Evaluating Modes of Teacher Preparation: A Comparison of Face-to-Face and Remote Observations of Graduate Interns

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Abstract

Although technology-mediated learning has its advantages, it does not come without operational tradeoffs. Thus, consideration of the effectiveness of new modes of teacher preparation in comparison to traditional, longstanding, research-proven methods is necessary. In this study, we evaluated one large southern urban university's implementation of synchronous remote observations of teacher education candidates using live classroom software. We compared remote and face-to-face observations to determine if the modes of observation were equivalent in supporting professional growth and evaluating quality instruction. Results suggest that both modes of observation are not equal but are comparable in supporting graduate interns' professional growth and in measuring teaching effectiveness. The implications of this study shed light on the advantages and limitations of emergent technologies as teacher education programs explore alternative forms of Web-based evaluations of teacher candidates. (Keywords: Teacher education, student teaching, internship, remote observation, video)

Impending changes within teacher education, whether motivated by national or state educational mandates, teacher shortages, shifting teacher education candidate needs, growth of second-career professionals seeking employment, or tighter operating budgets, have paved new and innovative avenues for teacher preparation programs. These changes come at a time when emerging technologies are being explored as pedagogical tools for new learning pathways. Although many education programs have investigated or implemented online coursework, the challenges of conducting clinical experiences and teaching observations in a virtual setting still pose a barrier that limits the scope of online licensure opportunities. Adoption of cutting-edge processes does not necessarily translate into positive learning outcomes, as gaps in educational research linking the two abound (U.S. Department of Education, 2009). Although technology-mediated learning has its advantages, it does not come without operational tradeoffs. Thus, consideration of the effectiveness of these new modes of teacher preparation compared to traditional, longstanding, research-proven methods is necessary.

In this study, we evaluated one large southern urban university's implementation of synchronous remote observations of teacher education candidates using live classroom software. We compared remote and face-to-face observations to determine if the modes of observation were equivalent in supporting professional growth and evaluating quality instruction. Results suggest that both modes of observation are not equal but are comparable in supporting graduate interns' professional growth and in measuring teaching effectiveness. The implications of this study shed light on the advantages and limitations of emergent technologies as teacher education programs explore alternative forms of Web-based evaluations of teacher candidates.

Overview of the Research Project

With the push to address teacher shortages and increasing population growth, universities, colleges, and state departments across the nation have sought alternative processes for licensing teachers. The rise of urban-based programs such as Teach for America, regional alternative licensing centers, and postbaccalaureate licensing programs are evidence of innovative strategies designed to attract and recruit second-career professionals to teaching. Although these programs sought to address the needs of urban centers, they fell short of meeting the needs of more remote and rural areas outside of the geographic boundaries of the facilitating institution. Simultaneously addressing the demands of schools not within the proximity of licensing organizations and interests of geographically bound professionals necessitates rethinking instructional practices and re-visioning programmatic structures. One college of education at a large southern urban university has engaged in addressing these unmet needs through the implementation of a 100% online graduate teacher licensure and master's program.

Although educational faculty at this particular university willingly accepted administrative challenges to expand licensure opportunities to address statewide teacher shortages, most articulated a belief that technology-mediated instruction has limits. Thus, the initial design of an online licensure program for second-career professions was limited to only lateral-entry teachers. Lateral-entry teachers are professionals who have a content-area degree (such as a BA in history) and are temporarily employed in public schools as teachers in a related field (such as social studies) but do not hold a teaching license. Justification for this decision was twofold: First, by national standards (No Child

Left Behind), lateral-entry teachers are not considered "highly qualified" and are required to complete relevant pedagogical and content preparation for teacher licensure. Second, the state department accepted school-based clinical observations of lateral-entry teachers as evidence of successful completion of the graduate internship, whereas all nonteaching licensure candidates must be observed by the licensing institution during the student teaching experience.

Although university faculty could envision similar processes for online and face-to-face instruction in all pedagogical coursework, they were troubled with the challenge of how to facilitate classroom observations during the student teaching experience (referred to from this point forward as the graduate internship). Second-career professionals who are not employed as teachers are required to complete an internship experience similar to student teaching—a semester teaching practicum with an experienced, practicing teacher. Deep-seated beliefs about quality teacher preparation and research-based strategies for scaffolding the professional growth of novice teachers inhibited educational faculty from considering alternatives to onsite observations of teacher education candidates. Consequently, internship observations since the inception of the online program had to occur within driving distance from the university so that observations could be conducted face to face; resulting in geographic boundaries (the metropolitan region and 14 surrounding counties) defining the scope of programmatic outreach. With continual demands of expanding the teacher licensure program to address statewide teacher shortages, a growing untapped market of potential consumers, and increasing availability and cost-effectiveness of emerging technologies, this urban university administration shifted its vision to more aggressively adopt innovative platforms for instructional delivery. These sentiments, exacerbated by economic pressures, state-mandated declines in operating expenses, and overall long-term budgetary cuts, created an urgency for exploring strategies that would reduce costs but not sacrifice the quality of instruction, giving credence to the re-visioning of existing programs that could potentially be expanded and reconceptualized through technology. In response to these compounding forces, faculty within the college of education began to reconsider how technology tools could facilitate an equivalent observational process, overcoming previous barriers and expanding the graduate master's of arts in teaching degree to a 100% online program. At the core of this dialogue was the concern of whether or not teaching could be effectively measured through online observations.

In this study, we explored this issue of quality in terms of how technology-mediated learning compares to a more traditional approach to teacher preparation. Specifically, we examined the differences between two modes of teaching observations: face-to-face (in-class) observations and synchronous remote observations of graduate interns. In our comparative study, we evaluated the differences between the two observational modes and whether these differences affected the quality of teacher preparation. The implications of our study contribute to a growing body of research evaluating the quality and effectiveness of technology-based teaching and learning.

Identifying Research and Technology-Based Solutions to Teacher Training

We conducted an initial literature review to evaluate existing technology-based solutions to teacher preparation and to determine their viability in addressing our programmatic and stakeholder needs. The use of technological applications that support synchronous teacher preparation activities at a distance is not new. Videoconferencing tools, for example, have been used in teacher education programs in a variety of ways (Hixon & So, 2009; Northwest Educational Technology Consortium, 2005). These include remote communications and observations with students and teachers in real classrooms, administration of field experiences in simulated environments, and the facilitation of remote supervision and communication during traditional field experiences (Hixon & So, 2009). A great deal of research has been conducted regarding the effectiveness of the uses of technological applications as time- and cost-effective solutions to engaging geographically distributed personnel in information exchanges related to real-time observation of praxis. For example, Bonk, Malikowski, Angeli, and East (1998), Kale, Hur, Yerasimou, and Brush (2006), and Moffett (2001) developed video-supported online discussions and communities to promote sharing of student experiences and diverse interpretations of events. Additionally, Vannatta and Reinhart (1999) used videoconferencing to afford preservice teachers enrolled in methods courses opportunities to observe and communicate with expert teachers integrating technology into their classrooms, resulting in a positive effect on the technological proficiency and integration skills of both university faculty and preservice teachers.

Extending this concept, Johnson, Maring, Doty, and Fickle (2006) and O'Connor, Good, and Greene (2006) used videoconferencing as a tool to mentor student teachers as well as to observe and interact with real classrooms. Both of these projects resulted in high degrees of participant satisfaction with the processes as well as perceived learning. However, these projects were cost prohibitive and did not allow time for participant reflection, both of which are important components of technology-mediated solutions in teacher education (Benbunan-Fich, Hiltz, & Harism, 2005).

As part of a Preparing Tomorrow's Teachers to use Technology (PT3) project, Lehman and Richardson (2007) added yet another dimension to the use of videoconferencing in teacher education. In addition to observing the classroom and the actions of the students and teacher, preservice teachers also interacted with the children and teachers and prepared and presented a variety of enrichment activities. Although this work provided teacher candidates with opportunities to explore diversity of

instructional practices, examine diverse settings, and consider innovative applications of instructional technologies, technical difficulties, time involved in implementing the videoconferencing, and a perceived lack of authenticity by the teacher candidates limited the effectiveness of the process.

A second application of videoconferencing tools in teacher education involves the administration of field experiences in simulated environments or "virtual practicums" (Zibit & Gibson, 2005). Although this area has limited research, Foley and McAllister (2005) found that simulated field experiences improved the teacher identity of candidates, provided ample opportunities to connect theory and practice, improved reflective decision-making, and developed collegial dispositions, all resulting in an overall feeling of being more prepared and confident to enter the classroom. Although this possesses significant pedagogical benefits, the technical difficulties, cost associated with production, perceived lack of authenticity, and perception of reduced complexity are all issues that need to be addressed when using videoconferencing as a tool to facilitate "virtual practicums" (Hixon & So, 2009).

In response to the rising costs associated with observing student teachers, a number of researchers have experimented with the use of videoconferencing as a tool for supervision. Additionally, with improvements in the cost, usability, and functionality of video capture and sharing tools, as well as other communicative applications, such processes are becoming much more sustainable than in the past. Gruenhagen and colleagues (1999) and Venn and colleagues (2001) used compressed video as a tool to both supervise and interact with student teachers who, due to geographic barriers, might not have received an adequate or appropriate level of support. Although videoconference proved promising, drawbacks included lack of personal contact, the participants' distraction by the camera, an increased sense of pressure regarding classroom management skills, and technical problems. Garrett and Dudt (1998) included the use of a videoconferencing unit, a network, and a room to observe teachers during field experiences. One limitation of this project was using one room to observe 3–14 student teachers. Dymond and colleagues (2008) used videoconferencing to supervise preservice special education students. Although findings suggested that the process was potentially a time- and cost-effective alternative to the supervision of traditional field experiences, technical issues were somewhat prohibitive. Problems related to intermittent Internet connectivity, equipment setup, sound quality, and visual field all reduced the overall effectiveness of the process. Lastly, Burrack (2007) used videoconferencing to facilitate remote observations of student teachers as part of a hybrid observation program. Benefits were substantial and included more frequent observations, more substantive feedback flexibility, and more frequent and higher-quality interactions. Cost and problems accessing school networks due to firewall issues limited the project's overall effectiveness.

Based on the research-based benefits of videoconferencing, relatively low-cost technologies for implementation and continuation, and value of interactive communication among all participants, we designed a synchronous method of observation to parallel the widely accepted traditional observation method. The Remote Observation of Graduate Interns (ROGI) was initially supported by Centra, a state-of-the-art multimedia conferencing platform (Petty & Heafner, 2009). We used the designated participant tool in Centra's IP videoconferencing feature during the graduate internship to remotely observe teaching, deliver formal observation forms, provide immediate feedback on instruction, and support an interactive dialogue among university faculty, geographically dispersed teacher candidates, and cooperating teachers. Although Centra was the main software tool, hardware was needed to facilitate the two-way video and communication exchange. We purchased the additional technology through a university-funded Academic Improvement Grant. Hardware included a laptop computer, a camera with video streaming capabilities, and a tripod. The camera was connected to the laptop. The laptop had to be configured with each school's IP address and then connected through the Ethernet cable to the school's server. We repeated this process at each school and tested the technology prior to the observation to ensure it worked properly. A graduate assistant, hired through grant funding, traveled to the schools and served as videographer for all of the observations in the pilot semester. We trained the graduate intern to set up the technology for each observation and to operate the camera to capture what the observer directed through a text-chat feature in Centra.

Throughout the piloting of ROGI, we considered the following questions, which serve as the questions that guided our study:

1. Are remote observations equivalent to face-to-face observations?
2. Are there differences in the two processes?
   a. If so, what are these differences?
   b. Do these differences affect the quality of teacher preparation?

Methodology

During the pilot semester for ROGI, two graduate interns located within the same school system voluntarily agreed to participate in the project evaluation. One intern was a lateral-entry teacher currently employed at a middle school, and the other intern was a student teaching at a high school. We chose this particular school system as the pilot location for this project for several reasons: (a) its willingness to participate, (b) its location in regard to the university (the system was far enough from the university to warrant remote observation but close enough to troubleshoot the technology when the need arose), (c) its technical support, and (d) the consent of the graduate interns who had been placed in this system prior to receiving an invitation to participate in ROGI. We collected data from graduate intern teaching portfolios and postconference meetings. A graduate assitant conducted

an interview with each graduate intern following the internship experience, asking the graduate interns to provide thoughtful answers to 26 open-ended questions. The questions related to their experiences with ROGI, their likes and dislikes of ROGI, their experiences with face-to-face observations, their likes and dislikes of face-to-face observations, and their preferred mode of observation. The graduate assistant recorded, coded, and transcribed the interviews.

Experienced university supervisors, content methodologists, and site-based personnel conducted the observations of graduate interns. The two university supervisors, who were also content pedagogy experts, observed each graduate intern a total of five times, and the cooperating teacher/school administrators each conducted four observations. The cooperating teacher and administrator's observations all were face to face. Two of the university supervisors' observations were traditional face-to-face observations, whereas three were remote observations. For the first observation, both supervisors observed the intern face to face. During the second observation, one supervisor observed face to face, and the second supervisor observed remotely. The roles of the supervisors were reversed for the third observation. Both supervisors observed remotely for the final two observations. The college of education's director of field experiences, a veteran observer with more than 25 years experience, participated remotely in the fourth observation as a means to triangulate data. We used observer feedback and observational data provided on the Observation Feedback Form to capture various aspects of both processes and evaluate the project. We made comparisons between observers and by the mode of observation, in addition to analyses of each graduate intern using observer data collected from a required collegewide common scoring rubric and open-ended feedback form that asks the supervisor to identify the strengths of the intern, areas of improvement for the intern, and any comments or suggestions.

University supervisors also provided journals covering their experiences and written reflections on lessons learned. These data included the university supervisors' views on the overall experience, the use of technology, and the comparison of observational methods. In addition, we evaluated data from archived Centra teaching observation transcripts for remote observations. Centra has a text-chat feature that university supervisors used to communicate with each other and with the camera operator. Finally, the graduate assistant conducted, recorded, transcribed, and coded interviews with university supervisors following the internship experience.

Each of the researchers read the qualitative data, including observational transcripts from Centra, supervisor reflections, and graduate intern and university supervisor interview transcripts, three times. Each researcher highlighted commonalities in the transcripts and then compared them for themes using the constant comparative method (Glaser & Strauss, 1967). We attended four meetings to discuss findings and interpret emergent themes. Each time, we read and reread data to affirm researcher agreement on themes and to explore participant meaning. After we identified patterns and sorted the data into domains (Huberman & Miles, 2002; LeCompte & Schensul, 1999), we identified and cited specific examples from the narratives to support each of the emergent themes.

We analyzed quantitative data from observational tools using a multistep process. First, we made statistical comparisons using the observation assessment rubric to evaluate differences among observers (cooperating teacher or school administrator and university supervisors) and differences between graduate interns (Teacher 1 and Teacher 2). Second, repeated measures were performed by the teacher and between observers to measure reliability of data. Third, we calculated summative scores for each of the 10 variables identified within the scoring rubric. Variables align with the 10 Interstate New Teacher Assessment and Support Consortium (INTASC) standards for initial licensure (see http://www.ccsso.org/Projects/interstate_new_teacher_assessment_and_support_consortium/). Finally, we made intraclass comparisons to determine if differences in observation scores were attributed to variance among observers or differences between graduate interns.

We evaluated observational feedback data from the open-ended observer form using the constant comparative method (Glaser & Strauss, 1967) to identify emergent themes as recognized characteristics of good teaching. We met four times to discuss themes and confirm consistent meaning of characteristics across observers. Next, we independently reread observation data using themes to quantify frequency of occurrences and evaluation of good teaching characteristics. We categorized observer evaluations as interns' strengths or weaknesses to allow for comparisons across interns. We discussed the data and created a common chart measuring consistency across observers by intern. Qualitative methods of evaluation followed established evaluative processes (see Marshall & Rossman, 1999; Patton, 1990).

Results and Implications

Are Remote Observations Equivalent to Face-to-Face Observations?

The first research question explored the issue of whether or not remote observations are equivalent to face-to-face observations. We define equivalent as being the same in effect, value, and meaning. We evaluated quantitative data to understand if the observational processes were interchangeable in allowing consistency in assessing teaching performance and in observing attributes of successful teaching behaviors. Data from the standardized observation rubric documented consistency in observed teaching improvement over four observations for each graduate intern. Over time, average observation scores improved (see Figures 1 and 2, p. 158), although the lateral-entry teacher (Teacher 1) received higher ratings by all observers than the student teacher (Teacher 2). Analyses of estimated mar-

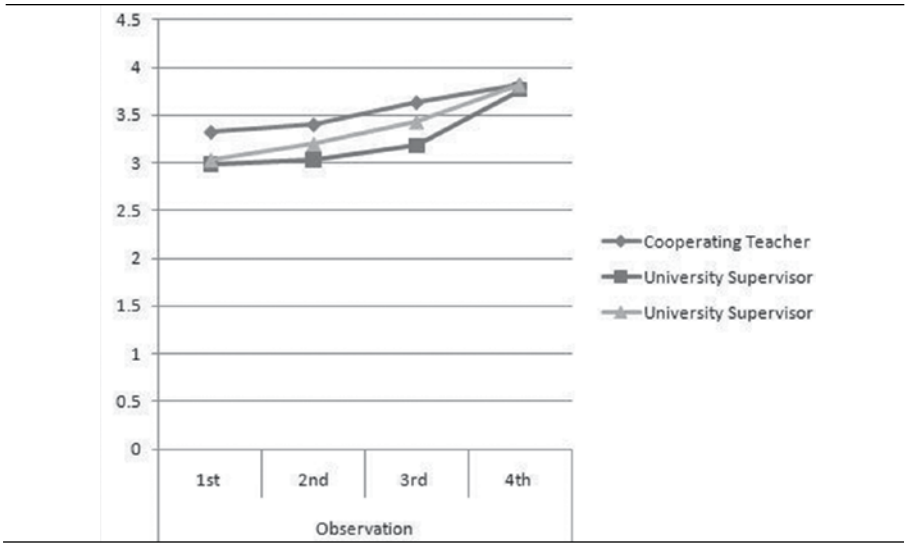

Figure 1. Average summative evaluation of teaching by observer over time for Teacher 1.

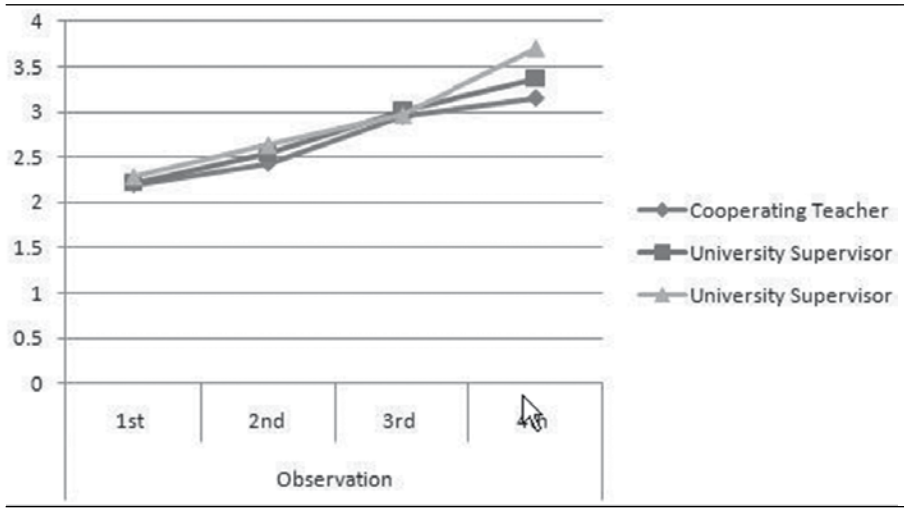

Figure 2. Average summative evaluation of teaching by observer over time for Teacher 2.

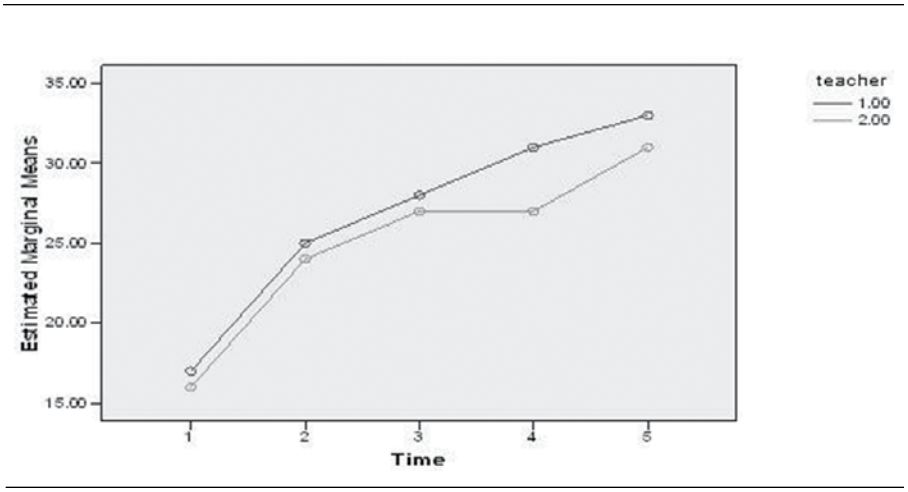

Figure 3. Estimated marginal means of observation assessment rubric by teacher over time.

ginal means for all 10 INTASC standards (or measured variables) for initial licensure affirmed reliability of these findings, indicating that over time both graduate interns demonstrated growth in their teaching (see Figure 3). Data support an accepted expectation of an effective internship program—that over time and with support of the university supervisor and onsite mentor, interns will improve their content and pedagogical knowledge and skills.

We attributed the observed differences in teaching effectiveness as measured by the common teaching rubric to the differences in experiences of the two graduate interns and not to the mode of observation or observer. As presented in Figures 1 and 2, data indicate consistent agreement across observers over time for each teacher. Teacher 1 was a certified elementary teacher with 6 years of elementary teaching experience prior to becoming a lateral-entry middle school math teacher. Teacher 2 was a second-career professional student teaching in secondary social studies. He had retired from the military and chose to student teach rather than pursue a lateral-entry position for the benefits of having a cooperating teacher and supportive internship experience. Teacher 1 was consistently rated higher on all observations and was noted to be a more experienced instructor and fluid at adapting content and instruction to meet diverse student needs.

Furthermore, to evaluate whether or not the mode of observation could have affected observer evaluations of intern performance, we calculated estimated measures of marginal means for each of the 10 variables measured within the standardized assessment rubric by observer and over time for each graduate intern. The data that Figures 4 and 5 present indicate agreement across observers and over time for all 10 variables. Observer 1 was the school administrator, and Observers 2 and 3 were the university supervisors. For example, Teacher 1, although an experienced teacher, initially did not provide the level of depth in her instructional plans needed for success. Although her planning (Variable 7),

as evaluated by university supervisors and administration, was acceptable (Level 3) at the first observation, she did not demonstrate exemplary (Level 4) pedagogical thinking until her third observation. Data indicate agreement across observers even though observations occurred both face to face and remotely. Likewise, Teacher 2 struggled with student motivation and classroom management (Variable 5) in the first observation (Level 2 or below expectations) but made gradual improvements in his skills over the next three observations (as noted by observer evaluations of levels of upper 2s to 3s). The pattern in observer evaluations of teaching behaviors was consistent for each observation whether or not the observation occurred face to face or remotely.

With opportunities to practice management skills and pedagogy and build content expertise, the accepted expectation among teacher educators are that interns should demonstrate growth over time. Data from the observation assessment rubric and data from open-ended evaluation forms support this general assumption. Aforementioned quantitative data document intern growth over time (see Figures 1–5).

Evaluation of open-ended data presented a richer understanding of the observed characteristics of good teaching behaviors. Analyses of qualitative data revealed emergent themes of observed characteristics of teaching: instructional strategies, classroom management, organization, questioning techniques, student engagement, content, feedback, and assessment. To determine reliability and consistency in feedback across observers participating in a synchronous (remote) observation, we noted the frequency of emergent themes and whether these were identified as strengths or weaknesses. For the purpose of this study, we selected the fourth observation for each graduate intern to qualitatively evaluate inter-rater reliability in a remote observation. The purpose of using this observation was to examine if observers were able to consistently measure common traits of

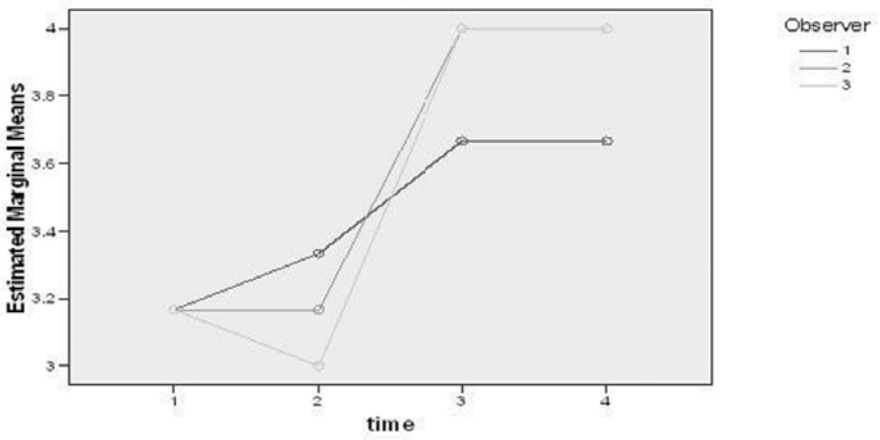

Figure 4. Estimated marginal means by observer evaluation of teacher 1's instructional planning.

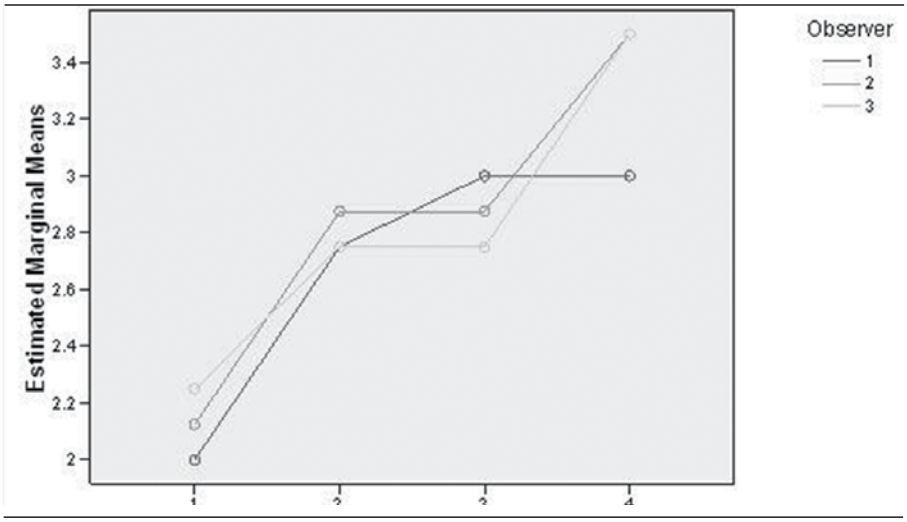

Figure 5. Estimated marginal means by observer for Teacher 2's student motivation and classroom management.

good teaching in an online setting. As an additional attempt to cross-validate data, the fourth observation included comparisons with an extensively experienced observer, the director of field experiences. All three observers conducted this observation remotely and independent of other observers. Tables 1 and 2 (p. 160) present the findings.

Overall, observers generally agreed in all observation categories for both graduate interns. Observers were consistent in identifying common elements of effective teaching. They also noted similar areas for improvement. There was consensus among observers that Teacher 1 was a stronger teacher and exhibited successful pedagogical strategies. Teacher 2 had more areas for improvement across observers. There was some variance in frequency of noted strengths and improvements, although overall agreement exists. Differences can be attributed to observer expertise. University Supervisor A is a math methods specialist, holds initial and advanced licensure in middle and secondary mathematics, and was the lead instructor for Teacher 1. University Supervisor B was the lead instructor for Teacher 2, holds advanced licensure in grades 6–12 and secondary social studies and initial licensure in grade 6–12 mathematics, and is the social studies methods specialist. The director of field experiences has 25 years of observational experience and holds advanced licensure in all core content areas, including mathematics and social studies. Overall, data indicated that all observers were able to independently observe common characteristics of effective teaching. Agreement across observers, who observed independent

Table 1. Comparison of Observation Feedback for Fourth Observation for Teacher 1 by University Faculty

Teacher 1	Evaluator					
Lateral-Entry Teacher Middle School Math	University Supervisor A		University Supervisor B		Director of Field Experiences	
	Frequency of Occurrence in Observation Feedback Form					
Emergent Observation Feedback Themes	Identified Strength	Recommend Improvement	Identified Strength	Recommend Improvement	Identified Strength	Recommend Improvement
Instructional Strategies	2	1	2	1	1	1
Classroom Management	2	1	3	1	2	1
Organization	2		3		2	
Questioning Techniques	2		2		1	
Student Engagement	3	1	4	1	2	1
Content	3		2		2	
Feedback/ Assessment	2	1	3	1	2	1

Table 2. Comparison of Observation Feedback for Fourth Observation of Teacher 2 by University Faculty

Teacher 2	Evaluator					
Student Teacher Secondary Social Studies	University Supervisor A		University Supervisor B		Director of Field Experiences	
	Frequency of Occurrence in Observation Feedback Form					
Emergent Observation Feedback Themes	Identified Strength	Recommend Improvement	Identified Strength	Recommend Improvement	Identified Strength	Recommend Improvement
Instructional Strategies	2	1	2	1	2	1
Classroom Management	2	1	2	1	1	1
Organization	1	1	1	2	1	2
Questioning Techniques	2		2		2	
Student Engagement	2	1	2	1	1	1
Content	1	1	3	3	1	1
Feedback/Assessment		1	1	1	1	1

of each other, affirmed that the remote observation process did not impede their ability to evaluate each intern's teaching performance.

Are There Differences in the Remote and Face-To-Face Observations? If So, What Are These Differences?

The analysis of the observational transcripts unveiled five emergent themes regarding the differences in the observational processes. These data present the best description for how all participants perceived these differences. Themes included sound, video, curriculum materials, observation forms, and added value of technology.

Sound. The data revealed problems and challenges related to sound as well as success and added value. During the first observation of the first intern, there was no sound. The camera did not have an external microphone, so the observers were not able to hear the graduate intern and were able only to view the graduate intern. This issue was resolved by using an external microphone connected to the computer. During the first observation of the second intern, the observer was able to use the external microphone; however, what was heard was limited. The students' comments were not clear, and when the graduate interns posed questions, the observers could not hear the students' responses. Small-group conversations were not audible. The supervisors had to request clarifications from the camera operator. At times, even the teacher was difficult to hear. The external microphone was effective only with teacher-directed instruction, and even then it was limited. This experience led to the use of a wireless microphone.

With the implementation of the wireless microphone, sound quality drastically improved. Not only could the teacher could be heard clearly, but this device provided access to teacher–student individual interactions that were not accessible in face-to-face observations. The observers could hear whispers between teacher and student, making it possible for observers to access teacher feedback. Evaluations included nuisances of teaching, such as student behavior and discipline actions, as well as teacher feedback and one-to-one instruction. Teacher–student conversations were not observable in face-to-face observations, so the remote setting uncovered a new layer of teaching evaluations.

Video. The data analysis revealed limitations of the streaming video. The video in Centra provided a limited scope of what is viewable in the classroom. All students were not visible on the screen at one time, as the supervisor could see only the view that the camera projected. There is a need to scan the room to see the intricate aspects of teaching, such as what all students are doing and where the teacher is in proximity to students with discipline issues or students with special needs. The video does not provide personalization. The students' facial expressions are difficult to read unless the image is close. The supervisor can see only from one camera angle, which may not capture both the student's and teacher's expressions in detail. The size of the video is also limited, which is a limitation of Centra. Only two sizes of viewing screen are available through Centra. When using the larger undocked view, the images become somewhat distorted because pixilation is reduced. The clarity of the video is also restricted. This again is due to the limitations of Centra and of the camera. Finally, the room and lighting affects the observation. The windows can lighten or darken the video, so room lighting is essential. Both of these can disturb the clarity of visual images.

Curriculum materials. In a traditional face-to-face observation, the graduate intern provides all curriculum materials for the university supervisor to view both before and during the observation. During the initial observation, we realized the importance of access to these materials. We asked the graduate interns to e-mail instructional materials to the supervisor prior to the observation. This provided several benefits for the supervisor. The supervisor uploaded PowerPoint presentations, lesson resources, readings, political cartoons, etc., to Centra for all observers to view simultaneously with teaching observations. The observer followed curriculum materials during the teaching of the lesson because Centra allowed two windows to be viewable at the same time. Centra document-sharing features also proved to be beneficial during the postconference with the graduate intern. Observers provided feedback immediately so the intern could read instructor comments during the debriefing session.

Observation forms. During the initial observation for each intern, the supervisors did not have access to electronic versions of the observation forms. This served as a barrier during the postconference, as the supervisors could not share the forms with the interns, as they could in face-to-face observations. We obtained e-versions of these forms and used them for subsequent observations. This was a benefit in that the observation forms and evaluations could be shared with the graduate interns via Centra during the postconference.

Added value of technology. Although we uncovered several limitations during these remote observations, we also discovered several benefits. Multiple observers could take part in an observation. This provided different lenses on learning, from both the pedagogical and content-area sides. ROGI allowed for limited class intrusion. Multiple observers in a classroom would cause a disruption in a traditional face-to-face observation and affect student behavior as well as intimidate novice teachers. ROGI "encouraged real teaching and not just a performance." The camera size was small and less noticeable to both the graduate interns and students than a person sitting in the room observing. Interns noted forgetting that the camera was in the classroom; however, in face-to-face observations, they did not indicate these feelings and instead acknowledged differences in student behavior from the norm as well as in their own nervousness about being observed.

Centra allowed uploading written feedback that was both viewable during the postconference and available for multiple viewers. This provided immediate, rich feedback on the lesson plan, observation, and curriculum materials. This immediate feedback simulated that of a traditional face-to-face postconference. The graduate intern received recommendations for instant implementation. Interns noted in their final interviews that they made changes to subsequent lessons the day of the observation.

Cost-benefit analysis revealed significant cost differences in modes of observation. A single university supervisor conducting a total of five face-to-face observations for two graduate interns would have cost the university a total of $864.60. For two university supervisors to provide the same number of observations, as occurred in this study, would have cost $1,723.20. The general practice is for graduate interns to be assigned a single university supervisor, so the latter figure is not truly reflective of actual costs but does present the argument that ROGI offers new alternatives to the observational process than are possible in traditional settings. These figures, in comparison to the two observations that were conducted face to face for each intern, was significantly higher than the $345.84 that was incurred during the pilot study.

Table 3. Round-Trip Cost for One Observation at Each School

School	Mileage	Cost*	Travel Time
Middle	72.72	$42.54	1 hour 22 minutes
High	75.1	$43.92	1 hour 20 minutes
Total	147.82	$86.46	2 hours 44 minutes

**Reimbursement per mile ($.0585) in this state*

Another added value of ROGI was travel time saved (see Table 3). Although observation time did not vary depending on mode of observation, travel time to these remote face-to-face sites does. It would have taken two university supervisors 54 hours and 40 minutes for roundtrip travel to conduct five observations for two graduate interns. The actual time savings for the university supervisors in this study were 32 hours and 48 minutes. Time savings in travel could potentially affect university supervisors' workload capacity by enabling them to observe more interns during a semester for the same amount of time as face-to-face observations.

Do Differences in Observational Processes Affect the Quality of Teacher Preparation?

Additional qualitative data from summative interviews provided evidence that face-to-face and remote observations were interchangeable processes, based on the comparison of experiences of interns and university supervisors. In both settings, university supervisors observed each intern teach a lesson and then conducted a postconference immediately following observation. For remote observations, they conducted the postconferences using a webcam, headset with microphone, and the ROGI classroom technology. Both interns commented that they felt comfortable with classroom observations and noted personal and professional growth as a result of the overall internship experience. Teacher 1 commented that she found observations helpful and stated that "to see and to give you some input on knowledge that they may have, things that may help you with things that went wrong with that one class…. That is very helpful." Teacher 2 acknowledged that he "enjoyed the observations. I felt that professors actually seeing ... how you are

managing your classroom in approaching your lesson. It's very beneficial to your teaching future." The interns commented on the importance of having an expert observe their teaching and the value of feedback in helping them recognize strategies for improvement. They noted gaining positive feedback and strategies for improvement and did not distinguish differences in teaching evaluations based on the mode of observation. Teacher 1commented that she valued getting "a different perspective from someone observing my class.… Everything they told me about in the debriefing I found helpful. I tried to use these suggestions and be better or improved on them the next time they observed me." Teacher 2 affirmed these feelings in his interview: "They [university supervisors] can see firsthand how you are doing things, and they [university supervisors] can comment on the spot…. They observe you and correct you on the spot. I felt that face-to-face and remote observations can do the same thing. They can fix it right there." In addressing a question asking interns to compare the observation processes, Teacher 1 stated that the observation process was "not that much different in that you still get to the conference afterwards, and the technology was wonderful." She did, however, frequently (in 13 separate comments) note in her interview that she was more comfortable during the remote observation process than face-to-face. She indicated that that technology enabled a more authentic snapshot of her teaching. Teacher 2 stated that "both observation processes helped me. Yeah, I felt both of them [face-to-face and remote observations] were beneficial … to my success.… There is no, one or the other that was … that weighed more heavily on me being successful or unsuccessful." Although he did equate the processes, he was not as comfortable with the remote observation because he not did have someone in the classroom in case things went awry with his teaching.

University supervisors also spoke about their experiences as observers in both face-to-face and remote settings in their interviews. All supervisors felt comfortable using either observation processes and noted that they felt that they could assess interns' teaching effectively assessed in either setting. University Supervisor A commented, "I think we have tried to simulate the face to face so much that we have found the remote observation to be reliable, reliable between supervisors, and from experience I do think they are both effective." University Supervisor B stated that "… overall both methods of observation are very comparable." The director of field experiences also affirmed these data by stating that she did not "feel that there were major differences in watching an intern teach on the computer versus sitting in a classroom." Based on these and aforementioned analyses, assessment data provide evidence that the remote observations are interchangeable with face-to-face observations in measuring the overall effectiveness of teaching.

Discussion and Implications

In comparing the two observational processes of face-to-face and remote (ROGI), we found that the modes of observation are not equivalent methods for evaluating graduate interns; however, data suggest that these processes are comparable. Each mode of observation has both benefits and limitations, but neither process was overall a more effective method of evaluating the quality of teaching.

Equivalency means that the observer and intern had the exact same experience despite the mode of observation, which did not occur in this study. Each mode of observation presented differences in observational experiences for participants, although these were interpreted as both benefits and limitations. Although face-to-face observations allowed the observer more autonomy over what was observable as well as clear, discernable views of facial expressions, the process was more intrusive to the graduate interns and presented a staged lesson that was not truly reflective of teaching practices and student behavior. ROGI, in contrast, was less intrusive and presented a more authentic view of teaching and learning; however, it did not allow for full disclosure of the entire classroom at all times, and facial expressions were less vivid. One significant contrast in the mode of observation was what the observers heard. Face-to-face observations provided an environment in which student voice and participation were easily understood; however, when students were working in small groups or independently with the teacher, student voices were not distinguishable. In contrast, ROGI with the use of a wireless microphone provided opportunities to hear teacher–student and student–student exchanges in both small groups and individual interactions; yet, in the whole-class setting, student input was difficult to understand. Both of these examples as well as overall data findings suggest that neither mode of instruction was without flaw. Despite limitations posed by the modes of observation, benefits were gained in both processes, distinguishing each as interchangeable but not equivalent.

By comparison, we purport that observational experiences for all participants were similar and interchangeable without compromising the quality or value of the internship in promoting professional growth. As these data indicate, the mode of observation did not inhibit the observer from deciphering elements of effective teaching and good teaching behaviors; thus, the observer, whether sitting in the classroom or viewing synchronously, was able to provide essential feedback to help the graduate interns improve their pedagogical practices. Data analyses suggest that the mode of observation did not affect the overall outcome of improvement for both graduate interns. Feedback from observations, whether they were conducted face to face or remotely, identified common elements of successful teaching. Differences in summative evaluation of the interns' performance were attributed to differences between the two interns and observer expertise.

Data also indicated that ROGI does offer a viable and fiscally wise alternative for

conducting teaching observations. Over time, the investment in hardware and software was more cost effective and time efficient than would have been possible if five face-to-face observations had been required for each intern. Additionally, having a second university supervisor is both cost and time prohibitive; however, ROGI allowed for additional expertise and cross-validation of performance assessment of graduate interns. Thus, we conclude that, as both observation processes are comparable and effective teaching can be measured either face to face or remotely, the added layers of the evaluative process and the potential cost benefit of technology-mediated observation is a justifiable alternative, challenging traditional perceptions of teacher preparation.

As colleges and universities seek innovative strategies to address teacher shortages, increase enrollment by tapping new populations, and respond to economic pressures for lower operating costs, ROGI offers an opportunity to expand educational outreach for teacher licensure programs beyond traditional geographical boundaries. This research provides possible uses of technology that can be expanded to address growing pedagogical needs in an evolving online teaching and learning community. To fully embrace the capabilities of emergent technologies, additional research is needed to explore the effectiveness and feasibility as well as the impact of the widespread use of ROGI.

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