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PEDAGOGY

Student Teachers' Perceptions of Traditional Observation Versus Virtual Observation

Brandy M. Lynch, Jennifer M. Krause, Scott Douglas

Abstract

One of the most important stages in preservice teacher training is the student teaching experience. The university supervisor (US) plays an integral role in this developmental stage by maintaining a connection between the cooperating teacher, student teacher (ST), and the university. While the traditional method of observing STs has been found to be effective, universities are seeking alternative means of conducting teaching observations that alleviate time, distance, and financial constraints. One such option is virtual observation through video chat programs. Thus, the purpose of this study was to determine STs' perceptions of the effectiveness and feasibility of virtual observation versus traditional observation in physical education teacher education (PETE). Results showed STs prefer virtual observation with a PE content expert over traditional visits if the US did not have PE content expertise. STs noted technological challenges such as Wi-Fi connectivity and environmental distraction with virtual observation. Benefits of virtual observation include increased ability to hear STs' interactions with students, improved feedback potential, less travel time, and financial savings. Results of this study suggest that while traditional on-site observation visits are preferred and ideal, virtual observation is a viable alternative when technological challenges are appropriately addressed.

Brandy M. Lynch, School of Teaching and Learning, University of Central Missouri.
Jennifer M. Krause, School of Sport and Exercise Science, University of Northern Colorado
Scott Douglas, School of Sport and Exercise Science, University of Northern Colorado.
Please send author correspondence to brlynch@ucmo.edu

One of the most important stages in preservice teacher training is the student teaching experience, where education majors embark on a full-time semester-long "internship" in a school setting (Behets & Vergauwen, 2006/2012; McIntyer et al., 1996). This experience provides student teachers (STs) an opportunity to utilize acquired content knowledge and pedagogical skills in an authentic environment. When the principal of a placement school agrees to host a university student for this practicum experience, the ST is then paired with a cooperating teacher (CT) from that school, who provides direct supervision throughout the placement. In addition, the ST is assigned a university supervisor (US), who completes the "student teaching triad." This individual, ideally a university faculty member, typically travels to the placement school to conduct formal observations and evaluations. The US becomes a link between the university and the placement school, helping to navigate any pedagogical priorities and teaching practices that may conflict with the teachings within the teacher education program. Additionally, the US must possess a strong understanding of the university requirements and licensure standards for which STs are held accountable (Yusko, 2004). A typical observation visit involves a preconference with the ST and CT, followed by a teaching observation with the use of a teacher feedback form, and on occasion, systematic observation instruments, and finally, a postlesson conference to discuss strengths and weaknesses. The quality of the supervision provided is a critical component to a successful student teaching experience (Kaufman, 1992; Slick, 1997).

While the traditional method of supervising STs has been found to be effective, several issues have been noted. Time and financial constraints have caused many problems with this approach. Faculty members who serve as a US may struggle to appropriately balance supervision requirements and other university responsibilities related to teaching, research, and scholarship (Olson et al., 2001). For junior tenure-track faculty, much emphasis is often placed on activities that affect their professional advancement, such as improving teaching methods or preparing a manuscript for publication. As such, heavy workloads and rigorous research agendas make it difficult for a US to arrange time to complete formal observation visits, especially when a placement school is located far from the university

(Kelly & Bishop, 2013). Additionally, when a US is responsible for multiple STs, a significant amount of time in their schedule must be set aside for travel, which results in less time to devote to other, more scrutinized, university responsibilities (Olson et al., 2001). Furthermore, financial constraints have changed the way some universities conduct observations. As the cost of fuel increases, so then does the cost of travel to placement sites. It is common practice for a US to be compensated for mileage, which adds to already strained university budgets and therefore affects which schools STs can go to and the number of site visits allowed by a US.

In addition to time and financial issues, many universities allow STs to complete practicum experiences, such as student teaching, outside of the designated supervision area decided upon by the university. Many students choose to go out of state or even out of the country for a different experience or to be closer to home, which poses a unique problem in regard to assigning a qualified US. When this occurs, universities may experience difficulty securing an individual who is both qualified and available to stand in as the US. Often, the US role is assigned to a nearby individual who is deemed acceptable to complete the supervisory duties, such as a retired teacher in the area, another classroom teacher, and in many cases, the school principal. While these individuals possess a wealth of school-based experiences and are likely competent observers of basic teaching methods, several problems become evident. First, the person whose role is intended to bridge the gap between the university and the placement site may or may not have any affiliation with the university. Second, the quality of observation is questionable, as these supervisors may lack the familiarity and skill set required to successfully oversee and evaluate STs outside their subject area. For example, the dynamic, movement-oriented atmosphere physical educators teach in may be unfamiliar to those accustomed to more common classroom settings. Similarly, most classroom teachers and administrators are not always fully educated as to what effective teaching skills look like across different content areas (Lindsay, 2014). Finally, although a retired teacher has practical experience in a school setting, they may not hold the same values or beliefs as the university that has trained the ST. In such situations, a disconnect may occur between the content learned at the university level and

the content learned at the school district level, leaving a US unable to reinforce content or skills taught prior to student teaching (Carlin et al., 2013).

Due to the significant role the US holds in the supervision triad of a student teaching experience, paired with the issues discussed, universities are seeking alternative means of conducting teaching observations that alleviate time, distance, and financial constraints. One such option is virtual observation. With advances in modern technology, it is now possible to visually and synchronously communicate with others all over the world through video chat programs (e.g., Skype, FaceTime, Zoom). With this progression in technology, it is possible for a US to virtually observe an ST's lesson without the need to travel. This innovation provides a possible solution to issues previously discussed. With the elimination of time spent commuting to placement schools, the highly qualified US now has more time available to virtually provide meaningful observations and valuable feedback to STs while maintaining direct connections to the university. Another favorable benefit for the university includes the significant decrease in the amount of funding needed for mileage reimbursement. Additionally, virtual observation offers a potential solution to other common issues related to scheduling observations, as well as to the overall quantity and quality of observations.

Some of the most evident benefits of virtual observation revolve around its effect on scheduling observation visits. Studies exploring virtual observation of STs have reported increases in the frequency and duration of observations, consistently noting when not having to consider travel time when arranging "visits," the US was more likely to schedule additional visits and/or longer observations (Burrack, 2007; Carlin et al., 2013; Pemberton et al., 2004). Similarly, there is more room for flexibility when it comes to rescheduling with virtual observation compared to more traditional approaches (Falconer & Lignugaris/Kraft, 2002). The value of a visit for observation purposes might also increase with the elimination of travel, as a US's energy level and focus are affected by long commutes (Carlin et al., 2013).

Concerning the quality of observations, Heafner et al. (2011) concluded both virtual and face-to-face observations of teacher education candidates were comparable in supporting ST growth and in measuring teacher effectiveness. Research findings have also revealed

implementation of a wireless microphone during virtual observation not only improves the sound quality of the video but also provides increased access to individual teacher–student interactions that are not easily available during face-to-face observations (Heafner et al., 2011; O'Neil et al., 2017). In addition, virtual observation has been found to be less disruptive (Falconer & Lignugaris/Kraft, 2002), less distracting (Carlin et al., 2013; Heafner et al., 2011; Scheeler et al., 2012), and unobtrusive (Dymond et al., 2008) compared to traditional forms of observation.

Synchronous videoconferencing technology has many benefit, but it nonetheless presents certain challenges to the supervisory process. The most prominent challenges to virtual observation involve technical difficulties stemming from complications with internet connectivity (Falconer & Lignugaris/Kraft, 2002; Gronn et al., 2013; O'Neil et al., 2017), hardware acquisition, equipment maintenance, and software crashes (Dymond et al., 2008; Falconer & Lignugaris/Kraft, 2002; Heafner et al., 2011). Setup and preparation of the technology system, including lack of familiarity with the technology (Pemberton et al., 2004), network access restrictions (Burrack, 2007; Falconer & Lignugaris/Kraft, 2002), limited scope of the camera angle (Heafner et al., 2011; O'Neil et al., 2017; Teo et al., 2015), and heavy, cumbersome equipment (Carlin et al., 2013), also present other challenges to utilizing this observation method. O'Neil et al. (2017) found that the virtual format of observation affected the ability of the US to build personal rapport with STs. Thus, there is significant evidence documenting the benefits and challenges of virtual observation. Therefore, to provide STs with the most valuable supervision experience possible, virtual observation should continue to be considered as a viable alternative to traditional observation methods as more research is conducted to explore these benefits and challenges.

While this virtual method of observation seems innovative and timely, research is needed to explore the effectiveness and feasibility of virtual observation in practicum settings compared to a traditional, face-to-face format. This study explored perceptions of STs with regard to traditional observation versus virtual observation in terms of the quality of observations, quality of interactions, technology logistics, ease of use, benefits, and drawbacks. The purpose

of this study was to determine STs' perceptions of the effectiveness and feasibility of virtual observation versus traditional observation in physical education teacher education (PETE). We accomplished this by investigating the following research questions: (a) What are the perceptions of STs regarding the effectiveness of virtual observation compared to traditional observation in physical education, specifically concerning the quality of observations and quality of interactions? (b) What is the feasibility of virtual observation in PETE in terms of technology logistics, ease of use, benefits, and drawbacks?

Method

Participants

Participants in this study were eight (4 male, 4 female) STs enrolled in a physical education K–12 teacher preparation program in the Northwestern United States. The study took place over two semesters, with four participants each semester. Group 1 (Semester 1) consisted of four female STs and Group 2 (Semester 2) consisted of four male STs. All four STs in Group 1 and one ST in Group 2 received both traditional observations and virtual observations by the US. One ST in Group 2 was observed by the building principal once and had five virtual observations by a US. Two STs in Group 2 received virtual observation only. Table 1 displays placement and observation details for each participant. Prior to student teaching, participants had over 640 hr of school-based field experiences, and those that required an observer were traditional (nonvirtual) in nature. Participants received basic training on how to set up and implement virtual observation tools at the beginning of their student teaching semester.

A university physical education pedagogy faculty member identified possible candidates for the study, according to the inclusion criteria of enrollment of the student teaching experience and having wireless internet access in their schools. Participants were contacted in person, informed of the nature of the study, and invited to participate. Participants completed a consent form in accordance with university Institutional Review Board policy.

Table 1
Participant and Placement Characteristics

Participant	Sex	Observation type received
ST1	Female	3 Traditional (OAS); 3 Virtual (US)
ST2	Female	4 Traditional; 2 Virtual (US)
ST3	Female	4 Traditional; 2 Virtual (US)
ST4	Female	4 Traditional; 2 Virtual (US)
ST5	Male	3 Traditional; 3 Virtual (US)
ST6	Male	1 Traditional (OAS-P); 5 Virtual (US)
ST7	Male	6 Virtual (US)
ST8	Male	6 Virtual (US)

Note. OAS = out-of-area supervisor; US = university supervisor; OAS-P = out-of-area supervisor-principal.

Instruments

Participants completed initial open-ended questionnaires as well as focus group interviews with open-ended, semistructured questions to explore participants' perceptions of and experiences with traditional observation and virtual observation in terms of effectiveness and feasibility. We created, piloted, and revised the questionnaire and interview guide for this study. As a result of pilot testing, some questionnaire and interview questions were reworded and refined to increase clarity (Creswell, 2013). Questionnaire items focused on STs' perceptions and experiences with traditional observation and virtual observation during their student teaching practicum, specifically regarding the effectiveness and feasibility of virtual observation compared to the traditional face-to-face format. The STs completed a paper-and-pencil version of the questionnaire at the end of their student teaching placements. We used questionnaire responses to complement and corroborate findings from subsequent focus group interviews.

In addition to questionnaire data, STs also participated in one of two focus group interviews. We designed questions on the interview guide to gain insight into how STs perceived (a) benefits and drawbacks of traditional observation (e.g., "What are the benefits of having

a US observe your teaching on campus; virtually?"), (b) experiences with virtual observation in terms of benefits and drawbacks regarding feasibility, quality of observation, logistics, quality of technology ease of use (e.g., "What challenges did you encounter with virtual observation?"), (c) comparison of the two methods (e.g., "How would you compare traditional observation with a non-university US with virtual observation with someone from the university?"), and (d) recommendations and preferences (e.g., "Would you recommend using virtual observation in the future?"). The interview guide was used with both focus groups for consistency. The semistructured format allowed for probing and follow-up questions to allow for clarification, exploration, and expansion of the main questions.

Data Analysis

To best answer the research questions, we used a qualitative approach. We used questionnaires and focus groups to explore topics included in the two research questions. We analyzed data collected from the questionnaire using document analysis techniques to identify the extent to which collected data substantiated interview data, a recursive and dynamic process originated from the emergent design that many qualitative researchers encourage and apply (Merriam, 2009). We independently analyzed focus group interview data to conceptualize trends and emergent themes, using initial codes derived from the research questions, key concepts, and important ideas. After each of use completed all independent analysis, we compiled and compared identified trends and themes. We used this method of independent analyst triangulation to increase the validity of the findings. Additionally, we used triangulation within and across data from questionnaires and focus group interviews to strengthen the credibility and dependability of the study (Creswell, 2013).

Results

The purpose of this study was to investigate STs' perceptions of the effectiveness and feasibility of traditional observation versus virtual observation in terms of quality of observation, logistics, quality of technology, and ease of use. Based on the analysis, themes with selected quotes that illustrate the opinions and experiences of the eight participants are provided in this section and are listed as ST1 to ST8.

Perceptions of Traditional Versus Virtual Observation

Quality of Observation

Four of the six participants who experienced both traditional observations and remote observations indicated that, in general, they favored a traditional observation over an observation conducted virtually by a US, as illustrated by the following examples:

> I think I got more in person. I don't know, I just felt weird . . . I felt the face-to-face feedback at the end was better in person. I also think that actually being there you get a sense of, like, the atmosphere, whereas on video might not get that. (ST4)

> If someone is there physically, they can see everything more. [With virtual observation] they might not be able to see everything that's going on constantly. And, they can give you feedback right on the spot. (ST2)

Similarly, ST1 believed face-to-face observations might allow the US to notice more throughout the lesson, suggesting "maybe [the US] would have caught a couple more details if they were there in person."

Participants, however, viewed virtual observation as a viable option to traditional observation and preferred the virtual format with a PE content expert over traditional visits if the US did not have PE content expertise (i.e., school principal). ST7 stated, "I would rather have virtual." The following excerpts are other examples of this preference:

> I'd say virtual for sure, because I had a principal do it the first time. There wasn't any specific feedback at all. It was, "Hey, good job. I like your management. You did well." And it's like, "You did a good job." They don't understand it from the university side. This is exactly what I'm looking for. And then, my CT hasn't been in college for a really long time. She's about to retire. (ST8)

> There was this retired principal that if this [virtual observation] didn't work out she was going to be the one

> who was going to observe me. She was older and had no PE experience. The CT even told me that [the retired principal] wouldn't be able to give me any applicable feedback to PE because she's never taught PE. (ST3)

Interestingly, ST8 commented about the acceptance of a "noncontent expert" being adequate as a US but only if the CT was really good:

> But if you have a good CT . . . then I would be fine with the principal coming in because the principal is the one who hires PE teachers. If your CT is good and they give you good feedback, then I'd be fine with the principal. I just feel like I got more feedback from my CT anyhow. If a principal would have come in, compared to a US, it wouldn't have made a substantial difference.

Quality of Interaction

Having the ability for the US to hear the ST (using an earpiece) regardless of placement in the gym allows for a richer assessment of teaching behaviors, as shown by the following example: "I like how you can actually hear what I'm saying to every student…and then you know I am getting to every student and giving them that specific feedback – not like when you're there [in person]" (ST5).

Having an ST with an earpiece had substantial benefits to both the US and the ST with their feedback and communication. As shown in the following examples, the ability to communicate with the US during teaching was seen as a positive to some, but the US must make sure that the ST is comfortable receiving feedback and/or instruction from the US during a "live" lesson with students:

> I would rather be getting feedback as its going. Like if you see that if I'm doing something wrong. I would rather you say, hey, you know, fix this now instead of waiting until the end. (ST2)

> I felt like [feedback from the US] was pretty much the same, honestly. Not that I don't like to see [the US] in person, but it was pretty much the exact same thing. (ST1)

> I thought it worked really well. The feedback was great. My [US] was able to write the whole time during my observation, so she didn't miss a beat. (ST6)

> It'd be really good if you had an earpiece and I had an earpiece and could just hear it as you're watching me (in school)" (ST5).

A few of the participants did not like using an earpiece and having feedback given to them by the US during their lesson, unless it was positive in nature. A couple of comments included the following:

> So [the US] said like one thing to me . . . [they] said something like 'more feedback' or something and I was like ok, I was totally off. I was just out of teacher mode. (ST4)

> I think that if they give you positive feedback, then you're encouraged and more excited through your teaching . . . you know, stuff like that. (ST2)

Because of technical difficulties, supervisor preference, or ST preferences, some participants did not have an earpiece in during their observations. ST2 noted,

> I think that could be something that you could talk about. Like, let your [US] know. Like, hey, I'm comfortable with you doing this (giving feedback while using an earpiece) or I would rather you wait until the end and kind of make it on your own.

ST3 said, "The only thing hard was not having the Bluetooth. [The US would] have to ask me about what I said in my closure. I wasn't very loud and I was just right next to the kids."

Feasibility of Virtual Observation

While participants had varying perceptions of observation when it was conducted virtually compared to traditional, face-to-face, STs also provided a range of responses concerning topics related to the effectiveness and feasibility of virtual observation. Such topics included technology logistics and ease of use.

Technology Logistics

Virtual observation in rural areas brought the biggest challenge to effective observations. The Wi-Fi connectivity of the gymnasium was paramount to effective implementation of a virtual observation. ST1 said, "In my gym at certain points it was like dead areas, but for the most part I never had an issue with ours." Others had issues with distractions from internet disconnections:

> The fact that the back gym that I was in was nothing but steel and concrete. You're not going to get a Wi-Fi connection back there. (ST2)

> If we were outside, I don't think that it would have worked at all. (ST7)

> Our [post-conference] was kind of awkward because we kept freezing . . . and then it'd be like, 'Sorry, [you were] frozen. Can you say that again?' So it was like 15 minutes of repeating everything. (ST8)

> I tried to do a lesson where we moved from the gym to the fitness room and back. I lost my supervisor halfway through it. You know, obviously that wouldn't happen if there was a teacher there. It gets you flustered. (ST6)

ST8 reported limitations on when he was able to utilize the school internet due to scheduled standardized testing. He explained, "The other hard thing with my school was scheduling times because they were testing and when they tested they used the internet. Nobody else was allowed to be on the internet for any purposes." A few participants experienced connectivity issues, which caused the earpiece to beep, as demonstrated in the following excerpts:

> I had issues with our Wi-Fi, so like every time it disconnected with [the US], I could hear it beep again [in the earpiece]. (ST5)

> When I had the Bluetooth in, as soon as it would disconnect, you'd hear the BEEP! BEEP! BEEP! I got disconnected about 12 times in the first five minutes. (ST2)

Ease of Use

Another feasibility issue that arose was earpiece comfort and its security. Effective physical education teachers are constantly moving around the gymnasium while giving feedback and motivating students to give their best effort. The earpiece can fall off the ST's ear, not feel comfortable during teaching, or simply malfunction, as indicated by the following remarks:

> Well, it just fell off a few times, but that didn't bug me necessarily. There were a few times when I jumped in to play and I was holding the earpiece and playing badminton. Like . . . this is really weird. (ST4)

> Sometimes it would be really easy to connect [the earpiece] to where Skype and my computer were and then sometimes it would be a major hassle. For 5 or 10 minutes before class started it would work and then it would kill itself. Then I was messing with [the earpiece], which would kill some time. (ST3)

When discussing the ease of use related to the implementation of virtual observation, participants identified various issues they had to overcome while trying to set up the technology necessary to conduct virtual observation. One participant had to find alternate software to use. Others just found it a drain on their time:

> I wasn't allowed to use FaceTime at the first school. It was like on their list of things you can't use, I guess. So I had to use Skype. (ST1)

> There was only one benefit, [immediate feedback], the drawback is it's more of a headache to do the virtual observation for that. (ST8)

ST8 had problems with general setup of the equipment because of their school's network password protection. He commented on these issues:

> My phone wasn't set up to the school and we were unclear of what we were doing until the night before. So I had to stop and go get the password . . . had to stop teaching . . . go get the password and set it up. And then we still couldn't connect, so then we had to retry it like another 30 minutes later.

Setup and installation also proved to be challenging for those participants with limited tech experience. However, ST4 reported feeling more at ease with the setup and implementation of virtual observation after familiarizing themselves with the technology prior to using it in an observation, as encouraged by the US. The participant explained, "Practicing brought my anxiety down. Like, I've already done this."

In addition, participants had to take special measures to protect the iPad or laptop computer being utilized for virtual observation purposes. This was an important factor in the gymnasium setting, where a lot of movement with various implements can generate inherent hazards to conducting observations virtually. The following excerpts are examples of these challenges:

> Yeah, I would just tell my students to watch out for my computer over there. Please try to avoid throwing the ball at it. (ST3)

> I'd always let them know what was going on in the corner, that it was there. Then I would put students over there if there was a student sitting out for some reason or if the CT was there. (ST1)

> I had nothing to lay mine on where I could be seen because we use the whole gym. My [CT] had to hold it . . . sometimes it was like at the ceiling because she'd be like talking to a kid and then she'd look at it . . . I think it depends on the age too, and what you're doing. (ST8)

Benefits of Virtual Observation

Participants identified several benefits of virtual observation. In addition to the increased feedback and communication during observations, the flexibility provided by virtually supervising STs with distant placements made scheduling and class time conflicts less of an issue. Significant cost savings and decreased distraction during observations were also reported. Many STs chose to return home to save money or travel to a school district where they had future aspirations to teach. The participants commented,

> I'm 1,200 miles away and I can get pretty much the same thing that a person can get, well almost, with a teacher being there. It saved me $5,000 from having to stay within the observation radius so I really appreciate the long distance observation. It was nice to be home and not have to pay rent. (ST6)

> It was just easier at times than for [the US] to have to travel down [to the placement site] and then go in and check in to schools and a lot of schools are weird about visitors and things like that. So it was nice and easy to just put a screen up and you're good to go. (ST1)

> I either had to teach another class or [the US] had another class. So they were missing class to come observe me and had to get back to campus. (ST3)

Additionally, a few participants reported that having a US complete an observation virtually was less of a distraction for the ST as well as for the students in the physical education class:

> Yeah, I was just doing my thing . . . it could have been disconnected and I wouldn't have known. I didn't even look at the screen one time. (ST4)

> I think to some extent it might be less noticeable to students. Like they notice a computer but not a new person in the gym. As soon as I was like, yeah, someone is observing us in that computer. After like 5 minutes, they don't even notice. (ST3)

Drawbacks of Virtual Observation

Besides setup and connectivity issues, participants identified that in some situations CTs' negative perception of virtual observation was a drawback. As a whole, CTs were mostly supportive of the participants using virtual observation in their gymnasiums. ST6 explained, "My elementary teacher, he liked it." Another CT commented, "Cool, sounds good" (ST2). A few, however, reacted negatively to the idea of virtual observation, which in turn made it more challenging for STs to implement:

> My second CT at one point made me go turn off the video so she could chew the students out a little bit. So that was a little weird. (ST3)

> My high school CT hates technology because he's been teaching for like 35 years. He thought it was a waste of time. Plus he couldn't talk the whole time. He found it frustrating. (ST6)

> Oh, I told [my CT] that we're doing [virtual observation] because there are kids that are outside the [university] area and she still thought that it was a joke. (ST8)

Discussion

The purpose of this study was to determine STs' perceptions of the effectiveness and feasibility of virtual observation versus traditional observation in physical education settings. The results section addressed topics such as quality of observations, quality of interactions, technology logistics, ease of use, and benefits and drawbacks of virtual observation. This section presents the research findings, as they pertain to the research questions, in relation to relevant literature.

Perceptions of Effectiveness: Traditional Observation Versus Virtual Observation

Quality of Observation

In general, participants in this study seemed to favor traditional face-to-face observation over observations conducted virtually, citing visibility limitations related to the camera angle and the inability of USes to read the class "atmosphere" in virtual observation settings. Such factors have also been identified in research as limitations of observations conducted virtually (Heafner et al., 2011; O'Neil et al., 2017). Krause et al. (2018) suggested utilizing a wide-angle lens attachment to increase the viewing angle. However, STs preferred virtual observation with highly qualified university faculty in circumstances when the assigned US might otherwise not be affiliated with the university and/or not have content expertise in physical education. This finding is consistent with prior research (Carlin et al., 2013; Lindsay, 2014; O'Neil et al., 2017), which suggests virtual observation is a viable option when someone affiliated with the program (faculty member, graduate assistant, qualified adjunct professor) is unable to travel to the placement school. This type of situation often arises when a placement school is located outside of the observation area designated by the university.

Quality of Interaction

Similar to research findings on virtual observation (Heafner et al., 2011; O'Neil et al., 2017), this study's findings showed that participants in valued the Bluetooth capabilities of the wireless microphone, as it increased the ability of the US to hear teacher–student interactions, which would otherwise be indiscernible in traditional observation settings. Research has also found virtual observation offers increased opportunities for feedback and communication between STs and the US (Falconer & Lignugaris/Kraft, 2002; O'Reilly et al., 1992; Talvitie et al., 2000). In this study, participants were split on the perceived usefulness of immediate feedback, a contrast also apparent in the literature (Krause et al., 2018; Scheeler et al., 2012). While some participants found great benefit in receiving real-time, in-ear feedback during the lesson and were able to immediately correct errors (Coulter & Grossen, 1997), other STs reported immediate

feedback via a Bluetooth earpiece affected their concentration (Gronn et al., 2013) and the flow of the lesson (Scheeler et al., 2012).

Feasibility of Virtual Observation

Technology Logistics

Similar to findings in existing research, this study's finding show that internet connectivity was one of the most pervasive challenges with virtual observation (Carlin et al., 2013; Heafner et al., 2011; O'Neil et al., 2017). In some circumstances, participants in this study experienced complications with connectivity when transitioning between different teaching spaces (e.g., indoors to outdoors, weight room to gym, main gym to auxiliary gym; Falconer & Lignugaris/Kraft, 2002; O'Neil et al., 2017; Pemberton et al., 2004). In these situations, participants expressed frustration with the beeping sound they would hear in the earpiece that accompanied a disconnected call as the US would attempt to call back. Another participant noted a lack of consistent internet access in the area where the postobservation conference took place, which caused the video to stall or freeze during the conversation (Falconer & Lignugaris/Kraft, 2002). Due to fluctuations in Wi-Fi strength across various areas of a school campus, Krause et al. (2018) recommended completing a "walk through" to identify and resolve potential connectivity issues before the observation.

Ease of Use

Carlin et al. (2013) reported that the equipment necessary to conduct virtual observation was burdensome to transport and set up. In this study, the equipment required for an observation to be conducted virtually was fairly minimal, as the entire physical setup included an iPad or computer, a tripod or tablet mount, and a Bluetooth microphone/earpiece. However, some participants found the earpiece to be cumbersome, and in some cases, it caused discomfort because it was too large for the individual's ear. On occasion, the earpiece fell off as the ST demonstrated a skill or activity when teaching. Bluetooth connection issues also affected participants' ability to easily manage the technology aspects of virtual observation in this study. At times, connectivity issues may be affected by low battery

in one or more of the devices. Literature addressing issues related to setup and implementation of virtual observation has suggested going through a trial run beforehand and making sure all devices are fully charged (Krause et al., 2018). In accordance with research, issues with software and internet accessibility affected the convenience and manageability of virtual observation (Burrack, 2007; Falconer & Lignugaris/Kraft, 2002). In this study, STs found network firewalls and password protection protocols affected their ability to access and utilize synchronous videoconferencing programs and applications. Carlin et al. (2013) recommended that to alleviate some of these issues, the placement schools and university coordinate to provide technology support.

Benefits of Virtual Observation

Participants in this study found virtual observation to offer greater flexibility in scheduling and improved access, along with decreased time and travel costs often associated with traditional observation formats, which is in agreement with previous research (Carlin et al., 2012; Dymond et al., 2008; Kelly & Bishop, 2013; Olson et al., 2001; O'Neil et al., 2017; Pemberton et al., 2004). While most of the research has focused on decreased costs for the university, this study describes how virtual observation can also help to alleviate some of an ST's financial burden without sacrificing access to a US directly connected to the university. For example, one participant was able to move in with family to avoid paying rent, because they were able to secure a placement close to home even though it was not located near the university. Improved access to placements sites was also acknowledged as a positive aspect of virtual observation, as one participant emphasized the strict visitor policies enforced by many K–12 schools as a potential challenge of traditional observation. In contrast, related literature has identified a number of safety and privacy concerns that must be addressed in implementing virtual observation (Israel et al., 2012; Krause et al., 2018; Naffziger & Fawson, 2013). Overall, participants in this study found virtual observation to be less distracting and less disruptive, which aligns with benefits identified in previous research (Carlin et al., 2013; Heafner et al., 2011; O'Neil et al., 2017; Scheeler et al., 2012).

Drawbacks of Virtual Observation

In accordance with the literature, connectivity and setup issues the most prominent drawbacks identified by participants in this study (Carlin et al., 2013; Falconer & Lignugaris/Kraft, 2002; Gronn et al., 2013; Heafner et al., 2011; O'Neil et al., 2017; Pemberton et al., 2004). Another drawback participants reported included CTs' negative perceptions of virtual observation. STs found it challenging when the CT did not appreciate the added technology component or failed to understand why the observation was being conducted virtually. Carlin et al. (2013) stressed the importance of buy-in from all involved in the observation process, including those at the placement site, for virtual observation to work effectively.

Implications for Future Research

While this virtual method of observation seems innovative and timely, the body of research exploring its effect on scheduling, the influence of technology, and the quality of observation STs receive in comparison to traditional, face-to-face observation and evaluations is not without it gaps. With the continual progression of the internet, the types of equipment used in most of the cited studies have become obsolete and outdated due to rapidly evolving developments in technology. Because Bluetooth and video streaming technology are now so commonplace, many possibilities exist for STs and USes to connect virtually (i.e., smartphones, tablets, etc.), including numerous options that were not available even 10 years ago. It is no longer necessary for universities to allocate thousands of dollars per placement to provide STs with the essential technology to conduct observations using videoconferencing technology. Therefore, additional research needs to explore the effectiveness of virtual observation through these new types of technology, as well as the effect of the widespread use of tablets and smartphones with live-streaming capabilities on virtual observations. Studies looking at the feasibility of these new types of technology could also provide practitioners with information and recommendations for implementation and inform best practice.

Most of the cited articles come from a variety of educational disciplines such as social work, speech pathology, and special

education, with very little research being conducted in physical education. Many aspects of teaching and supervising look different between the classroom and the gymnasium, including management strategies, teacher feedback, and content delivery. Therefore, there is an apparent need for more research to be conducted in the realm of physical education, as the context and environment are considerably different in a gymnasium compared to a typical classroom setting. Because the research conducted up to this point occurred mostly in classrooms, it is important to consider the potential lack of generalizability and transferability due to the contextual differences for those teaching in physical education settings.

Another area of research on this topic that lacks saturation is studies focused on STs', CTs', and school administrators' perceptions of virtual observation compared to more traditional methods. It is important that research explores how individuals of each group feel about differences in observation experiences to evaluate perceived benefits and barriers and to assess the overall effect of virtual observation combined with the most up-to-date technology.

Conclusion

The student teaching experience of STs is both significant and impactful, as STs often comment that their student teaching experience had the greatest influence on their development as new teachers (Wilson, 2006). Therefore, it is imperative for teacher education programs to provide STs with the most beneficial feedback and observation experiences available by a qualified US. The task of finding a qualified individual to fill this role becomes increasingly more difficult when considering the reality faced by most university professors, which includes stringent expectations for research output, rigorous teaching loads, the need to keep costs down, and the need to supervise a large number of STs. These issues result in the US not always being available, or willing, to undertake supervision responsibilities. The challenge is compounded when supervisors need to travel long distances for on-site observation. In an effort to combat university budget issues, supervisor shortages, busy work schedules, increased travel time, and scheduling conflicts, when STs are placed out of driving range, teacher education programs often resort to locating and assigning retired teachers or school administrators close

to the placement site to fulfill the role of the US (Carlin et al., 2013). This setup oftentimes does not prove ideal, as STs may not receive the accurate feedback concerning pedagogical issues and content specific to physical education. Thus, research has demonstrated that technology such as synchronous videoconferencing may have the potential to address some of these challenges (Gronn et al., 2013).

The identified empirical research is significant, as it substantiates this method of observation as a reasonably viable alternative to in-person observations, especially for STs with placements outside the range university-based supervisors are permitted (or would care) to travel. The use of two-way, interactive videoconferencing in observing field experiences has been proven effective across different settings and disciplines, between distant locations (saving travel time and money for the US), and for the purpose of providing immediate feedback to students (Falconer & Lignugaris/Kraft, 2002; Garrett & Dudt, 1998; Gruenhagen et al., 1999). Although findings suggest that the virtual observation process is potentially a time-efficient and cost-effective alternative to traditional observation methods of STs' field experiences, technical issues can be somewhat prohibitive. Problems related to intermittent internet connectivity, equipment setup, sound quality, and visual field all presented challenges to effectiveness of the process. The plethora of video streaming technology, which is currently so widely available, provides exciting new directions for the development of supervising field experiences within teacher education programs.

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