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Abstract

This paper describes a pilot study of collegial coaching for technology integration at two private Christian schools. Two students nearing completion of a Master's in Education in Curriculum and Instruction with a Specialization in Instructional Technology each coached three fellow teachers, self-described as digital immigrants, to integrate technology into their teaching. The coaches spent an average of 15 hours per teacher brainstorming, teaching, and facilitating technology integration. Information obtained from a variety of data sources (interviews, a post-coaching questionnaire, a focus group, and analyses of journals kept by both coaches and coached teachers) revealed the positive effects of their collegial coaching and suggested ideas for optimizing coaching for technology integration.

Introduction

There were twelve chosen by Jesus Christ. His goal was to reach the entire world by calling, equipping, and sending out twelve disciples who would then make other disciples. Instead of concentrating widely, the concentration was deep: deep with the twelve. This disciple-making model, which is illustrated above, can be replicated in developing an effective technology-training program in schools. In 2003, Polk County School District demonstrated the effectiveness of such a model when applied to technology training. The district started with 12 volunteer teachers dedicated to coaching and supporting their colleagues in implementing the integration of technology into classroom instruction. Over a four-year time span, the 12 technology coaches, trained over 200 teachers in technology integration ("Teachers support," 2007). Much like the 12 chosen and taught by a master teacher (Jesus Christ), the knowledge and skills of technology coaches multiplied to many.

Christian schools often lack large professional development departments that provide district-wide technology training. The aforementioned model allows schools to effectively utilize limited budgets and provide professional development across campuses. Private Christian schools can develop a few "disciples" of technology integration who can then disseminate their own knowledge and skills in technology integration to their colleagues through peer coaching. This study explored the implementation of a peer coaching (disciple-making) model in two private Christian middle schools.

Training and Selection of the Chosen Ones

Christ's model provides insight into the selection and training of coaches as well as the coaching process. When choosing disciples, it is evident that the selection of several fishermen was not by accident (Matthew 4:18-22). Jesus carefully selected his disciples based on the strengths they possessed and the identified needs he had. Fishermen were aware that many occasions exist where multiple attempts at "net–throwing" occur before successfully landing a large catch. They had to be patient, determined, confident, and tenacious; and they knew first-hand what it was like to be "in the boat." These same qualities are essential for technology coaches to possess. In addition to being patient, determined, confident, and tenacious, technology coaches need to have themselves utilized technology in content instruction.

Initially, Jesus spent time with the disciples: coaching and mentoring them as he preached the good news and shared the gospel. He modeled how to share the gospel as he made converts and disciples of people from all walks of life. He modeled how to reach people where they were: how to teach and how to heal (John 3). Jesus knew that the disciple-making process could not be hurried. He spent a great deal of time with the disciples. He began his teaching with a focus on large crowds, and then almost immediately afterwards spent time with the disciples away from the crowds in order to

encourage and support them on a more individual basis (Matthew 5; Matthew 14). When Jesus felt like his disciples had received adequate instruction with him, he sent them out to spread the gospel to others: to make additional disciples. Jesus emphasized the concept of working in teams as he sent the disciples out in twos (Mark 6:7; Luke 10:1). He challenged them to step out into the world and be the light in the world (Matthew 5:14). As Jesus (a master teacher) taught, preached, and sent out disciples, he used an effective model that can be simulated in mentoring and teaching others: a model that involves relationship, modeling, explanation, support, and empowerment to go and do likewise. These five elements were all a part of Christ's disciple-making model and these elements should also be included in coaching.

Correlating the practices which Jesus employed with his disciples can be mimicked when training modern day teachers and practitioners. In today's classrooms, full of digital natives (Prensky, 2001) who grew up in a digital world, the use of technology may, as did the message of Christ, change lives. The authors are not implying that the impact of integrating technology will change lives the way the accepting the message of Christ does; however, the integration of technology can help teachers meet different learning needs, styles, and strengths of students, which may impact the outcome of a student's success in society. Technology use may also help students develop important 21st century skills (i.e. creativity, collaboration, and critical thinking) that they will need in order to compete in future schooling and in life ("Partnership for 21st Century Skills," 2003).

The integration of educational technology into the curriculum can help improve student achievement, particularly when the technology is utilized in student-centered ways (Perez-Prado & Thirunarayanan, 2002; Smith, Ferguson, & Caris, 2001). In a meta-analysis of 311 research studies assessing the effects of instructional technology use on PK-12 students, Sivin-Kachala, and Bialo (2000) found consistent positive achievement gains as well as improvements in attitudes toward learning and self-esteem when instructional technology was used. Instructional technology can translate into higher test scores, deeper understandings of concepts, and increased student achievement (Salpeter, 2008). However, it can do more than increase student academic learning: it can also equip students with important skills that they will need in life. Technology is and will continue to be a driving force in workplaces, communities, and personal lives in the 21st century, and technology skills are considered to be among the 21st century skills today's students will need (CEO Forum, 2001).

Today's students are what Prensky (2001) termed "digital natives": 87% of teens engage in online activities (Lenhart, Madden, & Hitlin, 2005), 81% of teens use computers to play games, and 84% use computers to surf websites about movies, TV shows, music, and sports. Thus, instructional use of technology including multimedia seems particularly appropriate and important for them.

Today's digital native student wants and needs technology integration for maximum learning. However, their digital immigrant teachers often lack the skill and confidence needed for this type of learning process. Seat time in technology professional development sessions usually aren't enough for most digital native teachers (Autry, 2009), but when teachers are paired and asked to focus their activities on tasks directly related to workshop or training content, the coaching approach promotes skill transfer and application (Joyce & Showers, 1980). Thus, the coaching model used by Jesus and validated by research over the last 30 years ("Peer Helping Annotated Bibliography", 2010) seems to be a more practical option for facilitating technology integration techniques and expertise than presentations and workshops.

Pam Robbins (1991), in her book titled *How to Plan and Implement a Peer Coaching Program*, defined peer coaching as "a confidential process through which two or more professional colleagues work together to reflect on current practices; expand, refine, and build new skills; share ideas; teach one another; conduct classroom research; or solve problems in the workplace" (p. 1). Using a peer coaching model, teaching professionals can be empowered to explore and perfect technology integration through constant and consistent teaching, modeling, encouraging, and supporting contact with an individual trained to facilitate change in teaching practices: a technology-integration coach.

Coaching can look different depending on the goals the professional collaborators set. However, a collaborative relationship and process seem critical. The coaching needs to include collaborative task development, as well as joint refinement and sharing of the teaching and learning process—with a focus on collaboration rather than evaluation (Knight, 2009).

Teachers who are content and pedagogy experts may lack the technological knowledge required for planning and carrying out educational plans that entail educational applications of technology (Koehler & Mishra, 2008). With the sometimes daunting task of learning to incorporate an ever-changing medium into curriculum, there does not seem to be a clear professional development model to make the leap to create a 21st century school. The benefit of instructional coaching is in its inherent design: both participants agree to collaborate and learn from one another (Knight, 2009).

The Peer-Ed model of coaching used the U.S. Department of Education Challenge Grant found great benefits for teachers through the peer coaching model. There are three pillars to this model, which include: communication and collaboration (in order to build trust), moving to a more active and engaging instructional strategies, and understanding best practices in technology integration. The pair go through a five stage process: assessing, goal setting, preparing lessons, implementation, and analysis (International Society for Technology in Education, 2011).

Wong and Wong (2008) claimed that the benefits of coaching over professional development include the emphasis of context, relevance, and the fact that the coaching is an ongoing process. This model offers day to support, as needed, scaffolding the support on a "just in time" model.

Patrick Bassett (2006), President of the National Association of Independent Schools, encouraged each school to create a professional development plan that included strategies to advance the goals of the school. Private schools have the flexibility to create specialized programs for students where faculty can create their own curriculum and assessment systems (GreatSchools, n.d.); therefore, the concept of using focused coaching groups for targeted change or professional development seems to be appropriate in the private school setting. Dosen, Gibbs, and McDevitt (2004) studied technology use in private schools, including student and faculty access to computer/internet technology in labs, media centers, and classrooms. However, most of the teachers in these schools did not effectively make use of the technology in their classrooms to promote higher-order thinking and deep, practical learning. Dosen, Gibbs, and McDevitt concluded that while most of the teachers used the computers and the internet for lesson preparation, less than 25 percent of them actually integrated technology into their curriculums and instruction.

Mirroring the methodology of Jesus, the goal was not just to train the disciples, but also to embrace the teachings and philosophies and spread the teachings. This then became the goals for the discipling coaches: equip teachers with technological teaching strategies so that they become confident and comfortable using the tools and strategies on their own. Some schools or even entire school districts have chosen to institute peer coaching as a route to providing professional development. To answer the question, "Why coaching for technology?" an examination of three models of technology peer coaching can provide a picture of what a technology coaching initiative might look like in a school setting.

In 2007, Barnes Elementary School in Kelso, Washington began to work with the state's Enhanced Peer Coaching Program. The program was set up to occur over a ten-week period during which the coaches communicated with teachers after school and at lunch, as well as via email or telephone, in order to incorporate new learner-centered instructional techniques. In addition to the face-to-face meetings, the educators also established an online community of practice using content management software called Moodle, which gave teachers the opportunity to post questions to a discussion board, reflect on observations and experiences, and then form new opinions about pedagogy. Teachers shared what worked and asked each other how to improve (Small, 2008). The positive experiences and results from the teachers provide additional evidence for the benefits of peer coaching.

Another model included the formation of a technology study group. This model was designed

by a private school principal with the goal of transforming her teachers' instructional practice through in-house professional development (Gora & Hinson, 2004). The session began with a pre-assessment for the teachers which rated the teachers' comfort level using technology, then groups were established around interest areas, where they worked together to pursue proficiency in their areas of interest. In the end, the groups met to present what they learned to other teachers. Is there data about their success?

The Peer Coaching Program, a third model, launched by Microsoft, established a similar peer coaching model to enable teachers to coach their colleagues in utilizing technology in their classrooms to improve student learning. "Based on the idea that most teachers look first to their colleagues when they need assistance with technology" (Ishizuka, 2004, p. 1), the initiative was originally tried in four school districts in the state of Washington, utilizing150 teachers as peer coaches. In general, coaches assumed responsibility for helping plan technology-enhanced activities or projects, aiding in finding resources or strategies, team-teaching, modeling, or training individuals to help teachers create more enriched technological learning environments. The 2002 pilot was so successful that the Mukilteo district decided to enroll all their media specialists into the coaching training program for the next year. In 2005, they added print and online support to the initiative.

Peer coaching offers a number of benefits. In traditional training, teachers would learn a technological skill and then sometimes teach that skill to their students. The very nature of peer coaching takes the implementation well beyond a mere skill; it addresses how technology can be used to support learning initiatives (International Society of Technology Education, 2011). In regards to time, the coaching typically occurs during school hours, not necessitating travel on weekends or missed school days in order to attend a professional development conference. The training is on site, in the teacher's own classroom, during regular working hours. Automatically, this enhances the option from a faculty's perspective ("The Peer Coaching Program," 2006).

Another benefit to the coaching model has to do with application. Regular professional development offerings usually involve introducing a teacher to a set of skills or a technology tool, and then it is left up to the teachers to implement it in their own classrooms. With the peer coaching model, the integration is a natural part of the process. Instead of leaving the integration up to the teacher, the coaching model includes training and implementation.

Potentially, the most important benefit of peer coaching is that it has been found to directly influence an increase in student engagement and achievement. In the San Diego School District, teachers who were using the eMints coaching program found their students had improved test scores and a higher percentage of students affected by the coaching program placed in the proficient or advanced categories of standardized tests (Foltos, 2006).

Research Questions

This study used qualitative methodology to explore answers to the following questions:

1. Can peer coaching enable teachers to help other teachers effectively integrate technology into their teaching processes?
2. What is needed to help make a peer coaching of technology integration process optimally effective?

Procedures

Design: The initial design of the study involved two teachers who each coached three colleagues at their private Christian middle schools in the process of integrating technology use into instruction. One individual (colleague) dropped out due to personal issues leaving two coaches and five teachers involved. Working individually with each teacher over a three month time period, the coaches helped each teacher explore possibilities then select and implement specific technology-based learning activities in his or her classroom.

Prior to the coaching, the coaches completed graduate university coursework about educational applications of technology and integrated technology into the learning processes in their own classrooms. They then met with a university support person to explore characteristics of effective coaching and to plan the process and procedures that they would use in coaching colleagues as well as the data they would collect about the experience. The coaches continued to meet with this university support person during the three months of the

coaching (every week for the first month and then every other week) to discuss issues they encountered and brainstorm solutions. In essence, the coaches were coached by the university professor.

Participants: The two coaches were experienced middle school teachers in the process of completing M.Ed. degrees in Curriculum and Instruction and working towards Texas Master Technology Teacher certification. Each coach initially asked for volunteers and then selected three teachers on her own private Christian middle school campus to coach: one with minimal technology experience and expertise, one with some technology experience and expertise, and one with more technology experience and expertise. Two of the teachers selected also held administrative positions. Demographics about the teachers who were coached are summarized in

Table 1.

Table 1. Teachers Who Were Coached as Part of the Study

Coach	Teacher	Initial Technology Level	Years in Education	Grade/Subject Taught
1	1	Minimal	30+	Grade 8 History
1	2	Some	30+	Grade 8 English & Administrator
1	3	More	30+	Grade 8 English
2	4	Minimal	30+	21st Century Skills & Administrator
2	5	More	7	Grades 6-8 Bible Teacher
2	6 *Dropped out*	Some	9	Grade 6 English

The Coaching Process: Initially, the coachees were interviewed by their coaches about their current experience, skill, and comfort with technology integration. Following the interview, a coach met with each coachee to establish a coaching routine and a few initial goals that the coached teacher hoped to achieve. Each teacher identified projects he or she would like to have help from the coach in implementing. Subsequent meetings were individually scheduled based on need and available time. The goal was for each participant to integrate technology in three different ways during the semester. Table 2 summarizes the technology tools they used and how the teachers used them.

Table 2. Technology Applications Implemented by the Coached Teacher

Teacher	New Technology Tool	Use
Teacher 1 [Coach 1]	Internet	Created a Blog to use for current event lessons.
	OneNote	Organized information for a team of teachers to use during their team planning time. This included student information and lesson plans. All of these items can be shared among the team of teachers.
	PowerPoint	Created presentations with information, links, and images
Teacher 2 [Coach 1]	OneNote	Organized information found on the internet to use as she taught a unit on A Christmas Carol.
	OneNote	Created class notes with worksheets which were posted to a website for students
	Internet	Searched for images, YouTube videos and new lesson plan ideas on NetTrekker and BrainPop
Teacher 3 [Coach1]	Photostory	Compiled images and music with transitions to create a TEASe (Technology Enhanced Anticipatory Set) to introduce a unit
	MovieMaker	Converted video found on Youtube and imported to edit videos for classroom use.
	LanSchool	Learned how to monitor students' computer use
Teacher 4 [Coach 2]	Internet	Searched for pictures, videos and quotes
	PowerPoint	Created power point as lead-in for discussion including photos, movies, & quotes from internet.
	Word and Internet	Created and used a "digital scrapbook" to organize and save online resources and activity ideas for later use (copied and pasted links)
Teacher 6	IPhoto	Created slideshow from pictures adding music and then converted slideshow to DVD

[Coach 2]		
	IMovie (new version)	Used iMovie to edit video of student productions. Learned how to edit film, add music, place transitions, compose titles, etc.
	Internet/iTunes	Searched for music and video clips to insert into the iMovie project listed above.
Teacher 3	Photostory	Compiled student work into a photostory file posted on the class web page for students to view
[Coach 2]	PowerPoint	Designed & used student project which involved taking original folktale and "publishing" using pictures, sound, backgrounds, layouts, animation schemes, and transitions.
	Internet	Used Picsearch.com to find images for students to use. (Website has family filter so safe to use in schools) Copied, saved and then inserted these images Photostory. Used student server to save work.

Data Collection: Both the coaches and the coached kept journals during the entire process. Researchers analyzed journals and met with the coaches midway through the coaching period to discuss their progress and at the conclusion of the coaching process. Additionally, at the conclusion of the coaching process, the coached teachers were individually interviewed about their experiences, and both the coaches and the coached teachers participated in a focus group in which they evaluated their coaching and technology integration experience. They also suggested lessons they had learned from the experience and insights that might be helpful to schools that want to adopt this peer coaching and technology integration process. Patterns and insights emerged from this data that seem helpful in planning future coaching and technology integration efforts.

Findings

All of the coached teachers voiced appreciation for the coaching process and unanimously stated that they found coaching easier, more pleasant, and more effective than traditional professional development. They stated that with traditional professional development, they heard about and even practiced new skills. However, when they returned to their classrooms, they often had difficulty actually implementing what they had learned, often with no one to help them as they encountered problems. The teachers all reported that this type of one-on-one and on-demand professional experience provided them with the necessary scaffolding they needed to feel more confident in their own abilities with respect to technology integration.

The participants also reported increased enthusiasm, engagement, and learning by their students when they used technology applications in the classroom. Many of the teachers expressed this on their evaluations, and one teacher wrote, "With the new technology use, I began to get very positive feedback from students, parents, and teachers; and the students were very excited and motivated by the technology." Another said, "Students are excited about creating new types of products and presentations."

Additionally, the analysis of the journals kept by participants (both coaches and coached), the individual interviews with the teachers, and the focus group of participants revealed insights which

might be used by other schools to increase effective technology integration through peer coaching. These insights suggest implications centered around five topics: characteristics of good coaches, stages in the coaching process, background and support for coaches, changes in beliefs about teaching and learning, and ripple effects.

Characteristics of Good Coaches: In the focus group, the teachers clearly and consistently articulated three sets of skills that they believed made their coaches effective: technology skills, pedagogy skills, and relational skills. Appreciation of these abilities was also reflected in their journals. There was a relationship of caring, respect, and trust between the teachers and their coaches. The coached teachers indicated that the respect they had for the coaches as successful teachers who used technology effectively helped set the stage for their desire to learn to integrate technology into instruction. The coached teachers also said that the mutually respectful nature of their relationships with their coaches made it easier for them to ask for and receive help. Thus, it seems important for coaches to be skilled, respected teachers who themselves use technology and for them to take time to establish positive relationships with the teachers they coach. The coached teachers expressed appreciation that their coaches were approachable, diplomatic, patient, and unselfish with their time and attributed some of the success of the coaching process to the presence of these qualities/attitudes in their coaches.

Stages in the Coaching Process: Three distinct but connected stages seemed to characterize each of the coaching experiences involved in this study: (1) Establishment of a positive relationship; (2) Collaboration on setting goals, then exploring and implementing options; and (3) Encouragement of independence and confidence so that the teachers could independently use and then share their newly developed technology skills with others. These seem to somewhat parallel what Walker (2003) described as the three stages of discipleship the original twelve disciples experienced: relationship, apprenticeship, and leadership.

The coaches first took time to get to know their coached teachers and establish a relationship of trust and respect with them. They learned about their content areas and preferred teaching styles. This enabled the coaches to tailor goals and processes to each individual situation. After setting goals with the coached teachers, they collaboratively explored both technology and pedagogy possibilities that might best meet those goals. "Just-in-time" teaching and assistance followed—always with the goal of helping the coached teachers become independent technology users.

Several teachers reported independently accomplishing similar technology-based tasks after initially doing the tasks with their coaches. The coaches encouraged this type of independent application. Just knowing that the coach was available, if needed, seemed to give the coached teachers confidence to venture out on their own. A coach journaled, "Teachers get a great sense of satisfaction and confidence that serve as a catalyst for their future endeavors in the area of technology integration." The coached teachers reported a sense of satisfaction, self-assurance, and pleasure as they shared their technology expertise with colleagues.

Needed Background and Support for Coaches: The coaches suggested that the course activities preceding the coaching, the structure and pacing provided for the coaching, and the scaffolded support during their coaching made major differences in their coaching success. These activities included assignments that involved learning new Web 2.0 tools and then teaching them to the class, brainstorming ideas for adding technology "poppers" (10 minutes or less technology integration pieces) on a class wiki, and taking a Meyer's Briggs and Strengths Quest test. They had to analyze their own personality traits and determine how it might affect their work with others. Each week, during the coaching process, the coaches came together to meet, discuss their success and failures, and solicit ideas for integration from their colleagues. One coach wrote, "When I was not sure what to do with my teachers, I knew I could tell them I would get back to them. After our coaching meeting, I always had options/ideas/solutions to present to my teachers."

Often coaching required flexibility and the ability to differentiate instruction based on the needs of the coached teachers and their teaching environments. This required each of the coaches to do additional learning in order to meet the needs of the teachers they coached. The coaches needed an exploring mentality and willingness to learn with their

coached teachers. They also needed to have a basic comfort level with general tools used in different ways throughout the instructional cycle (i.e., video used to prepare students vs. informing students vs. reflecting upon what they know). Specifically, they had to gather a variety of resources, utilize a variety of multimedia software, and become familiar with internet tools like blogs, wikis, etc. The course activities before and during coaching helped with these things.

Changes in Beliefs About Teaching and Learning: The technology integration required that teachers learn new pedagogical skills as well as new technology skills. The models provided by the coaches in their own classrooms helped with this process. One teacher wrote, "It was helpful for me to see how the coach used technology in her own classroom, then it gave me ideas on how I could use it." Encouraged by the results they observed in their coaches classrooms and then in their own classrooms, the coached teachers became stronger advocates of not only instructional technology use, but also of active, student-centered learning. Consistent with research that indicates that student-centered uses of technology are more engaging and motivating for students (Deaney, Ruthven, & Hennessy, 2003), the coached teachers reported that positive changes in student learning occurred when their students used the technology to actively engage in the learning process (taking notes through One Note, blogging, creating digital stories, etc.). As the coached teachers began to plan for more student-created projects instead of teacher-centered lessons, they reported that student engagement and motivation increased. Thus, their general pedagogical practices as well as their use of technology began to change.

Ripple Effects: A ripple effect often occurred as the coached teachers shared their successes and enthusiasm with their colleagues. As the coached teachers excitedly shared their accomplishments with their fellow teachers, interest in learning to use technology began to spread among the faculties of their elementary and middle schools. Several of the coached teachers presented their technology integrations at faculty meetings. One teacher wrote, "The students were so thrilled with their projects that they made me promise to show other teachers what they did—and I did at a faculty meeting." Additionally, two of the schools involved saw such benefits from the coaching that they added instructional technology positions to their staffing so that the coaching could continue the following year.

Implications and Conclusions

This study clearly indicated the benefits of collegial coaching of technology integration: improved instructional effectiveness through increased student-centered uses of technology as well as newly empowered teachers with heightened confidence and improved technology expertise that in turn influence their colleagues to integrate technology into instruction. The participants consistently expressed a preference for this type of professional development rather than professional development in traditional "sit and get" formats. One coach wrote, "I realized that there are teachers that desire to improve their personal technology skills and classroom technology integration, but this desire is hindered or even squelched by various factors that include embarrassment, fear, lack of time, lack of support, lack of encouragement, or lack of individualized instruction. Coaching gave them the tools to overcome those factors."

This research further suggested considerations that can strengthen a collegial coaching process. For optimal effectiveness, coaches need pedagogy, technology, and relational skills as well as support in exploring new pedagogies and technologies and in navigating the interpersonal issues and time constraints involved. Collegial coaching takes time for both the coach and the coached. As one coach said, coaching is "a process that cannot be rushed." The coaches commented on the large time commitment that the coaching entailed. The average of 15 hours spent with each coached teacher seemed to them like a really long time; however, it often transformed the way teachers taught and their classroom effectiveness—in the equivalent of less than three work days. In the big picture, this seems like a great deal of benefit in a relatively short time span.

Coaching for technology integration appears to be an approach that schools should strongly consider. As one of the coaches commented,

> There are few feelings greater than helping someone learn something new or become more confident in an area. That is the goal of teaching. When you help a colleague

achieve this experience, it is even more rewarding because you are indirectly helping hundreds, if not thousands of students down the road.

Using the model explored in this study, higher education and PK-12 schools can effectively partner to help disciple coaches who then empower their colleagues. Jesus used this discipleship model with only twelve, and it changed the world. Imagine the impact these empowered teachers might have on our classrooms today and in the future.

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