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Effects of Different Camera Perspectives on Preservice Teachers' Written Reflections

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Promoting meaningful reflection from teacher candidates is an ongoing challenge for many teacher preparation programs. Video-based reflection provides an opportunity for candidates to examine their own teaching more closely as they reflect on their continued growth. This study examined the role of different cameras and camera angles in the reflection process for preservice teachers implementing one-on-one reading tutoring sessions. In particular, we were interested in whether using video from head-mounted cameras as a basis for reflection activities would have an influence on the focus and type of statements used in reflections. We were also interested in the advantages and disadvantages of the different cameras from the teacher candidates' perspectives. Results indicate that camera type did not influence the focus and type of reflective statements. In general, candidates preferred the traditional camera setup, but the head-mounted camera did offer some advantages. Implications for practice and future research are discussed.

Keywords: Video analysis, teacher reflection, teacher preparation, tutoring

The teaching profession is often seen as entailing life-long learning. There are several avenues through which a teacher can pursue this life-long learning, including professional development initiatives, mentoring, or additional degrees. One commonly used way to promote improvement for educators is through reflection on one's own teaching (Zeichner & Liston, 2014). This method has become popular in teacher preparation programs, and many of them require their teacher candidates to engage in some form of reflection (Shanahan, Tochelli-Ward, & Rinker, 2015). Reflection activities are generally intended to help teacher candidates notice their own strengths and weaknesses and develop plans for improvement (Calandra, Brantley-Dias, & Dias, 2006). The popularity of reflection does not come with uniformity. In fact, there is great variety in the way programs and researchers implement, assess, and define reflection (Nelson & Sadler, 2013). Tripp and Rich (2012) collapsed multiple definitions spanning over five decades to

characterize reflection as "a self-critical, investigative process wherein teachers consider the effect of their pedagogical decisions on their situated practice with the aim of improving those practices" (p. 678).

Unfortunately, the ability to systematically analyze instruction by breaking a complex instructional practice into its constituent parts and use the insights gained to plan subsequent lessons does not always come naturally. Therefore, developing this ability should be a focus in teacher preparation programs to ensure the teacher candidates will be able to transfer what they have learned into their professional careers (Rosaen, Lundeberg, Cooper, Fritzen, & Terpstra, 2008).

The use of video to aid in reflection has been in place for several decades (Shanahan et al., 2015). In fact, the practice has been used in formal assessments of teaching, including the National Board for Professional Teaching Standards (NBPTS) and edTPA (Pearson Education, 2014). Video-based reflection has several benefits over reflection from memory of a lesson. For example, Clarke, Hollingsworth, and Gorur (2013) found that participants "noticed things about themselves, their students, and the environment of which they were previously unaware" (p. 115) through viewing a video of their own teaching. The things they noticed ranged from the arrangement of the classroom furniture to what their body language was communicating to evidence of their students' thinking. Additionally, written reflections based on videos demonstrated higher accuracy and focus than those without a video base (Tripp & Rich, 2012).

Rosaen et al. (2008) identified two important elements that help develop the capacity for meaningful reflection: the shift in focus from the teacher (or teacher candidate) to the students, and a change from describing teaching to analyzing it. Previous research does not give a clear picture on how video-based protocols support this shift, even though there is a large body of work describing what participants learned from reflection (Danielowich, 2014). It is clear that multiple opportunities for reflection may be necessary to optimize learning, because even if teacher candidates attempt analysis, initially this may be focused only on teacher behaviors and neglecting to take student learning into account (Danielowich, 2014; McVee, Shanahan, Pearson, & Rinker, 2015). Furthermore, during initial evaluations of their own teaching, teachers tend to overestimate their performance. For example, participants in a collaborative professional development study that included multiple video reflections, consistently rated themselves high on a rubric at the beginning of the year. The participants' self-rating on later videos decreased as they became more self-critical (Osipova, Prichard, Boardman, Kiely, & Carroll, 2011).

Nelson and Sadler (2013) identified three strands of research in teacher reflection. The first strand focuses mostly on the theoretical and philosophical foundations of reflection; the second strand studies tasks that help teacher candidates reflect. The last group of studies examines the development of reflective practice through careful analysis of one's own writing. Additionally, Nelson and Sadler identified four key components of reflection: stimulus, content, process, and outcome. Stimulus, in this case, "refers to the context of the initial problem that triggers an act of reflection" (p. 50), or the cause of a particular reflection. It is important for programs to pay explicit attention to what

constitutes a stimulus in order to develop focused and systematic opportunities for reflection. The second element, content, applies to the topics on which a candidate reflects. The precise characterization of content, therefore, can depend on the focus of an assignment. The third element, process, refers to the sequential actions of candidates while analyzing their practice. Specific structures that are put in place by a program to guide the reflection process can influence the quality and nature of the reflection. The last element is the outcome, and it is related to the purpose of reflection (i.e., for personal growth, to evaluate technical aspects of a practice, etc.).

Providing specific guidance can improve the quality of reflection and its outcomes. Nagro, deBettencourt, Rosenberg, Carran, and Weiss (2016) compared two groups of teacher candidates who wrote reflections about video-recorded lessons. The treatment group received directed guidance and feedback to strengthen their video analysis. Although both groups self-reported significant improvements in their teaching, only the treatment group actually demonstrated significant growth in reflection skills and instruction. Finding effective ways to guide reflection remains a challenge for teacher educators.

In a review on video analysis for teacher reflection, Tripp and Rich (2012) indicate that guiding teacher candidates' reflection through specific tasks increased the quality of reflection by directing their focus to specific parts of a lesson and helping "to literally see their teaching from a different perspective" (p. 686). In this case, the change in stimulus that influenced the content of reflection consisted of a different task or assignment. It is possible, however, that a different type of stimulus change may also constitute a shift in content. In the case of video based reflection, we can take 'seeing teaching from a different perspective' more literally by changing the camera perspective. That is, a different camera or camera angle may provide teacher candidates with a different view of the technicalities of their teaching, therefore giving them more opportunities to observe 'triggers' or surprises that lead to reflection. A camera change may instigate a stimulus change that could feed into more specific content and broader focus of reflection.

The traditional camera set-up can pose challenges for teacher candidates when reviewing their video for reflection. This set-up usually consists of a camcorder on a tripod situated at a fixed spot in the classroom. For whole class lessons, the camera is usually placed at the back of the room. For small group or one-on-one instruction, the camera is placed closer to the instruction and usually slightly askew from, or sideways to the teacher candidate. The camera angle is not always sufficient to view the entire scene, and because the cameras are stationary the teacher candidate or the students may not be visible on film for parts of a lesson. Additionally, without external microphones, these traditional cameras do not always have sufficient audio recording capacities to capture meaningful or important nuances in a lesson (e.g., a student's precise pronunciation of a word or sound, an encouraging "mhmm," a sigh of exasperation, or a whispered prompt), especially if there is background noise. Due to the prevalence of high-tech personal items with video recording capacity including smart phones and laptops, teacher candidates may even use these devices to record their lessons. Laptops,

however, pose a range of additional challenges. Not only do they have an even narrower lens width than traditional cameras, without special settings they also tend to capture footage in a mirrored fashion, making interpretation of some details of teacher or learner behaviors (e.g., teacher's gestural cues, student's letter formation) challenging.

Currently, there are several technological innovations available that could aid the quality of video footage. One approach to combat the narrow angle and stationary position of the traditional camera is placing a video capturing device on a special mount that rotates by following a sensor carried by the teacher candidate (e.g., Swivl). Another type of camera that might address several of the issues indicated above is the head-mounted camera, which can be worn by a specific student. Head-mounted cameras allow teachers to see themselves from the students' perspective. They also have a wider angle than traditional cameras, so in a small group or one-on-one setting, the camera captures the instructor, the instructional material, and the child's hands. Additionally, these head-mounted cameras allow teacher candidates to notice where the student's attention is directed at various points during the lesson, since the camera follows the student's head movements. A final potential advantage of such cameras is their ability to capture audio. To date, no study has looked at the influence of different cameras on teacher candidates' reflections.

The only instruction-related use of head-mounted cameras we found was a university instructor who taught classes in oral communications. He had individual students wear a head-mounted GoPro® at various points during the semester in an effort to see his teaching from a student perspective (Kindt, 2011). "Capturing the view of a participant, unencumbered by a handheld camera and unconstrained by a stationary perspective, seemed to be a clear advantage of the GoPro® camera" (p. 180). Kindt also noted that the GoPro® provided excellent recording of the instruction, including clear audio of both the instructor and the wearer's voices.

A possible disadvantage of the use of head-mounted cameras is its intrusiveness. Especially in a one-on-one setting, the presence of the camera is much more noticeable than a traditional camera. However, a study by Calderwood, Ackerman, and Conklin (2014) indicated participants from groups using either head-mounted camera, mobile eye trackers, or traditional camera set-up did not behave differently from each other. In this study, the researchers investigated college students' off task study behavior by tracking their activity at a computer station for three hours. These outcomes suggest that the different camera set-ups would not affect the behavior of study participants. Additionally, the GoPro® cameras are shifting from being used mostly to share exhilarating experiences in first-person view to becoming more common in everyday life (Paumgarten, 2014); therefore, wearing a GoPro® may not be a novelty for the participants.

The purpose of this study was to examine the role of different cameras and camera angles in the reflection process for preservice teachers. In particular, we were interested in whether using different cameras as a basis for multiple teacher candidate reflection activities has an influence on the focus of and type of statements used in their written reflections. We were also interested in the advantages

and disadvantages of the different cameras from the teacher candidates' perspectives.

Methods

Setting

The context of the study was a five-year teacher preparation program at a large university in the southeastern United States. The program leads to a dual certification in elementary and special education. Teacher candidates in this program earn a bachelor's degree in elementary education and a master's degree in special education, along with state certification in both areas.

In the final year of this program, in addition to a two-semester internship, teacher candidates engage in an intensive block of courses designed to prepare them to implement effective assessment and intervention for students with reading disabilities. The block of courses includes a four-week summer practicum experience during which teacher candidates apply what they have learned in one-on-one tutoring, small-group intervention, and whole-class instruction.

The focus of this study was the one-on-one tutoring project. Tutoring sessions were conducted every day of the program, and teacher candidates (i.e., tutors) were assigned to one of three scheduled tutoring times. Tutors provided intensive intervention using an adaptation of the Orton-Gillingham (O-G) approach to tutoring. The O-G approach includes multisensory (i.e., visual, auditory, kinesthetic, and tactile) practice of skills designed to activate multiple neural pathways simultaneously. The daily, one-hour tutoring session includes review of skills and concepts necessary for decoding words, spelling practice with regular and irregular words, introduction of a new decoding skill or concept, fluency practice with connected text, and comprehension strategy instruction and practice. The tutoring model includes a variety of complex teaching methods and strategies that many tutors find challenging to master. Tutors are supported in their planning and teaching in several ways: (a) they are provided with a scope and sequence of skills to follow their long-term planning, they use a structured lesson plan to guide their daily planning, and they write daily journal entries to reflect on each lesson; (b) they are observed once or twice each week by a supervisor with extensive experience implementing the tutoring model, and they participate in post-observation conferences; (c) they trade videotaped sessions with peers, so they analyze the instruction of others, and they receive feedback on their own instruction; and (d) they view two of their own videotaped sessions and develop written reflections of their practice.

Participants

Participants in the study were 26 teacher candidates enrolled in the master's year of the dual certification program in elementary and special education. Some participants were in their second semester of the program, while others were in their first semester, but all were enrolled in the same block of courses. As one of their course assignments, all participants tutored children with significant reading disabilities. The demographic data for the sample are summarized in Table 1.

Table 1
Participant Demographic Information (N = 26)

Age[a]	
Mean	22.7
Range	19 - 30
Sex	
Female	23
Male	3
Race/Ethnicity	
Caucasian	17
African-American	2
Asian	2
Latino	5
Semester in M.Ed. program	
First	20
Second	6

Note. a: Age in years.

Description of Assignment

As part of their practicum assignment, all tutors wrote a reflection on two of their individual tutoring sessions. The reflections had no specifications regarding format or content, but guiding questions for the content were made available to the tutors. For example, tutors were encouraged to consider effective and ineffective elements of their lesson and to provide evidence of this based on their video. Tutors were also prompted to consider what changes they would make in the future based on evidence from their videos.

Data Collection

Tutors submitted their written reflections within 48 hours after each recorded lesson. A course instructor randomly assigned numbers to all written reflections and redacted identifying information. The master list with numbers and corresponding names was kept separate from the coders to ensure a blind review of the responses to the extent possible. All tutor and child names were blacked out, but other potentially identifiable information (for example details about the child's reading or behavior) was kept to maintain the readability and integrity of the responses.

Using a coding scheme that was developed through careful analysis of previous cohorts' written reflections, one member of the research team coded the responses by assigning a combination of three coding categories (Focus, Content, and Type) to either a single clause or a cluster of clauses. A cluster is defined as a sequence of clauses referring to the same aspect of the event central in the sequence (see table 2 for examples of statements from each code, including single clauses and clusters). In this paper, we will use the term

"statement" to refer to either a single clause or cluster of clauses that received a set of codes as one entity. Codes were only assigned to statements that described or related to events happening at that moment in the video. General statements, summaries, or statements about earlier tutoring sessions, either videotaped or not, were not included.

Table 2
Examples of Coding Categories

Focus	Observation	Observation with Evaluation	Evaluation with Justification	Intention to Change
Tutor				
Presentation	I also noticed that when she wasn't automatic at producing the sound, I would unconsciously make the mouth movement of the sound.	During the visual drill, the T did make use of facial expressions that may have cued the student into answers or needs to make use of corrections.	I had a stern look on my face when having to ask him to correct his behavior multiple times. This is not something I am used to seeing in myself and was odd looking back on.	When I saw a letter I knew she was struggling with, I began to make the mouth movement before she said the letter name and sounds. I probably should prevent that because it may give her hints.
Instructional Motions	I remembered to point at each letter on the card, so S would say each letter.	The T made sure to follow the student's directionality for pound and sound	(*)	I also think the Pound-and-Sound activity can be more in sync to help the student hear the sounds and spell them correctly.
Pedagogy	During the auditory drill, I made sure to point at my mouth to get her to watch me to make the sounds.	I had a lot of specific, positive praise throughout each section of my lesson.	Throughout my instruction, I often leave wait time to encourage S to self-correct. I believe this also helps S to closely monitor his reading and thinking.	The T should also avoid asking the S if they'd like to complete a task rather tell the S this is what we're going to do in an effort to avoid any opportunities for S to responses of no.
Planning and Organizing	I have her clean up materials while I get our stuff ready for pound and sound.	The amount of time I spent reviewing the concept was appropriate and that is something I have been working on.	I think my flashcard was ineffective because it may have confused him with the letter being in the blank spot. I ended up	When selecting a book, perhaps choosing one of the S's choice (that is still on the S's readability level) could help motivate the S to read for the

			throwing that card away.	comprehension.
Execution and Content	The T opened the lesson with the visual drill with the letter cards	I quickly and positively redirected her attention back to the deck.	I also repeated the wrong prompt during that correction so that definitely threw him off.	One of the things that I wish I had done differently today was spend less time on the spelling section. I believe my irregular word section took longer than it should have because I spent some time reviewing words that were missed instead of doing a swift correction.
Student Behavior	She also sang for our black beauty drill.	He enjoyed using the mirror, although he did get fixated on the mirror and it did make for a bit of a difficult transition into the rest of the new concept activity.	My student was least engaged in Step 4; she did not enjoy Great Leaps. I believe this was due to the fact that the words might be a bit challenging for the S. The S shuts down when challenged.	Additionally, I noticed that I need to find more ways for him to move around and do more on his own. He seems to get a little antsy and jumpy during parts of the lesson, and I can tell from watching that he needs more movement and hands-on activities.
Routines	S monitored the sentences with the acronym COPS.	(The S) did well remembering the drills and why we do them.	The S did a wonderful job of retaining the purpose of each drill. When asked to provide the purpose for the current activity, the student immediately stated the correct response.	The S needs o work on the routine for sentence dictation; the S sometimes forgot to pull down the felt squares after writing each word.
Specific Academic	During the comprehension section he read a	The S struggled with the letter “d”, “l”, and “x” specifically in	Something I noticed in the video, ad while	S really needs more review with spelling the irregular words.

	WWII book to me and told me which sections were important to take notes of for him.	the various drill activities.	working with my S, was how he checked the sentence before the COPS arrived. He recalled what we had learned about silent –e syllable to correct the word 'time' in his spelling, adding spaces between his words, and checking for a punctuation mark.	Repetition is crucial, in addition to reviewing them
Generic Academic	In the video, he was doing a brand new passage and was excited about doing a new one.	I noticed in the video that he was using a lot more language than in the sessions.	(*)	(*)

Note. **(*)** There were no examples of these combinations of codes.

Definitions of categories. The first coding variable, Focus, was based on theory about reflection. A statement could either be tutor-focused or student-focused. A tutor-focused statement was one in which the primary concern in the statement or cluster was about the tutor (e.g., instructional actions, gesture, facial expression). A student-focused statement was one in which the primary concern in the statement or cluster was about the student (e.g., responses to questions, engagement).

The second coding variable, Content, was dependent on Focus. The research team sorted statements from these reflections into Tutor and Student Focus, and then subdivided them into content areas (or subthemes). For Tutors, the subthemes that emerged from previous analysis were Presentation, Instructional Motions, Pedagogy, Planning and Organizing, and Execution and Content. For Student Focus, the content included the subthemes Behavior, Routines, Specific Academics, and Generic Academics.

In order to be considered as Presentation, a statement needed to refer to facial expressions or body language from the tutor that could influence the lesson in either a positive or a negative way (e.g., a distracted look, or unintentional feedback on student performance). Instructional Motions included references to those elements of the tutoring protocol that focused on physical motions, such as

pointing to cards during a specific drill, or hand motions that were used as cues. All statements referencing general pedagogical elements, such as questioning, modeling, praise, prompting, and gradual release elements fell under the category Pedagogy. Within the category Planning and Organizing, we included statements about the set up of the workspace, time management of the lesson, preparation of explanations, the appropriateness of the level, length, sequence, and content of the activities. Finally, statements about the completion, implementation, and adjustment of activities, as well as reference to behavior management were included under Execution and Content.

Student-focused statements were coded under Behavior if they described a student's emotional response (either positive or negative) to a task, off-task behaviors or non-compliance, and atypical behaviors. The category Routines included statements about the student's use of strategies, verbalizing of knowledge of the tutoring protocol, self-corrections to an element of the tutoring protocol, or references to correct or incorrect execution of these elements by the student. The category Specific Academics included statements about student's self-corrections, use of cues or modeling, or performance on a task. Any statements that did not include a specific task, but referred to academics in general were coded as Generic Academic.

The final coding variable indicated the Type of statement. This could either be (a) an Observation, (b) an Observation with Evaluation, (c) a statement with an Evaluation with Justification, and (d) a statement that included an indication of Intention to Change. A statement was always coded for the most inclusive type (i.e., a statement indicating Intention to Change could also have an Observation with Evaluation within its cluster, however, only the code for Intention to Change would be assigned).

Interrater reliability. To establish interrater reliability, a second member of the team coded a random sample of 33% of the reflections (*n* = 18). This coder was involved in the establishment of the coding categories and helped validate the categories on four samples not included in the final data set. Reliability for coding was calculated as the number agreements divided by the number of agreements + disagreements. An agreement was noted if both coders assigned the same combination of codes to a statement. The statement needed to have a core segment similar across coders, but did not have to consist of exactly the same segments. Disagreements were resolved through discussion. Reliability between coders was 97.45% (range 80.60 - 100%).

Social validity. To determine tutors' perceptions of the experience of videotaping their instruction and reflecting on the lesson, and to determine whether camera type affected their experience, we conducted a brief post-practicum survey. Along with other questions about the course and practicum, tutors were asked to do the following: "Please comment on your experience videotaping your tutoring sessions. In particular, share your perception of the advantages and disadvantages of the use of the different cameras." They also rated the value of the video self-analysis on a 5-point Likert scale.

Research Design and Data Analysis

We used a counterbalanced design to explore the effects of cameras on tutors' reflections. All tutors were randomly assigned to one of two groups. The groups differed only in the order of the cameras

used to record the tutoring sessions. Group 1 used the head-mounted GoPro® for their first session, and a camera mounted on a tripod for the second session, and Group 2 used the cameras in reverse order. All sessions were filmed during tutoring day 3 or 4, and 11 or 12 (out of a total of 15 sessions). The research team made a video schedule based on the group assignments, helped tutors set up cameras, and provided technical support during video days. The tutors were not aware of the experimental nature of the different types of cameras. On any given video day, approximately half the tutors filmed their sessions, and an average of 5 tutors filmed at the same time.

To examine the effects of camera type on the Type and Focus of statements in the reflections, we conducted a Poisson-regression based on Generalized Estimating Equations (GEE) with camera type as a predictor. GEE are a preferred statistical approach for repeated measures data and other correlated data, especially when the data represents frequencies or counts (Hanley, Negassa, & Forrester, 2003; Johnston & Stokes, 1996).

Equipment

We used two versions of the GoPro®: HERO 4 Silver Action, and the GoPro® HERO+, in a regular case (i.e., not waterproof) to provide optimal recording of sound. The settings used to record were 720 (narrow) with 120 fps, which allowed a wide enough angle to ensure the recording would include the tutor as well as both the student's hands and workspace without including too much of the surrounding space. The students wore the GoPro® with an elastic headband with the cameras tilted downward at an approximately 45-degree angle. For the regular camera, we used a Zoom Q2HD Handy Video Recorder mounted on a tripod. This camera was placed perpendicular to the tutoring space to allow for a simultaneous side view of both the student and the tutor.

Results

The tutors in our sample were, on average, more focused on themselves (M = 17.13, SD = 13.904) than on their tutees (M = 7.58, SD = 5.5054), and this trend was present for each of the cameras at both recording times. When the focus was on the Tutor, the Organization and Planning aspects of the lessons received most comments on average (M = 6.29, SD = 5.414); for focus on Student, tutors reflected mostly on Specific Academic outcomes (M = 3.63, SD = 3.074). Three of the content variables occurred very rarely (i.e., Tutor Presentation, M = .21, SD = .457; Tutor Instructional Motions, M = .21, SD = .498; and Student Generic Academics, M = .12, SD = .427). For Type of statement, the Intention to Change had the highest average occurrence (M = 8.48, SD = 4.717), followed by Observations with Evaluation (M = 7.42, SD = 8.772). However, the mean scores on Type of statements across the cameras and time showed considerable variability. See Table 3 for outcomes separated by type of camera and recording time.

Table 3
Mean Occurrence of Coding Categories

	GoPro®				Regular				Total	
	T1 (*n* = 12)		T2 (*n* = 14)		T1 (*n* = 14)		T2 (*n* = 12)		(*N* = 52)	
Category	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Focus Teacher	15.08	11.30	18.29	12.22	21.21	18.75	13.08	15.84	17.13	13.90
Presentation	0.17	0.39	0.21	0.43	0.29	0.61	0.17	0.39	0.21	0.46
Instructional Motions	0.33	0.78	0.14	0.36	0.14	0.36	0.25	0.45	0.21	0.50
Pedagogy	3.75	3.33	6	5.70	7.21	10.76	4.25	4.07	5.4	6.76
Planning and Organizing	6.83	6.04	5.93	4.71	8.21	6.86	3.92	2.47	6.29	5.41
Execution and Content	4	3.74	6	5.34	5.36	4.27	4.5	6.22	5.02	4.89
Focus Student	8	5.66	7.36	5.14	8.79	4.42	6	5.22	7.58	5.05
Behavior	3.25	3.05	2.43	2.44	3.21	2.00	2	1.91	2.73	2.37
Routines	1.25	0.87	1.14	1.42	1.14	1.79	0.75	1.06	1.08	1.33
Specific Academic	3.42	3.53	3.64	2.59	4.21	3.36	3.17	3.07	3.63	3.07
Generic Academic	3.42	3.53	0.14	0.56	0.21	0.58	0.08	0.29	0.12	0.43
Observation	3.67	9.61	2	5.02	1.5	4.54	10.83	22.44	4.29	12.41
Observation with Evaluation	5.08	4.46	8.71	8.44	10.57	13.42	4.58	3.23	7.42	8.77
Evaluation with Justification	3.58	1.56	6.79	6	7.93	6.87	3.5	2.65	5.60	5.21
Intention to Change	10.67	4.56	8.14	3.88	10	5.51	4.92	2.58	8.48	4.72

We analyzed the data using the GEEpack package (Højsgaard, Halekoh, & Yan, 2006) in *R* (R Core Team, 2016). For each of the Focus and Type codes, we estimated correlation coefficients using the geeglm model with the camera type as a predictor. We assumed the distribution of the data followed the Poisson distribution, and that the correlations between factors were exchangeable (Højsgaard et al., 2006).

The data showed considerable overdispersion, which usually leads to an underestimation of the standard error, and therefore lower probability values (Yang, Hardin, & Addy, 2009). Since none of the coefficients were statistically significant, the overdispersion did not have influence on Type I error and was not regarded as a problem. Table 4 shows the outcomes of the GEE estimates for each of the codes. The results indicate that the type of camera did not have an effect on the Type or Focus of the reflective statements of the tutors in our sample.

Table 4

Summary of Parameter Estimates from the GEE Model with Focus and Type as a Function of Time

Condition	b^1	*SE*	Wald Z	*p*	*a*
Focus Teacher	.04	0.16	0.13	.72	.77
Focus Student	-.02	0.12	0.03	.87	.56
Observation	.74	0.50	2.16	.14	.49
Observation with Evaluation	.10	0.22	0.22	.64	.51
Evaluation with Justification	.10	0.16	.041	.52	.59
Intention to Change	-.17	0.15	1.66	.20	.04

Note. 1: Number of Clusters = 26, Cluster size = 2; *a*: estimated correlation parameter.

Discussion

This study was conducted to examine the role of different cameras and camera angles on tutors' reflections of their own tutoring. Our findings revealed no statistically significant differences in the Focus and Type of reflections based on camera type. In fact, only changing the camera type seems to have no effect on tutors' written reflections. Even though the GoPro® cameras are primarily focused on the tutor, reflections after sessions using this camera type did not include a higher quantity of comments about their instructional motions, modeling of sound production, facial expressions, or body language.

In addition, we were interested in tutors' perceptions of the value of video-based reflections and the advantages and disadvantages of the different cameras. Tutors mostly rated video self-analysis as being valuable (89%), but there was little consensus over how valuable. Tutors noted such benefits as being "able to see the areas in which I was stronger," having the opportunity to "witness my interactions with my student," "learning about what I did to keep my student on task, or what made my student lose focus," and "seeing how I needed to change what I was specifically doing in order to improve our tutoring sessions." Overall, the tutors valued the regular camera over the GoPro®, specifically because tutees were less distracted with the regular camera. Only one tutor specifically favored the GoPro®, citing the change in perspective as being beneficial, allowing her to "see what the student was seeing and how I needed to change what I was specifically doing in order to improve our tutoring sessions."

The majority of tutor comments addressed the logistics and behavior of students due to the cameras, and not on the impact it had on the actual reflection. This raises questions about what tutors understood as the purpose and value of reflection and video-analysis.

Most teacher preparation programs include some form of reflection-based assignments. These assignments may be included due to the expectations of accrediting bodies, such as the Council for Exceptional Children (CEC) and the Council for the Accreditation of Educator Preparation (CAEP), or due to the use of performance-based assessments for teacher candidates (Nagro et al., 2016; Rosaen et al., 2008). However, although reflection is highly valued by teacher educators, the value and purpose of reflection may be unclear to teacher candidates. McVee et al. (2015) explained that a substantial body of research "has already documented the need for instructors to be explicit with regard to what they mean by the term 'reflection' or the verb 'to reflect' and the means through which reflection in accomplished" (p. 65). Other researchers have confirmed that a specific focus for reflections can help teacher candidates (e.g., Danielowich, 2014; Shanahan et al., 2015), and guidance and feedback can both improve the quality of reflections and lead to better instruction (Nagro et al., 2016). Previous reflections that we used to develop the coding system were completed with little guidance, and given more specific directions, we saw more thorough and meaningful reflections completed during this study. Nevertheless, further refinement of the directions could likely yield even better reflections and better instructional outcomes. Assignment specificity is important to reflection quality and depth; however, Danielowich warns of a mimic effect if assignments are too directed. That is, the teacher candidate learns what the professor wants to hear and writes the reflection accordingly. Our expectation was that using the GoPro® would naturally focus tutors' attention on key instructional practices, and in some cases, it did. Still, overall, it did not. A more specific assignment may accomplish this, but the possibility of mimic effect would need to be accounted for, possibly through the use of a structured observation instrument that requires elaboration about the quality of implementation of specific practices.

Providing tutors with instructor modeling of effective lesson critiques and the opportunity to practice critiquing tutoring sessions of others before they reflect on their own could help them develop a better understanding of the expectations and mechanics of the process (e.g., what to look for, how to comment, how to judge quality). Group viewing and critique of videos through critical friends groups (Dunne & Honts, 1998) has also been shown to elicit meaningful reflections (Key, 2006). Although clarifying expectations for reflections seems to be important, Danielowich (2014) found that teachers are more likely to use peer sharing processes effectively when the focus of collaboration is left to them.

Several limitations of this study are worth noting. The use of a small convenience sample limited the power of the statistical analyses and the generalizability of the findings. Generalizability is particularly limited by the nature of the instructional format. That is, it is unclear whether our findings from reflections about a one-on-one tutoring activity would hold true in small-group or

whole-class instruction. The assignment was one of many the tutors completed during their practicum experience, so the time and effort devoted to the reflections may have been insufficient to yield the kind of specific observations and insights we expected to find. The coding process may pose another limitation. Although the process for defining the codes for analyzing tutors' reflections was thorough, the codes we settled on may not have captured all of the useful comments. Reaching interrater reliability was somewhat challenging, so the codes may leave too much room for interpretation.

Despite the study's limitations, we believe it has several important implications for practice. Use of the head-mounted GoPro® camera held much appeal for us as teacher educators. The prospect of a tutor being able to view his or her tutoring from the student's perspective was enticing because it could allow the tutor to observe specific instructional techniques much more closely. Quite frankly, we did not anticipate the extent of the problems posed by placing the camera on the head of a fidgety child. The distraction of wearing the camera was problematic, especially for the younger children, and it became heavy and uncomfortable over the course of a one-hour lesson. Although the head-mounted camera allowed tutors to see how much or how little of the child's attention was focused where they intended, watching video that included much head movement on the child's part was difficult. One tutor even indicated that she was unable to watch the entire lesson because it made her "motion sick." The appeal of the novelty of the GoPro® and its perceived value could overshadow its disadvantages in this context.

These disadvantages of the GoPro® likely outweighed the advantages; however, the advantages are worth noting. In the tutoring model employed in this study, tutors were expected to master a number of very precise instructional motions and behaviors, including for example the correct modeling of mouth movements during sound pronunciation and the proper guidance of students' formation of letters. Having a camera angle that clearly showed the tutor's face and hands, as well as the table, did capture these behaviors more effectively than a typical side-view angle, even though the advantage of the camera angle went unnoticed in the tutors' reflections. With more guidance from the instructor, teacher candidates may be more likely to notice these nuances of the lesson and improve their teaching accordingly. In addition, it may be possible to replicate the advantageous camera angle with careful placement of a traditional camera.

Some simple adjustments may mitigate the problems posed by the use of the GoPro® camera and may warrant further research. For example, exploring the use of the GoPro® camera with older students may be worthwhile. The fourth and fifth grade students in our study were far less bothered by the head-mounted camera than the first graders. They also tended to have less head movement during the lesson, which resulted in videos that were easier for the tutor to watch. Videotaping shorter tutoring sessions or only taping segments of longer sessions may be advisable. Shorter sessions would be more practical for wearing the head-mounted camera and would allow for more targeted reflection by the tutor. Another option would be to have an observer wear the GoPro®, which would maintain the ability to focus on specific tutor behaviors.

The observer's notes could then be compared with the tutor's own reflections to provide a check for agreement as an added advantage. Having the tutor wear the GoPro® could offer an entirely different set of benefits without the previously noted disadvantages. In the midst of managing a complex lesson, a tutor may be likely to miss many subtle but important responses from the student. Recording in this way may allow the tutor to reflect more accurately on the impact of instruction.

Conclusion

In this study, we set out to determine whether the use of a head-mounted camera to record tutoring sessions facilitated meaningful and focused reflections by the tutor. No clear differences were noted between reflections on lessons recorded with GoPro® and those recorded using a traditional camera. With both camera types, tutors focused mostly on their organization, lesson planning, time management, materials, and generic instructional strategies. Differences between tutors existed, but these differences were not related to camera type. Questions remain about whether the lack of difference may have actually been a byproduct of the nature of the assignment and the reflection skills of the tutors. Attempting to reflect without fully understanding the reflective process can be thought of as reflecting in the dark—a futile and frustrating endeavor.

We concur with Shanahan et al. (2015), who indicated the need for additional studies of different conditions for video reflection. They note the dearth of research on video reflection on literacy pedagogy, which leads to a lack of understanding about how, when, and why video reflections can be most effective for improving reading instruction. Ultimately, how effective video reflection is may depend on how teacher candidates view the reflective process. Do they understand its purpose or value? Do they see it as just another assignment to be completed and checked off their list? Or, do they see it as an authentic opportunity to improve their teaching?

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