

# Virtual Bugs: An Innovative Peer Coaching Intervention to Improve the Instructional Behaviors of Teacher Candidates

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Throughout the evolution of education, various methods of teacher training have emerged to provide general professional development to educators. After trial and error, forms of coaching, including peer coaching, emerged as one of several operational training tools and has been a recommended method of teacher development in recent years (Cotabish & Robinson, 2012; Dailey, Cotabish, & Robinson, 2013; Tschannen-Moren & Tschannen-Moren, 2010). The traditional goal of peer coaching is to provide positive feedback to instructors (Slater & Simmons, 2001); however, more recently the peer coach has a greater responsibility. The coach should take on the roles of content expert, teacher support, classroom helper, and at times instructional facilitator (Appleton, 2008; Dailey, Cotabish, & Robinson, 2013). The coach must provide expert advice on content and pedagogical knowledge as well as be available to model and facilitate classroom lessons. Findings indicate that teachers attribute their increased knowledge and skills to observing and talking to their coaches (Dailey, 2013) as well as classroom support from their coaches (Appleton, 2008; Dailey, Cotabish, & Robinson, 2013).

## Introduction

In recent years, peer coaching has demonstrated its usefulness as a viable embedded professional development option. Other educational research projects have used technology such as Bug-in-the Ear (BIE) to conduct virtual coaching. For example, Rock et al. (2009) found the utilization of Bug-in-Ear technology allowed coaching to take place in real-time while the teacher interacted with and instructed students. Rock et al. reported 73% of teachers found the virtual peer coaching to be helpful and the program resulted in a significant improvement in instructional practices (ES > .98) as well as increased student engagement (ES = 1.40). Furthermore, teachers indicated

the real-time feedback was not disruptive and enabled them to bridge the gap between learning and practice. To minimize distractions caused by real-time feedback, Scheeler, Congdon, and Stansbery (2010) recommended coaches utilize short phrases such as, “good praise, remember to reinforce, positive reinforcement, stick with him”, p. 33. Through methods such as these, a coach can provide support to a teacher without being physically present in the classroom.

With the increased demand for universities to provide online programming options for their students, technology-driven, cost-effective approaches for instructional delivery are a high priority. To respond to the demand, a virtual peer coaching innovation was implemented

with non-traditional teacher candidates during semester-long internships. Specifically, the intervention employed on-demand corrective feedback utilizing Bug-in-the Ear (BIE) Bluetooth technology and Skype, a voice-over IP service. This paper reports the logistical considerations required to carry out the innovation as well as the lessons learned to date and future implications for K-12 and higher education.

### **Theoretical Background**

Joyce and Showers (1980) stated that the most effective training design model includes “practice under simulated conditions, and practice in the classroom, combined with feedback” (p. 384). This particular training model created a paradigm shift that increased the odds of successful skill development; thus, the principles of peer coaching emerged. To reinforce the concept of peer coaching, Showers and Joyce (1996) state that peer coaching is not to be used for teacher evaluation purposes; rather, it is a professional development delivery technique that targets the implementation of innovations that can be used to improve existing practices.

In a journal article summarizing their overall findings from previous studies, Joyce and Showers (1996) reported teachers “practiced new skills and strategies more frequently and applied them more appropriately than did their counterparts who worked alone” (p. 14). Participants in their studies showed greater retention rates and implemented models more appropriately than their counterparts. With follow-up training, participants could coach each other and produce sustained results (Showers & Joyce, 1996).

In another study of 17 teachers who participated in a newly implemented peer coaching program (Slater & Simmons, 2001), peer-coached participants “expressed a newfound awareness of their own personal strengths and acceptance to new ideas and strategies through

collaboration” (p. 75). Additionally, participants reported they developed positive relationships with their collaborative partner(s) and adopted new practices as a result of participating in peer coaching.

In a science intervention targeting 30 Grade 2-5 teachers (Cotabish, Dailey, Hughes, & Robinson, 2011; Cotabish, Dailey, Robinson, & Hughes, 2013), researchers documented the effects of the combination of peer coaching and traditional professional development and the use of inquiry-based science instruction in the elementary classroom. The results of the study revealed a statistically significant gain in science process skills, science concepts, and science content knowledge by students in the experimental group when compared with students in the comparison group. Moreover, teacher participation in the professional development program had a statistically significant impact on students’ variability in post-test scores.

As peer coaching has evolved as a viable form of embedded professional development, so has the advancement of technology. It is this pedagogical foundation that guided the selection of peer coaching as the innovation to deliver on-demand corrective feedback to pre-service teacher candidates utilizing BIE technology. By utilizing technology, a coach can provide support to a teacher without being physically present in the classroom. This technology removes the barrier of distance and allows more teachers to receive the benefits and increased frequency of coaching interactions.

### **Purpose**

The purpose of this pilot intervention is to assess the effects of virtual peer coaching on the instructional behaviors and perceptions of participating teacher candidates. For the purposes of clarification, virtual peer coaching in the pilot study is defined as the collaboration between a teacher candidate and their university internship

supervisor. This manuscript does not fully report the qualitative results from the pilot study; rather, we report the logistical considerations one must consider when implementing this innovation as well as excerpts from participants:

1. What planning is required for implementation of a virtual peer coaching innovation?
2. What are the lessons learned thus far?
3. What do participants say about participating in virtual peer coaching intervention?

## Methods

### *Participants*

To date, eight non-traditional pre-service teacher candidates in the Master of Arts in Teaching (MAT) program were selected to participate in the first Cohort of the pilot intervention. Due to attrition related to technology issues in two participants' schools, six participants completed their required semester of internship using BIE technology. The MAT graduate degree program is designed for individuals without teaching credentials but who have successfully completed a baccalaureate degree and wish to become a teacher in an expeditious fashion and is intended to assist potential teachers, those having a baccalaureate degree in a content area, to become practicing educators.

### *Intervention*

Prior to the implementation of the intervention, participants completed a 2-hour professional development workshop focused on the observation rubric used in the study (Danielson, 2007) and practiced using the BIE technology under simulated conditions. After the completion of the workshop, the treatment group participated in a semester-long internship requiring three formal observations (2 BIE observations and one video-taped observation) conducted by a university supervisor. During each of the formal observations, the university

supervisor provided live coaching and immediate feedback using Skype technology and a long-range BIE device. The traditional face-to-face internship experience requires three formal observations (2 face-to-face and one video-taped observation) by a university supervisor with feedback being provided immediately following the observed lesson. Thus, the overall study sought to compare face-to-face internship observations with delayed feedback (business as usual) with virtual internship observations peer coaching using on-demand corrective feedback via BIE technology.

### *Logistical Considerations*

There are several important considerations regarding the planning and costs when implementing a virtual peer coaching innovation. Bug-in-the-Ear technology may not be feasible nor the first method of choice for changing teachers' instructional behaviors. Furthermore, the deliberate decision to use BIE as a method of intervention is largely dependent upon the individual. Are participants proficient in using technology on a daily basis? Are their current instructional practices typical of novice teachers? If you answered no to either question, you may want to reconsider utilizing this intervention tool. To better understand these considerations, we address these questions and our lessons learned to date.

### **What planning is required for the implementation of a virtual peer coaching innovation?**

*Technology.* Required technology and costs must be considered for project implementation. Materials that are needed to implement the innovation include Skype® voice-over IP service software, Pamela® Call Video Recording software, Computer or tablet computer such as an iPad, Bluetooth wireless USB adapter (for computer), Bluetooth headset (BIE), and a webcam. Excluding the costs associated

with a personal computer and/or a tablet, the virtual peer coaching equipment and software costs approximately \$80 per student and the equipment is reusable. Experimental participants were given the option to use their own personal tablet computer rather than using their school computers. Basic technology needs and suggestions were informed by Rock et al. (2009).

*Testing technology.* Internship candidates that participated in the innovation adapted well to the new technology. These candidates were able to problem solve and work through various technological challenges. The internship supervisors found that the peer coaching prompts take practice. It is difficult to utilize the technology in a way that supports the candidates learning rather than interrupting instruction and discouraging the candidate. In addition, Skype conferences were often conducted to test the technology, communicate about expectations, and work through technology issues.

*Training and directions for students.* As supervisors worked on testing the technology, a specific, detailed list of directions was created for the experimental participants to guide them through setting up the technology. Interns were asked to keep all packaging for the equipment for reuse with future student interns. Each student was provided with a Cirago Bluetooth 3.0 USB Micro Adapter, Web Cam, Plantronics M50 Bluetooth Headset (BIE device), and asked to create a Skype account. Students were then asked to send a Skype contact request to the internship supervisors. Practice sessions were conducted before the observations commenced. Interns were successful in setting up the technology, following the step-by-step directions that were provided to them. On the day of the observations, a short testing session was conducted to make sure that all technology was working properly in the classroom.

*Coaching prompts.* The internship supervisors brainstormed a list of potential

coaching prompts to be used during virtual peer coaching. Coaching prompts grounded in Bloom's Taxonomy were especially helpful and served as reminders to interns to ask higher-level questions during teaching and instruction. Incorporating suggestions from Scheeler, Congdon, and Stansbery (2010), the supervisors utilized short phrases such as, "Work the room", "Remember Bloom's", "Give wait time", "Avoid yes/no questions when prompting student responses." Moreover, instructional behaviors characterized by the Danielson (2007) instrument framed coaching prompts that focused on planning and preparation, classroom environment (e.g., fairness, rapport), and student engagement.

*Coordination of interns.* Typically, internship supervisors are assigned four interns per semester, equating to a three credit-hour load. Both university supervisors involved in this study were assigned four interns to be virtually coached using the BIE technology. The assignment of the four interns each constituted an overload for both supervisors, adding to their normal workload and commitments to teaching, scholarship and service. To be successful, the internship supervisors organized their observations well in-advance of the semester. The convenience of the technology came to light early on when last-minute public school schedule changes allowed the supervisors to complete the BIE/Skype observations from work and home settings; thus, reducing management and travel time.

### **What are the lessons learned thus far?**

#### *Benefits*

The virtual peer coaching innovation utilized in this study has already produced early positive benefits. Students have demonstrated effective use of new technology, produced more thoughtful self-reflection essays, and immediately improved their teaching performance and instructional behaviors as a result of the on-demand corrective feedback. Supervisors have also noted an

enhanced positive rapport with the participants. Furthermore, using Pamela Skype recordings allowed the supervisors to improve assessment techniques by reflecting and watching recorded lessons multiple times. Early indicators, based on focus group interviews, showed that participants were encouraged by the immediate feedback during the lesson, and have reported no negative feedback to date regarding the intrusiveness of the BIE technology.

### *Drawbacks*

Some drawbacks and limitations associated with the virtual peer coaching innovation have been noted. The three most notable drawbacks are: (a) technology limitations within schools districts (e.g., broadband internet blocked, dropped Skype calls, and other internet difficulties), (b) the uncomfortable sense of “being intrusive” when supervisors provide immediate, on-demand feedback, (c) and the loss of physical engagement due to the supervisor not being present in the classroom (aesthetics are missing).

*Technology limitations.* In regard to technology limitations, the supervisors found it difficult to work with school districts that were not equipped with broadband internet, which blocked access to websites such as Skype, and had protocols in place that limited access to the internet. Furthermore, some participants had outdated computer systems, further escalating technical difficulties. Two participants were dropped from the selection process at the onset of the project due to technical difficulties.

*Intrusiveness.* During the observations, supervisors noticed that interns could hear every word, murmur, and sigh. Supervisors quickly learned to utilize the mute button to avoid unintentional feedback. The supervisors also found it to be more difficult to give appropriate feedback when instructional teaching was not going well, particularly when multiple

comments by the supervisors were warranted. The interjection of multiple comments made the supervisors feel intrusive, and at times, rude even though they were meant as constructive feedback. It is important to note that participants did not express these concerns.

*Engagement.* As seasoned internship supervisors serving as the primary researchers in this study, one qualitative characteristic did surface above others. One supervisor missed the engagement and interactions involved with conducting face-to-face observations. During one particular observation, an elementary student told her virtually-coached teacher that she “smelled like rainbows and sunshine.” The supervisor noted in her field reflections that she, too, would have liked to have “smelled the rainbows and sunshine,” also commenting that:

...there is something to be said for observing the face-to-face interactions that take place in a classroom. When you are observing interns from a computer, you lose the power of the face-to-face experience such as impromptu modeling of classroom instructional and management strategies, and the interactions with the students who are being taught. (T. Benson field note # 3)

## **What do participants say about participating in virtual peer coaching intervention?**

### *Participants' Perceptions*

To gain insight into participants' perceptions regarding the innovation, interns participated in a focus group that yielded interesting findings. All virtually-coached interns reported that they preferred the virtual supervision experience over the traditional, face-to-face supervision. Specifically, interns reported that virtual peer coaching was a more authentic experience, noting that their students engaged in typical classroom behaviors and learning that was unfiltered and

unaffected by an outside observer. Moreover, they noted that the technology was convenient and increased their accessibility to the supervisor. Interns also shared that they were pleasantly surprised as to how well the technology worked during observations. To sum up their experience, one intern stated:

I enjoyed this process. I thought it was helpful that we could get immediate input from our supervisor during the lesson using Skype. I can see how this can be a tool that can be used throughout a school district for teacher review and observations. I thought it was a less obtrusive way to conduct an observation. I also felt like my students' behaviors were more honestly reflected during this type of observation versus having a guest in the room. (Respondent #5)

Furthermore, the teacher preparation program utilizing this innovation serves many teacher candidates living hours away in rural communities. According to participants, the availability of the online internship option was convenient and increased their technology skills. Although some benefits were evident throughout the study, two unexpected findings emerged from the focus group interview. First, participants reported positive and increased rapport with their supervisor due to the additional communication required to implement that innovation. One intern summed up this benefit, stating, "The frequent communication with my supervisor increased the personal nature of our professional relationship. I felt more comfortable about approaching her when I had questions or concerns regarding the internship experience" (Respondent #1). Second, five of the eight interns suggested that they would prefer more frequent Skype interactions with their supervisor and other interns throughout the semester. Specifically, they reported that they would like to interact with other interns in a group setting using the Skype group conference calling feature. To date, the supervisors have only

utilized the Skype group calling feature to test the technology (before implementation) and to conduct the focus group interview.

In terms of improving the innovation, some suggested increasing the number of coaching prompts and the nature of the constructive criticism. One particular intern stated, "I was expecting more feedback through the ear during my teaching. The type of comments I received were positive and encouraging, but I would have liked more comments and instructions as I taught" (Respondent #2). One implication could be that once the intern realized that the BIE comments were not a distraction, s/he wanted more feedback and direction on how to improve instructional behaviors. Another intern stated, "Constructive comments such as 'You need ask more open ended questions' and 'You need to call on girls and boys equally' made me more aware of my teaching and forced me to rethink my instructional practices" (Respondent # 4).

## Discussion

Innovations, such as these, allow coaching to take place in real-time while teachers interact with and instruct students. Consistent with the findings reported by Rock et al. (2009), early anecdotal evidence from the pilot intervention supports virtual peer coaching as a potentially effective technological tool that can be utilized in teacher preparation programs. Furthermore, participants in our study indicated that the real-time feedback was not disruptive and enabled them to redirect their instructional practices and behaviors on the spot. Interns unanimously felt that the BIE virtual peer coaching was a positive experience for them, one they preferred over traditional face-to-face observations. They claimed that the immediate feedback and additional contact with the supervisors through Skype sessions helped them to improve their instructional behaviors.

Through BIE virtual peer coaching, a supervisor can provide support to a teacher

without being physically present in the classroom, and observe authentic teacher and student interactions. Additionally, virtual peer coaching removes the barrier of distance and allows more teachers to receive the benefits and increased frequency of coaching interactions; however, these benefits don't come without a cost. Technology issues can be problematic and can limit the utilization of innovative tools such as these. Moreover, the internship supervisors experienced a fear of intrusiveness when using on-demand corrective feedback. Additionally, one supervisor experienced a sense of loss due to the lack of interaction that only the physical environment can provide.

Key skills such as questioning and discussion techniques, student engagement, structure and pacing, monitoring of student learning, and feedback to students are important instructional behaviors and indicators of what beginning teachers show know. Virtual peer coaching has the potential to increase these target skills. Given the priority placed on improving student learning, increasing the frequency in which university supervisors' provide corrective feedback is an important consideration in teacher education.

### **Implications for K-12 and Higher Education**

*Higher education.* Research has historically shown the importance of the internship experience during a teacher education program and its power to impact the potential effectiveness for future teaching. Invariably, participants claim that they have learned more from this virtual learning experience than from other courses in their teacher education program.

Potential implications for using virtual peer coaching are widespread. Utilizing new and innovative technology to provide immediate feedback to teacher candidates can serve as a significant improvement to teacher education programs, and shows early promise in increasing the instructional behaviors and student

engagement of their benefactors. Specifically, on-demand feedback immediately redirects teaching behaviors before poor instructional practices have the opportunity to become poor instructional habits. Benefits for teacher candidates include improved teaching effectiveness, increased proficiency in technology, and enhanced intern-supervisor rapport. In terms of the financial impact, the innovation has the potential to decrease university travel budgets and/or allow the reallocation of travel funds to professional endeavors. With travel time diminished, faculty may have more control of their time management and scheduling, devoting more time to teaching, scholarship and other relevant projects. The barrier of distance often encountered when traveling to remote schools is obsolete, further supporting programs utilizing online delivery formats.

*K-12 education.* BIE virtual peer coaching also has implications for K-12 public school settings. Administrators can utilize the innovation for conducting classroom observations, instructional coaching, and for assessment purposes. Moreover, instructional coaches can use virtual peer coaching to provide on-demand feedback to redirect instructional behaviors. The innovation may be an especially useful tool to assist teachers who have been placed on a professional improvement plan, or require assistance with classroom management and student behavioral issues. Furthermore, on-demand corrective feedback can potentially increase levels of student engagement and promote teacher fairness among students.

*Future research.* The authors' future research efforts are focused on quantifying the observed behaviors; specifically, efforts are focused on assessing the impact of the intervention on teacher candidates' instructional practices as well as student engagement using valid and reliable instrumentation. It would also be interesting to see how the innovation transfers over to K-12 education, and the nature of utilization in K-12

settings. Regardless of setting, there is much to be explored when considering the implications of this virtual technology.

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Investigators of STEM Starters, a federally-funded project housed at the University of Arkansas at Little Rock (UALR). From 2004 to 2007, Dr. Cotabish coordinated the Arkansas Evaluation Initiative, a federally-funded state-wide school district program evaluation initiative housed at UALR. To date, she has authored, co-authored, and contributed to 82 manuscripts including 3 books, 42 journal articles, book chapters, and products focused on K-20 STEM and gifted education; and 37 refereed academic research papers and technical reports tied to externally-funded and university-based research initiatives. Her recent research has focused on K-20 STEM and gifted education, and examining the effects of virtual peer coaching on the quality of pre-service teacher candidates using Skype and Bluetooth Bug-in-the-Ear (BIE) technology.