for me." (Tutoring session, September 18)

In the post-intervention interview Teacher 2 commented that she became less afraid to incorporate strategies that were targeted by the training and this affected her learners:

"I'm hard on myself anyway, so I would think I'm left of center, toward the beginning, not towards the mastery, that developing, not even quite proficient, but somewhere in there, in that middle place... And I'm not afraid to incorporate those kinds of things. Um, and to be elementary at the high school level doesn't make it any less important, or rigorous. It makes it more accessible. For second language learners, that's what we need, is accessibility to the language, to the content, to the standards, to the knowledge. ...[so] they are more successful." (Post-intervention interview, October 4)

This teacher saw herself toward the beginning of the study as a growing teacher. Later she measured her progress through her students' success and observed they were more successful. This was her method of determining efficacy. Teacher 5 in the study also commented about herself at the beginning of her reflection only this time she stated she was nervous sharing her professional work in a collaborative setting.

“...I was a little nervous about it. I know that sounds crazy, but I was a little nervous just because I hadn’t worked with the strategies as far as, as sitting down and having someone else see my work. After about the first interview, that was shattered... Because then I realized it really was a no stress kind of thing. ... I put myself under that stress. It wasn’t like there was stress put on me... It was just that I felt stress not knowing exactly what I was gonna be doing. Yeah. And then, once I figured out what I was doing, it was like “oh great, OK, Saturday’s, that sounds marvelous.” And then I started really, really enjoying it.” (Post-intervention interview, October 22)

Another teacher expressed in her tutoring session how much better things were going in her class and how she felt about this.

Teacher 5: “That’s not too bad although I do have my sixth hour that I have .. it’s a lot of EL students in them and as heavy as we are in the book with like the story problems, they’re having ...some of them are having a really hard time, but I know they will get better and I’m just ... working with them, but it can be hard ...”

Teacher 5: “And actually I got to say this year is going so much better than last year and I feel so much better about it...”(Tutoring session, September 7)

Teacher 3 discussed how the study shaped the way she saw herself when she said.

“Um, and that I’m, you know, striving to be that excelling teacher. And feel like, I can actually achieve that now. Whereas, I think before, it was kind of like, well, I don’t know, I don’t know if I’m good enough, I don’t know if these people, I don’t know what they want, and so I feel like expectations have been more clarified and that, because of that, I can also meet those expectations. And that was a big fear for me before. I was not comfortable. So I appreciate the process because it has helped me feel less stressed about it...” (Post-intervention interview, October 2)

Teacher 6 commented in the post-intervention interview about how the study influenced her professionally. “... I am very happy doing this. I feel very comfortable..., speaking about the technology, and trying new things. I think that is fabulous. To be able to have that tutoring, that one-on-one, to learn...” (Post-intervention interview, October 2)

Chapter 5 Discussion

The discussion consists of three parts, lessons learned, implications for practice and implications for research. In the process of conducting this action research study significant themes emerged which provided opportunity for reflection as the project was completed. These reflections lead to lessons learned based on the action research study.

Lessons Learned through Implementing Tutoring

A lesson learned is that collaboration and efficacy are likely bed fellows. For the most part, teaching is an isolating profession where teachers are left alone for weeks without anyone walking into their classroom other than students. Then once or twice a year a guest, the evaluator, comes into the classroom. Some teachers are fortunate enough to have a group of peers or a department that works together, but this is not always the case. By providing a forum for their collaboration, participants discuss curriculum questions and issues and grading practices. The teachers also discuss how to use technology and share tips and short cuts they have learned with technology tools for the classroom. During and after the study, the collaboration within the context of the tutoring sessions and outside of the sessions is the part that made teachers more able to do their teaching on new and higher levels. The teachers' value working with others in the CoP and this influences their own growth and personal leadership. The collaboration during the one-on-one tutoring and during the development of the CoP helps foster growth in skills which in turn lead to an increase in the perception of efficacy.

The six women in the study influence the culture of school because they created a CoP as the study unfolded. This is leading change in the organization. Specifically, these women are becoming leaders within their content areas creating new CoPs across the campus. The study formed the core CoP and now new groups are developing. The core group has sent requests to me asking if I would like to teach a district class this summer for technology integration. Another person in the core has created a schedule and invited me to work with her CoP for six consecutive weeks specifically on one HYPS to support their curriculum needs. In this case, the CoP wants to work on cooperative learning and blending the concepts of differentiated instruction with the tenets of cooperative groups. This CoP is scheduled to meet five times before the school year is over with the intention that teachers in the CoP will create instructional units that incorporate both cooperative learning and differentiated instruction. Others are working in their CoP independent of the tutor, but they have their CoP functioning within their department. The growth in leadership also influences efficacy. Each teacher is now seen as a highly capable by their peers.

Typically, the TPACK model is represented by three equal circles that blend technology, pedagogy and content. In practice as observed in the study, emphasis on the three areas is not equal. For example, teachers are clear about selecting technologies to support their teaching. Moreover, teachers also describe quickly the content they wish to teach. The fact that content and technology are readily accessible to teachers is consistent with the first theme of the study which described the pattern of the sessions. These two circles, representing content and

technology, seem to be equally balanced for the teachers participating in the study. On the other hand, teachers find integrating the HYPS to be challenging.

Although teachers had received three tiered classes of blended training focused on the nine HYPS in conjunction with technology and one-on-one tutoring, they still struggle with the vocabulary and attributes of the HYPS. What is evident is that some participants could identify a HYPS, e.g. cooperative learning, but were much less likely to understand how the attributes like positive interdependence, face-to face promotive interaction, and so forth, worked in the classroom. It is as if there is giant silverware drawer named teaching and many of utensils are used interchangeably or just left in the drawer. Perhaps some are not in the drawer at all. For example, the attributes of cooperative learning are discussed in one transcript when a teacher is planning cooperative lessons in her classroom. When the attributes are described to her to help her see what her students need to do when they are in their base group she responds, “And that is what pairing up is?” which is reflective of her lack of understanding. In another instance cooperative learning is brought up in a post interview, yet none of the attributes are listed.

Further, teachers did not use HYPS specific vocabulary unless prompted. Teachers could specify the general categories like identifying similarities and differences, but there was no evidence that they initiated conversations about HYPS or specific details about the HYPS. One teacher stated in her post-intervention interview she could only think of two and she wished she could name more. As the interviews and transcripts were reviewed it became clear the

teachers responded to HYPS prompts and discussions, but did not initiate the discussions.

Lessons in Leadership

The study will change my approach to leadership in the future. One particular difference is that I will be open to the development of CoPs without trying to force or design the perfect working group to accomplish a task. Participants' personal growth is critical as is the natural formation of the CoPs. Moreover, emergence of the CoPs allows for leadership development during and after the study. Allowing for the organic formation of the CoPs and being an equal and willing participant in the CoP is forcing me to let go of control and become a different and more trusting leader in the school. In turn, teacher leaders are being developed.

Another large change in my leadership is my own pedagogical practice with respect to the HYPS. I was an instructor for the DV Tech Pro classes and taught whole groups with PowerPoint slide after slide about the HYPS. My background allows me to know teachers still need the one-on-one tutoring. I am aware through formative assessment this method is ineffective for some of the learners in the course. Following this experience, understanding of the HYPS seems even more elusive. I am going to review the literature again on the HYPS and determine whether I can identify the issues that lend to the disjunction between theory and practice as I look for new pedagogical models that facilitate learning. I believe this is critical for several reasons: (a) because the HYPS have powerful research behind them as the nine most effective strategies to influence

student learning and (b) teacher evaluation instruments across the nation are designed using the HYPS concepts and terminology. The HYPS are here to stay and those who implement them need ways to understand and connect them to their practice in a meaningful fashion.

As a leader I will continue to develop my skills and enrich my knowledge about using technology in education. We exist in a technological age that is fast moving and ever changing. Within the context of this study I took graduate courses through Arizona State University specifically designed for teachers about cutting edge uses of technology in the classroom to support my learning and the teachers. Although the technology did not always work exactly as we planned, teachers were not hesitant to use it. During the past two years, I have learned how to effectively maneuver in Blackboard, Moodle and Edmodo. Nevertheless, I also know that these technologies are already becoming outdated and something new is on the horizon. The teachers taught me that as a leader I must be aware and open to their ideas and uses of technology and willing to be a continuing learner. I must be able to bring something useful to the technology table regularly. I also learned that there is so much technology; I do not have to know it all even if I am a leader. When it comes to technology use, it is okay for all us to help one another by capitalizing on the collective knowledge of the group. Someone, who we least expect, will contribute knowledge when another is in a need. The lesson here as a leader is letting go and being gracious to myself and others and continuing to learn in all situations.

Implications for Practice

If others are thinking of conducting a similar study they may consider defining pedagogy more in a way that may include major pedagogical theorists like Madeline Hunter, Carol Ann Tomlinson, and the HYPS. If the HYPS are part of the pedagogy definition, certainly use of a graphic organizer is recommended to attach the HYPS to the knowledge that teachers already have regarding instruction. Further, continued reinforcement of this approach throughout the project will be required.

Another implication for practice is the benefit of constructing CoPs early in a project. The CoP allows for collaboration and communication among the researcher and participants while fostering a sense of community for all those in the study. The CoP also has the potential to create a residual effect on the larger community over time. Thus, constructing a CoP early on in a project could potentially have far reaching organizational benefit for the CoP and for the larger setting, the school.

What is particularly difficult to describe are the intangible benefits for these people who are trying new things and expressing belief in themselves when teachers are taking pay cuts and discussing lay-offs. Class sections and positions were reduced last year due to state budget cuts and this school year does not appear to be any better. These six teachers attend meetings about budget issues again and again and they are still moving forward. Their ability to persevere and create several CoP in this time of financial crisis creates a sense of stability and hope on the campus. Our high school is for an A+ visit from the Arizona

Education Foundation. These six women are major contributors in this process and the study and its residual effects play a role in why the school has been selected for this highly prestigious honor. Few high schools in the state are selected for a visit and the school hopes to receive the final A+ School of Excellence Award. The possible effect of this award for efficacy on a school-wide basis is yet to be determined.

For the future, the results also suggest continued experimentation of the nuances of TPACK in action is warranted. My own professional goals will eventually lead me towards a position that focuses on the blending of technology, pedagogy and content. As I seek and move into a position of this nature, it is certain that curriculum and technology will exhibit their natural blending.

Textbooks and Kindles™ are already a natural connection and on-line resources for textbooks and curriculum are the norm. The outlier is pedagogy which is also my passion. I learned from this study how difficult it can be to connect and activate all three circles, components, of TPACK. Further I know as a school administrator how critical it is that they are connected and stimulated for learning to occur. I want to train and coach administrators and teachers on the TPACK framework and help them to consciously keep the three ‘circles’ coordinated and balanced so that they feel efficacious in teaching their content using technology.

I have personally benefited by learning from the people in the study in many unexpected ways. I knew I would learn more about their content and about some new technology practices in the study. I also knew we would create lessons for their classrooms and this would help me to grow professionally as a school

administrator. What I didn't know is how much I would grow to respect the profession of teaching again watching each of the six women reinvent themselves by adding technology to their practice. Each person did this with regularity and tenacity and always wanted more when the session time expired. They wanted to engage in the process so much that they created a CoP to support themselves and others. Many teachers in the study came on Saturdays for their sessions and created time with me and their CoP. They requested I come and turn off the alarm at the school so they could work after the study was complete because they were so committed to their CoP. I have always respected teaching but watching this process evolve gave me a new found sense of professional commitment by others and me. It helped me to redefine what it means to be a teacher today in 2011. In many ways they served as my tutor.

Implications for Action Research

Further research may be considered on this topic in the future. Modifications and recommendations to actions of the study, instrument and data collection are offered for possible future action research projects. Modifications offer suggestions for potential benefits to better inform the practice for the teachers who regularly use technology.

Some modifications are recommended if a similar study is to be conducted in the future. One implication for a study regarding technology use and growth and teacher efficacy is the Teacher Proficiency Self Assessment would require updating to match current technology at the time of the study or a new assessment all together could be created based on the TPSA tenets. This would allow for

current information to be collected in relationship to modern technologies and teacher self perceptions.

Another recommendation is to eliminate the Field Note Collection Tool. In this study, teachers did not comment that the use of the tool was helpful and the instrument became another paper to manage. Participating teachers have not modeled a recording tool like the Field Note Collection Tool for their CoP, so evidence suggests they were not highly valued. The transcripts provide a much more accurate accounting of the tutoring sessions for the researcher. Further, it is recommended the researcher create a list of common technology words from the study with spellings to allow the transcriber to provide accurate transcriptions. This will save the researcher time later when coding data and extracting themes.

If a researcher is using items from the interview to replicate a similar study there are several questions which are highly helpful in the process of collecting data, specifically if the study is collecting data about the HYPS. It is recommended the researcher asks the participant which HYPS strategy or strategies they are most successful with and why. The question: is there anything else you would like to tell me, revealed the most information regarding teacher self perceptions. It is strongly recommended that this question is kept at the end of the interview. The entire interview questions created in this study was useful for coding data and finding themes related to the TPACK framework and teacher self perceptions.

If another researcher is considering a study similar, another option might be to include more participants. In this study, the researcher only selected people

who met specific criteria. As a result only six people met the requirements. This sample is too small to provide meaningful quantitative data. Opening the criteria will allow more teachers to participate and it will increase responses to the survey. Many teachers in the current study responded that they wanted to be part of the study but did not fit the criteria, after learning about the challenges with HYPS there could be a benefit for taking all volunteers and increasing the sample size.

The potential that this research clearly can inform practice is good. Because this study was conducted to examine directly the blending of three parts of teaching: content, technology and pedagogy, the researcher and teachers had a sense of what they knew and what they did not know. The teachers could articulate they did not know HYPS and they knew how to blend content and technology. Participants capitalized on their knowledge and created the CoP to share their expertise. The TPACK framework laid a powerful foundation for the participants. Thus their next step would be growing their pedagogical practice, while maintaining their shells in the other two circles.

A follow up study to this action research effort would focus on pedagogy while keeping both technology and content balanced in the framework. When the current study began the teachers said, 'I am in a technology study.' As the study progressed, they said, 'I am in a study about teaching with technology.' As complex as learning and applying new technology is, the most complex part was applying the tenets of the HYPS. A future study may examine in detail the HYPS initially and then add content and technology. The researcher could choose to broaden the definition of pedagogy beyond the HYPS in the TPACK framework

and measure teacher self perceptions of efficacy. How ever the researcher chooses to design the study, the question is what pedagogies are best suited to be employed with new technologies? It is guaranteed one circle in the TPACK framework is always changing: technology.

For teachers the three circles of the TPACK framework are in constant motion. The question is, how do they manage these moving orbs and make them stop for a moment so that they can write lesson plans, teach and assess children in meaningful ways and still feel efficacious in the process?

REFERENCES

- Chapman, J. W., & Tunmer, W. E. (2003). Reading difficulties, reading-related self-perceptions, and strategies for overcoming negative self-beliefs. *Reading and Writing Quarterly, 19*, 5-24.
- Dewey, J. (1963). *Experience and education*. New York: Collier Books.
- Lave, J. & Wenger, E. (1991). *Situated learning: legitimate peripheral participation*. New York: Cambridge University Press.
- Lucido, H. (1988). Coaching physics. *The Physics Teacher, 26*, 333-340.
- Marzano, R. J., Pickering, D. J., & Pollock, J. E. (2001). *Classroom instruction that works: Research-based strategies for increasing student achievement*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Mishra, P. (2009, March 10). *SITE08 keynote YouTubed!* Retrieved November 30, 2009, <http://punya.educ.msu.edu/2009/03/10/site08-keynote-youtubed>
- Mishra, P. & Koehler, M. (2006). Technological pedagogical content knowledge: A framework for teachers. *Teacher College Record, 108*, 1017-1054.
- Mishra, P. & Koehler, M. (2009). *TPCK - Technological Pedagogical Content Knowledge*. Retrieved from http://www.tpck.org/tpck/index.php?title=Main_Page
- Pinnell, G.S., Deford, D. E., & Lyons, C. A. (1988). Reading Recovery: Early intervention for at-risk first graders. Arlington, VA: Educational Research Service.
- Renyi, J. (1996). *Teachers take charge of their learning: Transforming professional development for student success*. Washington, DC: National Foundation for the Improvement of Education.
- Ropp, M. (1999). Exploring individual characteristics associated with learning to use computers in preservice teacher preparation. *Journal of Research on Computing in Education, 31*, 402 -424.
- Schön, D. (1983). *The reflective practitioner: How professionals think in action*. New York: Basic Books.
- Shulman, L. (1986). Those who understand: Knowledge and growth in teaching. *Educational Researcher, 15*, 4-14.

- Strauss, A. & Corbin, J. (1998). *Basics of qualitative research: Techniques and procedures for developing grounded theory*. Thousand Oaks, CA: Sage Publications, Inc.
- Vygotsky, L. S. (1978). *Mind and society: The development of higher mental processes*. Cambridge, MA: Harvard University Press.
- Wilson, S., Shulman, L., & Richert, A. (1987). '150 different ways' of knowing: Representations of knowledge in teaching. *Exploring Teachers' Thinking*, 104–124.

APPENDIX A

LARGE GROUP/SMALL GROUP EFFICACY SURVEY

ADAPTED TEACHER PROFICIENCY SELF-ASSESSMENT

Adapted from Teacher Proficiency Self-Assessment (Ropp, 1999)
Circle the number that indicates your level agreement with the following statements.

Strongly Agree	Agree	Mildly Agree	Mildly Disagree	Disagree	Strongly Disagree
1	2	3	4	5	6

I feel confident I could...

- | | SA | A | MA | MD | D | SD | | |
|------------|---|----------|-----------|-----------|-------------|-----------|--|--|
| 1. | 1 | 2 | 3 | 4 | 5 | 6 | ...write an essay describing how I would use technology in my classroom. | |
| 2. | 1 | 2 | 3 | 4 | 5 | 6 | ...create a lesson or unit that incorporates Web based tools as an integral part. | |
| 3. | 1 | 2 | 3 | 4 | 5 | 6 | ...use technology to collaborate with others who are distant from my classroom. | |
| 4. | 1 | 2 | 3 | 4 | 5 | 6 | ...describe 3 Web tools I would use in my teaching. | |
| 5. | 1 | 2 | 3 | 4 | 5 | 6 | ...write a plan with a budget to buy technology for my classroom. | |
| 6. | 1 | 2 | 3 | 4 | 5 | 6 | ...design a rubric that evaluates my teaching with technology for implementation of high yield strategies. | |
| 7. | 1 | 2 | 3 | 4 | 5 | 6 | ... create a unit that implements state standards, high yield instruction and technology. | |
| 8. | 1 | 2 | 3 | 4 | 5 | 6 | ...teach another teacher to design a unit that blends that state standards, high yield instruction and technology. | |
| 9. | Please provide your gender. M | | | | | | F | |
| 10. | Please select the age group that describes you. | | | | | | | |
| | 20-29 | 30-39 | 40-49 | 50-59 | 60 or older | | | |

11. Please select the group that best describes your total number of years teaching.

1-5 6-10 11-15 16-20 21 or greater

12. Please select the group that best describes your number of years of experience integrating technology into your classroom practices.

1-5 6-10 11-15 16-20 21 or greater

13. Describe if you train others using technology.

14. How many other people are you training?

15. What is the nature of the training?

APPENDIX B

PRE- AND POST-INTERVENTION INTERVIEW QUESTIONS

1. Describe what is happening in your teaching right now?
2. What standards are in your lesson plans now?
3. With what technology have you been experimenting in your classroom?
4. What are your needs based on your technology classes?
5. How do you feel about using high yield strategies in your lesson plans?
6. What high yield strategy are you most successful with and why?
7. Do you find blending content with technology and high yield strategies an easy process? Talk about it.
8. What do you wish we could work on during our sessions together?
9. What else would you like me to know?

Questions later added approved by IRB on 10/6/2010

1. As the study progressed, what actions did you take beyond our one-on-one tutoring sessions to supplement your understanding and use of technology?
2. As the study progressed, describe how you shared concepts, lessons, webtools, or items with others?

APPENDIX C

FIELD NOTE COLLECTION TOOL ONE

Name:
Date:
Week:
Focus:

I know:

I'm trying new:

<i>Content</i>	
<i>High Yield Strategy</i>	
<i>Technologies</i>	

Next time we meet I want to discuss...

APPENDIX D
INSTITUTIONAL REVIEW BOARD APPROVAL



Office of Research Integrity and Assurance

To: Ray Buss
FAB

for **From:** Mark Roosa, Chair *MR*
Soc Beh IRB

Date: 06/28/2010

Committee Action: Exemption Granted

IRB Action Date: 06/28/2010

IRB Protocol #: 1006005243

Study Title: Teachers' professional growth: The blending of technology, pedagogy and content

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

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

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

