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The Influence of Video Analysis on Teaching

Tonya R. Tripp

A dissertation submitted to the faculty of  
Brigham Young University  
in partial fulfillment of the requirements for the degree of  
Doctor of Philosophy

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## ABSTRACT

### The Influence of Video Analysis on Teaching

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Doctor of Philosophy

As video has become more accessible, there has been an increase in the use of video for teacher reflection. Although past studies have investigated the use of video for teacher reflection, there is not a review of practices and processes for effective use of video analysis. The first article in this dissertation reviews 52 studies where teachers used video to reflect on their teaching. Most studies included in the review reported that video was a beneficial feedback method for teachers. However, few studies discussed how video encourages teachers to change their practices.

The second article in this dissertations investigates the how video influences the teacher change process. The study found that teachers did change their practices as a result of using video analysis. Teachers reported that video analysis encouraged them to change because they were able to: (a) focus their analysis, (b) see their teaching from a new perspective, (c) feel accountable to change their practice, (d) remember to implement changes, and (e) see their progress.

Keywords: video, video analysis tools, teacher reflection

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## Introduction

Reflection has become an integral part of most teacher training programs. Researchers and educators have reported that video reflection can be an effective feedback strategy for helping instructors improve their teaching (Penny & Coe, 2004). As video has become more accessible, there has been increased interest in using video for teacher development. However, there has not been a synthesis of practices and processes for effective video analysis nor has there been an emphasis on the effect of video analysis on teacher change. Therefore, the purpose of this dissertation is to review the video analysis process used in past studies and to investigate how video analysis affects teacher change.

This dissertation consists of two articles. The first article is a review of the video reflection practices used in 52 studies. The review discusses the dimensions of the video analysis process that varied across past studies: (a) type of tasks, (b) manner of facilitation, (c) extent to which teachers reflect individually or collaboratively, (d) length of video used, (e) number of reflections, and (f) measurement. After reviewing past studies, the researcher discovered that studies typically reported that video was beneficial for teacher reflection, but few studies investigated how video analysis influenced teacher change. Schön stated that reflection should lead individuals to action (1983). Therefore, if video is beneficial for teacher reflection, it should lead teachers to action, or to change. Since very little is known about how video influences teacher change, the second article examined the impact of video analysis on the teacher change process. By reviewing past studies and understanding how educators engage in the change process, the researcher hopes that educators will be able to utilize video more effectively to instigate teacher change.

**Article 1: Using Video to Analyze Teaching**

Running Head: VIDEO ANALYSIS

Literature Review: Using Video to Analyze Teaching

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### **Abstract**

Recently, interest in using video to facilitate teacher reflection has increased. However, there is not a framework that is based on the results of video analysis research available to those who are interested in designing their own video analysis studies. The purpose of this paper is to review past studies in order to help educators make more informed decisions as they establish their own video analysis processes. This review includes 52 studies where participants recorded their own teaching, examined their performance on video, and reflected on the performance. Several dimensions of video analysis that varied across past studies are discussed: type of tasks, manner of facilitation, extent to which teachers reflect individually or collaboratively, length of video used, number of reflections, and measurement. This paper summarizes reported findings regarding each of these dimensions and raises several questions that need further investigation.

## Introduction

Interest in video for teacher reflection has waxed and waned since its inception. As video has become more accessible, there has been renewed interest in using video for teacher development. Past studies reported that video reflection can be an effective feedback strategy for helping instructors improve their teaching (Penny & Coe, 2004). Although studies reported that video was beneficial for teacher reflection, the processes used to come to this conclusion varied widely across studies. For example, in some studies teachers reflected on their videos individually, while in other studies teachers reflected on their videos collaboratively. Studies also used varying video reflection tasks, guiding frameworks, and methods for measuring the benefits of video reflection. Understanding the varying dimensions of past studies can help those who are interested in using video analysis make more informed decisions about the process for conducting their own video reflections.

This paper reviews video reflection practices that have been used in teacher education. The review was narrowed to studies where participants recorded their own teaching, examined their performance on video, and reflected on the performance. This includes studies that were conducted with both preservice and inservice teachers. Because we were interested in determining how examining one's own teaching performance on video influences self-reflection, this review does not include studies where teachers examined the performances of other teachers on video. Additionally, since we were interested in how teachers use video to alter their actual teaching experiences, we do not include microteaching in this paper.

We searched ERIC, SSCI, PsycInfo, Academic Search Premier, and digital dissertation databases for articles about video and self reflection, using the following terms: video, self-reflection, reflection, evaluation, teachers, and video analysis tools. We located additional studies



by identifying references from the resulting set of articles. Additionally, we identified a few key articles (e.g., Fuller & Manning, 1973) and performed a highly-cited search using the ISI citation index to discover newer articles that may have been based on early video analysis work. Finally, we contacted researchers at several universities that are currently using video analysis tools to report their current research. This resulted in a final set of 52 studies, including journal articles, conference presentations, and dissertations.

This paper reviews dimensions that varied across the 52 studies. The paper is organized around six questions educators may want to consider when establishing a video reflection process. The intent of this paper is to help teacher educators make more informed decisions as they begin conducting their own video analysis studies.

### **Dimensions of Video Analysis**

Dimensions of the video analysis process that varied across past research studies include: (a) reflection tasks, (b) reflection facilitation, (c) individual and collaborative reflection, (d) video length, (e) number of reflections, and (f) measuring reflection (see Table 1).

#### **Reflection Tasks**

In past studies, teachers engaged in several reflection tasks during or after viewing their teaching videos. These tasks included completing codes or checklists, participating in interviews or conferences, writing reflections, and video editing. This section explains how these tasks were used in the studies and summarizes the effectiveness of the tasks for facilitating reflection.

**Code/checklist.** In several studies, teachers used codes or checklists to help facilitate their video reflections. Teachers typically tallied the number of times certain behaviors

Table 1

*Dimensions of Video Analysis*

Dimension	Definition	Question
Reflection Tasks	Tasks teachers participated in during or after viewing their teaching: (a) completing codes or checklists, (b) participating in interviews or conferences, (c) writing reflections, and (d) video editing.	What type of reflection tasks will I ask teachers to engage in during their video reflections?
Reflection Facilitation	How the reflection process was facilitated. For example, in some studies participants chose their own reflection focus, while in other studies researchers or supervisors guided the teachers' reflections.	Will I provide teachers with a framework to guide their reflections?
Individual Reflection	Individual reflection refers to instances where teachers viewed and reflect on their video individually.	Will I ask teachers to reflect individually, collaboratively, or both?
Collaborative Reflection	Collaborative reflections describe when participants reflected on their videos with supervisors, researchers, peers, and/or colleagues	
Video Length	In past studies the length of video used for reflection varied from three minutes to an entire teaching episode.	What length of video will teachers use for reflection?
Number of Reflections	In past studies the number of times teachers reflected on their videos varied from one to more than three reflections.	How many times will teachers reflect on their videos?
Measuring Reflection	This refers to how studies determined the influence of video on teachers' reflections.	What methods will I use to determine if video was beneficial for teacher reflection?

occurred. For example, in Brawdy & Byra (1994) teachers tallied the number of positive and negative feedback statements and questions they used during their lesson. Studies reported that using checklists to reflect on teaching videos helped teachers to notice specific behaviors and to gain insights into their teaching (Hougham, 1992; Prusak, Dye, Graham, & Gaser, 2010; Schmidt & McCutcheon, 1994; and Struyk & McCoy, 1993). Although researchers found codes and checklists to be beneficial for facilitating reflection, one of the challenges researchers encountered was determining the optimal number of categories or items that should be included on the checklists or coding sheets (Prusak et al., 2010). Therefore, teacher educators who choose to use codes or checklists to facilitate teachers' analyses may need to investigate the optimal number of codes or items teachers should focus on during their video reflections.

**Interviews/conferences.** Interviews or conferences are another reflection task educators might consider as they establish a video analysis process. In past studies teachers were asked to discuss their teaching videos during an interview with researchers or supervisors or in a discussion group. The reported value of using video conferences to facilitate video reflections is discussed below.

In 17 studies, teachers discussed their video in an interview or conference session with supervisors or researchers. Teachers reported that optimal learning occurred when they watched and discussed their teaching with their supervisor (Grainger, 2004; Miyata, 2002). Teachers felt that video-based feedback was more helpful than supervisor evaluations without video feedback because video served as a common frame of reference on which the discussions were based (Deasey, Heitzenroder, Wienkee & Bloom (as cited in Wang & Hartley, 2003). As a result, many teachers felt that the suggestions and recommendations made during the video conferences

were the most influential contribution to teacher change (Brawdy & Byra, 1994; Dawson, Dawson, & Forness, 2001; Rich & Hannafin, 2008b).

In 10 studies, teachers met with their colleagues or peers to view and reflect on their videos. Teachers in these studies also felt that viewing and discussing their videos was the most valuable component of their professional development (Borko, Jacobs, Eiteljorg & Pittman, 2008; Griswold, 2004). Video discussions helped teachers see their teaching from a new perspective, recognize aspects of their teaching that they had not previously noticed, and realize that others had similar struggles (Bryan & Recesso, 2006; Collins, Cook-Cottone, Robinson & Sullivan, 2004; Griswold, 2004; Miller, 2009; Pailliotet, 1995; Schmidt & McCutcheon, 1994).

Overall, past studies indicated that teachers not only valued discussing their teaching videos with others, but felt that it was one of the most important aspects of their development. Video conferences provided a common frame of reference on which the discussions were based and allowed teachers to gain new insights into their teaching. Although past studies indicated that video conferences were beneficial they did not specify how many conferences or interviews are necessary for optimal growth, how frequently the conferences should be conducted, or at what point in the teachers' program or career the conferences or interview sessions should be implemented. Consequently, if teacher educators decide to use interviews or conferences, additional research may be needed to effectively arrange the logistics of video conferences.

**Written reflections.** Many studies asked teachers to complete written reflections during or after viewing their teaching videos. Teachers' written reflections included notes, essays, questionnaire responses, and journal writings. These studies allowed teachers to perceive classroom interactions at a slower pace and recognize things they did not notice when they reflected from memory (Miller & Carney, 2008; Rich & Hannafin, 2008; Rosaen, Lundeberg,

Cooper, Fritzen, & Terpstra, 2008; Tripp, 2009; Wright, 2008). As a result, researchers felt that teachers' written reflections tended to be more focused and accurate than teacher reflections without video (Shepherd & Hannafin, 2009; Welsch & Devlin, 2004). Teachers who used video to write their reflections also improved their ability to use evidence to support their reflection comments (Sherin & vanEs, 2005, 2009).

Although studies reported that written video reflections were useful for evaluating teaching, some studies reported that teachers valued discussing their videos with others more than writing their own reflections (Halter, 2006; Miyata, 2002; Welsch & Devlin, 2004). This was especially prominent in preservice teachers who trusted the feedback of others more than their own feelings (Rich & Hannafin, 2008b). It is possible that teachers would value written video reflections more if the reflections were used in conjunction with video conferences. Therefore, those who decide to use written reflections may want to consider having teachers discuss their written reflections with others.

**Video editing.** Another reflection task teacher educators may want to consider when establishing a video analysis process is video editing. In past studies teachers edited their videos to create a case study of their teaching, or they selected video clips to serve as evidence to support their reflections. Studies reported mixed results about using video editing to reflect on teaching. Some studies reported that there was not a significant difference in the reflection of teachers who used video editing to support their written reflections and teachers who wrote reflections without video editing (Spurgeon & Bowen, 2002; Warden, 2004). Cunningham & Benedetto (2002) also reported that teachers often spent more time selecting clips than actually reflecting. In contrast, other studies found that teachers' reflections were more detailed, longer, and multifaceted when they participated in video editing compared to written reflections.

Teachers also preferred the video case construction process to written reflections (Nicol & Crespo, 2004; Rosaen, Lundeberg, Terpstra, Cooper, Fu, Nui, in press; Yerrick, Ross, & Molebash, 2005).

It is possible that additional factors, such as reflection training, numbers of opportunities teachers have to edit their videos, or length of time between the lesson and the editing process, may impact the value of using video editing to reflect. Those interested in using video editing to facilitate teachers' reflections may need to further investigate the most effective method for incorporating video editing into the reflection process.

Along with video editing, educators need consider which tasks or combination of tasks they will ask teachers to complete during their video reflections. Past studies asked teachers to complete codes or checklists, participate in interviews or conferences, write reflections, and edit their videos. Most studies reported that these tasks were useful for facilitating reflection, but teachers seemed to value video discussions more than the other reflection tasks. As educators select tasks for video reflection they should also be aware that there are several questions that need further investigation: What is the ideal number of codes or items for teachers to focus on during their video analyses? How should the logistics of video conferences be carried out? Do teachers value written reflections more when they are combined with other reflection tasks? What is the best way to use video editing to facilitate reflection? Additionally, educators may want to consider which combination of these tasks is most useful for facilitating reflections.

### **Reflection Facilitation**

As educators set up a video analysis process they will also need to decide whether they will provide teachers with a framework to guide their reflections. Past studies used reflection questions, rubrics, checklists, or category codes to serve as a framework to guide teachers'

reflections. Most studies concluded that teachers needed a systematic set of procedures to guide their reflections (Collins et al., 2004; Miyata, 2002). Researchers felt that providing teachers with reflection guidance enhanced the quality of their reflections (Fox, Brantely-Dias, & Calandra, 2007) and that without reflection guidance teachers tended to focus on the technical aspects of their teaching (Calandra, Gurvitch, & Lund, 2008). Although these studies indicated that teachers should be given a framework to guide their reflections, a few studies reported that teachers preferred to select their own reflection focus (Nicol & Crespo, 2004; Rich & Hannafin, 2008b). Consequently, teacher educators might consider allowing teachers to select the focus of their reflection, and then helping teachers to narrow their focus to a structured framework for the reflection process.

### **Individual/Collaborative Reflection**

Teacher educators may want to consider with whom teachers will reflect on their teaching videos. Past studies asked teachers to reflect on their videos individually, collaboratively, or individually and then collaboratively.

**Individual reflection.** Participants in several studies individually reflected on their teaching by writing reflective essays, coding their video, or clipping segments and attaching reflection comments. While most of the studies did not indicate whether the participants or researchers felt that reflecting individually was beneficial, the participants in Halter (2006) preferred feedback from their mentors or supervisors to reflecting on their own. They perceived that their supervisors were more qualified to give feedback, and they trusted their supervisors' opinions more than their own.

**Collaborative reflection.** Several studies asked participants to reflect collaboratively with supervisors, researchers, colleagues, and peers. These studies also indicated that it was

beneficial for teachers to be able to discuss their teaching videos with others. Teachers felt that viewing and discussing their videos resulted in optimal learning (Thomson, 1992). Group discussions helped teachers to clarify, examine, and challenge their teaching assumptions and practices (Grainger, 2004; Miller, 2009). Teachers also reported that the suggestions and recommendations made by others were the most influential element in helping them change (Rich & Hannafin, 2008b).

**Both individual and collaborative reflection.** Some studies included both collaborative and individual reflections. Brawdy & Byra (1994) reported that teachers who met with a supervisor to discuss their individual reflections had a higher rate of improvement than teachers who reflected alone. Other studies found that allowing teachers to analyze their video before meeting with others helped teachers to think about their reasoning for selecting certain clips and to be more prepared for the discussions (Bryan & Recesso, 2006; Tripp, 2009).

Overall, studies reported that it was beneficial for teachers to discuss their reflection with others, and some preservice teachers indicated that they preferred to reflect with their supervisors because they valued their supervisors' thoughts about their teaching more than their own. The studies did not investigate whether it was more beneficial to use both individual and collaborative reflection, but a couple of studies indicated that teachers were more prepared for their discussions when they spent time individually reviewing their teaching before their discussions.

### **Video Length**

In past studies, the length of the videos used for reflection varied from three-minute clips of a lesson to an entire teaching episode. It is difficult to determine if the length of the video had a significant impact on reflection since none of the studies compared the differences in the length



of the video. However, the majority of the participants in Sharpe et al. (2003) thought the length of the video used for reflection should be longer than three minutes, while Pailliotet (1995) stated that the process of viewing an entire video was time consuming and claimed that it was impossible to complete a deep viewing session with each student. Additional research is needed to determine if there is an ideal length for teachers to reflect on.

### **Number of Reflections**

The majority of studies asked teachers to view their videos one to three times. Studies did not investigate whether the number of times teachers reflected influenced the value of their video reflection, but half of the teachers in Sharpe et al. (2003) felt that viewing the same video before and after the conference would have been valuable. The teacher in Storeygard & Fox (1995) reported that she gained new insights every time she viewed her video, and the teacher in Tripp (2009) wished she could reflect with video analysis every day, but recognized that it would be logistically too difficult because she did not have enough time.

Teacher reflection research does not state how many times teachers need to reflect before they begin to make changes to their practice. Therefore, additional research is needed to determine if the number of times teachers reflect on their videos influences their reflection and ultimately the changes they make to their practice. Future research might investigate how many opportunities preservice teachers should be given to reflect during their programs, how many opportunities inservice teachers should be given to reflect, how frequent the reflections should be, the number of reflections that should be individual or collaborative, and whether the focus of the reflection should change or remain the same with each reflection.

## Measuring Reflection

As educators establish a video analysis process, they need to decide how they will evaluate the effect of video on teachers' reflections. This is a valuable step to determine whether the benefits of video reflection are worth both the financial and time commitment. To determine effectiveness, past studies examined teachers' reflection comments, changes in teaching practices, self assessments of reflection ability, perceptions of the effectiveness of using video to facilitate reflection, scores on pre- and post-tests of teaching skills, and accuracy of video coding. This section explains how studies measured reflection and summarizes the conclusions.

**Reflection comments.** Many studies examined teachers' written and verbal reflection comments to determine the effect of video on reflection. These studies indicated that video influenced what teachers noticed or focused on during their reflection (Byra, 1996; Sherin & van Es, 2005, 2009). For example, teachers often shifted their reflection focus from themselves to student thinking when they used video (Yerrick, Ross, & Molebash, 2005). Video also facilitated detailed noticing and allowed teachers to analyze aspects of their teaching more specifically (Rosaen et al., 2008; Tripp, 2009). Wright (2008) reported that the number of things teachers noticed about their teaching increased when they used video to reflect rather than reflecting from memory. Detailed analyses helped teachers to identify solutions to the problems they encountered in their lessons, as well as broader applications for future teaching challenges (Miller, 2009).

**Changes in teaching practices.** Some studies conducted classroom observations or watched teachers' videos to determine if teachers made changes to their practice after participating in video reflections. All the studies reported that teachers made changes or improved their teaching practices after using video to reflect on their teaching (Koorland,

Tuckman, Wallat, Long, Thompson, Silverman, 1985; Storeygard & Fox, 1995; Stadler, 2003; Brawdy & Byra, 1994; Dawson, Dawson, & Forness, 2001; Hougham, 1992; Shepherd & Hannafin, 2008, 2009; Wedman, Espinosa & Laffey, 1999). However, Hougham was the only study that compared the changes that were made by teachers who used video to reflect with changes made by teachers who reflected on their teaching without video. Hougham concluded that teachers who used video to evaluate teaching improved their question asking strategies to a greater degree than teachers who did not use video evaluations. Additionally, the studies did not investigate whether the changes made by the teachers were temporary or lasting.

**Self-assessment of reflection ability.** Teachers in Warden (2004) assessed their ability to reflect by completing a teacher profile at the beginning and end of the project. Twelve of the thirteen teachers reported an improved perception of their reflective thinking skills and that the process of video editing was helpful. However, there was not a significant difference in the increase of perception of reflection ability among teachers who reflected with video and teachers who reflected without video. Warden suggested that perceptions of reflection ability may be influenced more by having opportunities to reflect than by using video for reflection.

**Perceptions of effectiveness.** In several studies teachers were asked to report whether video reflections were valuable to their teaching. The majority of the participants in the studies indicated that video reflections were beneficial. Thomson (1992) and Tripp (2009) were the only studies that compared teachers' perceptions of the effectiveness of using video for personal reflection with teachers' perceptions of the effectiveness of reflecting without video. Although the majority of the responses to video reflections were positive, many teachers felt that neither reflections with a supervisor nor individual reflections with video were as effective as participating in both.

**Pre- and post-test scores.** Some studies compared teachers' scores on pre- and post-tests to determine how teachers' scores improved after participating in video reflections. Participants in Halter (2006) and Kapanja (2001) took a test to determine their mastery of teaching skills. Although Kapanja did not describe or report the results of the tests, Halter concluded that reflection was a strong predictor of scores on the Performance Assessment for California Teachers (PACT). Martin-Reynolds (1980) compared students' pre- and post-test responses to the Video Self Report Form (VSRF). The researcher concluded that the teachers' responses shifted from themselves to their students after participating in the video reflections.

**Accuracy of coding.** In another study, preservice teachers were given 15 codes to mark and identify in their teaching videos (Prusak, Dye, Graham, and Gaser, 2010). Then researchers compared the preservice teachers' codes with the codes of an experienced teacher to determine the accuracy of the teachers' coding. Researchers found that the teachers were only moderately able to code their videos like an expert. Nevertheless, Prusak et al. felt that the coding process helped the teachers to gain valuable insights into their teaching.

In addition to coding videos, there are several methods educators may want to consider as they investigate the benefits of video on teacher reflection: teachers' reflection comments, changes in teaching practices, self-assessments of reflection ability, perceptions of the effectiveness of video for reflection, and pre- and post- test scores. Past studies indicated that when teachers used video to reflect, the focus of their comments shifted, and they made changes in their teaching practices. Most teachers felt that it was beneficial to reflect on their teaching using video, but teachers perceptions of their ability to reflect on their teaching was not significantly different for teachers who reflected with or without video.

## **Conclusions and Future Research**

As interest in the use of video for teacher reflection increases, there are several questions educators may want to consider as they develop their own video analysis processes (see Table 1). Although some of these questions can be answered from the findings of past studies, there are still questions that need further investigation. The following is a summary of the reported findings for the varying dimensions of video analysis, as well as the aspects of video analysis that need further investigation.

### **Reflection Tasks**

There are a variety of reflection tasks that teachers can engage in during the video analysis process. Past studies asked teachers to complete codes and checklists, participate in interviews or conferences, write reflections, and edit their videos. The majority of studies reported that these tasks were valuable for facilitating reflection. However, teachers preferred conferences over other reflection tasks. Teachers felt like video discussions helped them see their teaching from a new perspective. Video also provided a common frame of reference on which the discussions were based. As a result, teachers felt like the suggestions and recommendations made during the video conferences were the most important factor in the changes they made. Although the reflection tasks appeared to be beneficial for helping teachers reflect on their teaching, there are several aspects of these tasks that need further investigation: (a) ideal number of items to include on coding sheets and checklists, (b) how the logistics of video conferences should be carried out, (c) the most effective way to use video editing, and (d) whether combining conferences with the other tasks increases the perceived value of those tasks.

### **Reflection Facilitation**

Past studies used reflective questions, rubrics, checklists, and category codes as frameworks for the reflection process. Researchers reported that providing a framework enhanced the quality of teachers' reflections. However, teachers reported that they wanted to choose their own reflection focus. Therefore, researchers might consider allowing teachers to select the focus of their reflection and then helping teachers to narrow the focus to a structured framework.

### **Individual/Collaborative Reflection**

Teachers overwhelmingly reported that they preferred discussing their reflections with others to individually reflecting on their videos. This was especially prominent in preservice teachers, who trusted others' opinions more than their own. A few of studies indicated that asking teachers to discuss their video individually and then collectively improved the collective discussions because teachers were more prepared. Additional research is needed to investigate the benefits of using both individual and collaborative reflection as part of the video analysis process. Future research might also investigate the number of conferences necessary for optimal growth and how frequently the conferences should be held.

### **Length of Videos and Number of Reflections**

Although the length of video teachers reflected on and the number of times teachers reflected on their videos varied across studies, studies did not investigate how these characteristics impacted teachers' reflections. Therefore, future research is needed to determine if there is an optimal length of video teachers should use for reflection, as well as the number of times teachers should reflect on their videos.

## **Measuring Reflection**

Examining the benefits of video on teachers' reflections can help researchers determine whether the benefits teachers receive from participating in video analysis are worth the investment of time and money required to conduct the process. There are various ways that past studies measured the effect of video on teacher reflection. Studies examined teachers' reflection comments, changes in teaching practices, self-assessment of reflection ability, perceptions of effectiveness, pre- and post-test scores, and coding accuracy. Researchers who are interested in using video for reflection will need to determine which combination of these methods will help them effectively answer their specific questions about the video analysis process.

Although video is used increasingly for teacher reflection, there has not been a framework based on results of video analysis research available to those who are interested in designing their own video analysis studies. This review synthesized several dimensions of the video analysis process. Presented as practical considerations, these suggestions enable educators to understand how their approach to video analysis might yield varying results. Careful consideration of each of these dimensions does not guarantee that a successful process will be developed. However, these can serve as a framework for those who are interested in using video to facilitate teacher reflection.

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### Appendix: Synthesis of Video Analysis Studies

#### *Video Analysis Studies Reviewed*

Authors, Date	Participants	Video Procedures	Reflection Method	Data Collection	Results
Athanases, S.Z. (1993)	24 teachers from 1 to 15 years of experience	Recorded three class groupings (large-group, small group, and one-to-one)	Selected two 3-5 minute episodes from their lessons demonstrating successful events and problems; met with an examiner to review clips; used the clips in portfolio	Collected interviews and written statements during the nine months of the study; conducted exit interviews	Teachers reported growth in their teaching and in their thinking about their teaching.
Borko, H., et al. (2008)	16 middle school math teachers; half attended monthly professional development workshop	Recorded at least one lesson; some teachers shared their video with the group; group discussions were recorded and analyzed.	Coded their videos and shared with group	Coded teacher discourse during group discussions; established categories from topics consistently discussed	Teachers talked in a more focused, in-depth, and analytical manner about specific issues. They focused more on content and student thinking and the teacher's role in probing thinking.
Brantley-Dias, et al. (2008)	8 preservice science teachers	Recorded a single lesson; analyzed for 2-3 critical incidents	Used the Critical Incident Reflection protocol (Tripp, 1992) to guide reflection	Analyzed edited video, post-teaching interviews	The depth of reflection was mostly technical.



*Video Analysis Studies Reviewed (Continued)*

Authors, Date	Participants	Video Procedures	Reflection Method	Data Collection	Results
Brawdy, P. & Byra, M. (1994)	PE teacher majors	Recorded 10 minutes of teaching fundamental motor skills	Group 1: analyzed videos on their own and set an objective. Group 2: met with the supervisor and jointly coded types and frequency of verbal feedback, and made a plan to improve.	Tallied number of positive and negative feedback statements and questions; compared number of positive and negative feedback statements and questions	Teachers increased the frequency of positive specific statements and modified the frequency of their positive general statements.
Bryan, L. A. & Recesso, A. (2006).	Science student teachers	Recorded at least once with a max of three; video streamed across the local school system	Identified instances that supported or contradicted their personal teaching statement; presented clips to peers; discussed outcomes and reasoning; identified a concrete solution	Recorded weekly cohort mtgs.; analyzed student teachers' own written VAT comments; Analyzed student teachers' video(s).	Better prepared to think through and tackle demanding issues in their teaching; more engaged in thoughtful, structured dialog in supervisory conferences; aware of the complex nature of teaching and learning
Byra, M. (1996)	14 pre-service PE teachers	Recorded a 30 minute lesson	Watched video; answered questions regarding feelings about performance, strengths of the lesson, and aspects for improvement	Researchers coded the reflections as technical, situational, and sensitizing.	Video reflections focused on the technical aspects of teaching.

*Video Analysis Studies Reviewed (Continued)*

Authors, Date	Participants	Video Procedures	Reflection Method	Data Collection	Results
Calandra, B., Brantley-Dias, L., & Dias, M. (2006)	1 preservice teacher (Science Education)	Recorded self during 2 different teaching cycles	Edited videos for meaningful teaching incidents; discussed edited video with cooperating teacher	Used Grounded Theory to analyze data: audio-taped teacher conferences, full videos of teaching episodes, edited videos, debriefing session (post-conference), final interview	Final video-stimulated interview demonstrated high reflection on the Sparks-Langer et al. reflective scale. This contrasted with low reflection when not guided or video-enhanced.
Calandra, B., et al. (2009)	Group A used guided and collaborative reflection Group B created video vignettes	Captured 1 episode of teaching; looked for 2 critical incidents	Group A debriefed w/ mentors and used Critical Incident analysis. Group B edited videos for 2 critical incidents and used same reflection form as Group A.	Not described	Students who developed video vignettes produced longer and more multifaceted reflections.
Calandra, B., Gurvitch, R., & Lund J. (2008).	10 preservice PR teachers	Three 45-minute lessons were recorded during semester	Reported if they felt the lesson was successful and why; created 3 minute video clips for each 45-minute video to support their claim(s).	Used pattern matching and cross case analysis to analyze videos, edited vignettes, and written reflections	Congruence between vignette(s) and written reflection(s); clips were teacher-centered; focus on management and verbal instruction decreased across cycles; reflection became more explanatory across cycles

*Video Analysis Studies Reviewed (Continued)*

Authors, Date	Participants	Video Procedures	Reflection Method	Data Collection	Results
Collins, J. L., et. al (2004)	Students enrolled in a course on teaching writing for inservice and pre-service teachers	Teachers videoed themselves teaching a writing strategy	Edited video to a 3-6 minute presentation; videos were viewed by a group of peers who offered suggestions	Teachers reported on whether they felt there was educational value added to the course through the video assignment.	Teachers thought that the video reflection was highly valuable.
Cunningham, A. & Benedetto, S. (2002)	Pre-service teachers	Not described	Participants edited their videos to create a meaningful, reflective video.	Not described	Teachers felt that the editing process required them to be critical of the clips they selected to communicate their growth. Teachers spent more time selecting the clips than reflecting on the video segments.
Cuper, P., et al. (2007)	Pre-service teachers at Keen State College	One pre-service teacher video-taped another pre-service teacher teaching.	Gradual Replay Lens: watched their video on their own; met with their supervisor; replayed frames related to a particular lens	Not described	Identified specific teaching behaviors that they wanted to change or keep; felt that supervisory feedback was more convincing

*Video Analysis Studies Reviewed (Continued)*

Authors, Date	Participants	Video Procedures	Reflection Method	Data Collection	Results
Dawson, P.J., Dawson, K. E., Forness, S.R. (2001)	2 college students enrolled in a teaching practicum	Teachers were videotaped through a one- way mirror.	Videos were edited to contain equal amounts of effective and ineffective teaching behaviors. Teachers were asked questions such as, "What do you think was going on here?"	Trained observers compared the number of effective and ineffective behaviors exhibited by the teachers before and after viewing their videos.	Teachers increased effective and decreased ineffective teaching behaviors after seeing the videotaped sequence. Teachers felt that the video feedback was primarily responsible for the change in their behavior.
Deasy, G., et. al (1991) as cited in Wang & Hartley (2003)	19 pre-service teachers	Participants videotaped their teaching.	Viewed video and were given feedback about their teaching as it related to 8 teaching behaviors that were relevant to working with behaviorally disordered students	A participant survey was administered at the end of the study.	Teachers perceived the video method as more helpful than the traditional observation and feedback method for identifying gaps between their beliefs about best practices and their actions.
Fox, D. L., Brantley-Dias, L., & Calandra, B. (2007)	24 English Education preservice teachers	Created 2 vignettes to demonstrate their teaching	Used the Critical Incident Reflection guide (CIR), which was modified from Tripp's (1993) and Griffin's (2003) recommendations	Researchers analyzed edited digital videos, written reflections, follow-up, and open- ended questionnaires.	CIR enhanced the quality of reflections. Writing focus changed from teacher-centered to student- centered and from means- based to ends-based.

*Video Analysis Studies Reviewed (Continued)*

Authors, Date	Participants	Video Procedures	Reflection Method	Data Collection	Results
Grainger, S. (2004)	Not discussed	Teachers were videotaped.	Video Stimulated Recall (VSR): immediately after the lesson, played back the video and teachers stopped and commented on decisions	Not described	Viewing and talking about one's own teaching is the best way to access knowledge of one's own purpose.
Griswold, S. L. (2004)	13 K-8 inservice teachers from four different schools within a district	Teachers videotaped three thirty to sixty minute segments of instruction and chose a 10-15 minute clip to share with peers.	Teachers reflected with their peers after viewing the video and reflected in a journal throughout the process.	Used Teacher Video Self-Assessment/Reflective Writing questionnaire, teaching competency form, journals, professional development form, and concluding response survey	Sharing videos of classroom performances can be an effective means for guiding professional development. Viewing videotapes altered the teachers' self perceptions.
Halter, C. P. (2006)	67 intern teachers	Pre-service teachers were videotaped teaching a lesson.	Pre-service teachers wrote reflective essays.	Compared reflective essays. Questionnaires and follow up interviews were used to capture the thoughts and beliefs about reflection.	The type of reflective writing remained consistent, but the focus of the reflective writing was affected. Teachers saw value in using video, but viewed feedback from supervisors as more valuable than reflecting on their own.

*Video Analysis Studies Reviewed (Continued)*

Authors, Date	Participants	Video Procedures	Reflection Method	Data Collection	Results
Hougham, P. (1992)	Senior student teachers placed in local elementary schools	Videod during their teaching; viewed and evaluated their question asking strategies using a form	Recorded tallies for level of questions, types (focusing, probing, prompting, and closure) of questions, and techniques (redirecting and wait time)	Trained observers tallied the number of specific questions asked and the techniques used and compared results over time. Teachers rated the value of the video reflections.	Teachers who received video evaluations improved their question-asking strategies to a greater degree than students who did not receive video evaluations. Teachers agreed that videotaping was a beneficial tool.
Jensen, R. A., et al. (1994)	Student teachers majoring in elementary education, early childhood education, or special education	Recorded three different teaching samples; reflected on three different skill areas	Open-ended instruments focused observations in interpersonal skills, instructional, management, and organizational skills, and question skills.	Teachers identified both the assets and limitations of their experiences. Teachers assessed their overall teaching competencies through use of the "Preservice Teacher Reflection and Self Analysis".	Difficult to consistently identify strengths and growth areas; focused observations produced more helpful information than self-assessments; need more instruction and experience with recording and reflection
Koorland, M. A., et. al (1985)	3 pre-service teachers	Pre-service teachers videotaped themselves and mailed it to their supervisors.	Results on the Florida Measurement System (FLPMS) of effective and ineffective teaching behaviors was discussed during a conference call.	Researchers looked at changes in frequency counts on pre and post scores on the FLPMS.	The video group performed comparable to – if not superior to – the control group.

*Video Analysis Studies Reviewed (Continued)*

Authors, Date	Participants	Video Procedures	Reflection Method	Data Collection	Results
Kapanja, E. (2001)	40 curriculum Studies and Educational Technology students at the University of Ilorin in Nigeria.	The practicing teacher's micro-teaching lesson was recorded.	The participants met with their supervisor to watch and discuss faults that they noticed in their teaching.	Pre- and Post-tests were administered to the participants. No description of the tests was given.	The video reflection group had significant improvement over the control group. The video group was more confident and positive about the micro-teaching lesson.
Krammer, K., et. al (2006)	20 pre-service teachers from Germany and Switzerland	Recorded mathematics teaching project	Pre-service teachers' videos were available online to discuss the "implemented project and its effects on the students."	Used online "Mood Barometer;" administered two surveys to examine the change in instruction-related teacher cognitions; surveyed teachers about the use of instructional practices	Reflection on and discussion of personal teaching videos was deemed valuable by the teachers, but the process was very time consuming.
Lokey-Vega, A. & Brantely-Dias, L. (2006)	1 mentor; first year Ed-Tech teacher	A mentor and a first-year teacher selected 1 videotaped lesson to edit and reflect on.	Used the Critical Incident Reflection protocol (Tripp, 1992) to guide reflection	Collected and analyzed written reflections, video, and discussions	Assisted meaning feedback conversations

*Video Analysis Studies Reviewed (Continued)*

Authors, Date	Participants	Video Procedures	Reflection Method	Data Collection	Results
Martin-Reynolds, J. (1980)	30 student teachers were recorded (18 experimental, 12 control)	Split Screen Analysis with one camera on the teacher and the other on the students	Reviewed tape one on their own; filled out Video Self-Report Form; reviewed same tape with their mentor; second recording was viewed just by the student teacher and another VSRF was filled out	Used Flanders Interaction Analysis to analyze verbal communication and Love Roderick Scale for non-verbal communication; pre- and post-tests were compared	Focus from Pre-test to Post-test was dramatically shifted away from self to students in both groups, so treatment wasn't effective; however, this shows that something happened during video analysis that caused the shift.
Meade, P. & Mc Meniman, M. (1992)	1 chemistry teacher	Videotaped using two cameras and a vision mixer which allowed the researchers to track the teacher and students in any area of the classroom	Four Video Stimulated Recall (VSR) sessions	Analyzed the sessions by coding the comments using Shulman's 6 categories of knowledge; pre and post interviews	The process helped make the teachers' implicit theories about teaching explicit.



*Video Analysis Studies Reviewed (Continued)*

Authors, Date	Participants	Video Procedures	Reflection Method	Data Collection	Results
Miller, M. J. (2009)	5 Preservice Social Science Teachers	Each participant videotaped at least one of their lessons and viewed the videotape on their own.	2- to 3-hour seminar with five to six peers; used the Critical Friends Group protocol to guide problem-based conversations: shared a 10–15-minute segment of teaching video	Analyzed interviews, observations, videotapes, discussion transcripts, lesson plans, reflective papers, and student work; looked for codes and patterns; used constant comparison.	Teachers learned how to adapt lesson models to meet student needs, generalize beyond particular problems for future teaching, and clarify and challenge their teaching practices and assumptions about learning.
Miller, M., & Carney, J. (2008)	Not described	Not described	Teachers used Video Traces to record in-the-moment responses to their teaching videos.	Not described	Allowed access to real artifacts of practice; slow downed the teaching event; filtered the complexity of teacher interactions; allowed mentors to correct misinterpretations and extend interpretations

*Video Analysis Studies Reviewed (Continued)*

Authors, Date	Participants	Video Procedures	Reflection Method	Data Collection	Results
Miyata, H., (2002)	Elementary education preservice teachers at Shiga University in Japan	Recorded at least three lessons (first video during the first two weeks in the schools, second video by week four, and third video by week six)	Participants used a reflection instrument that focused on classroom environment, communication skills, and teaching procedures.	Not described	Teachers felt the process helped them improve their ability to monitor and adjust their practices. Optimum learning occurred when the student and college supervisor viewed and discussed the video together.
Nicol, C. & Crespo, S. (2004)	10 students from a problem-based cohort	Not described	Students created a digital case in the form of a web page that stemmed from the student's particular inquiry question and consisted of edited video data linked with analysis.	Analyzed a case study of one student in the cohort	The participant was able to sensitize herself to what she wanted to attend to. The participants' inquiries seemed to be prompted by the opportunity to ask her own question about her teaching.

*Video Analysis Studies Reviewed (Continued)*

Authors, Date	Participants	Video Procedures	Reflection Method	Data Collection	Results
Pailliotet, A.W. (1995)	Pre-service teachers	Pre-service teachers were videotaped teaching a lesson.	Teachers analyzed their videos according to three levels: literal observation, interpretations, and evaluation and application. They shared their observations with the whole group.	Data were analyzed for common themes.	Deep viewing helped preservice teachers to examine their personal beliefs about teaching.
Powell, E. (2005)	6 experienced teachers working on an in-service MA	Teachers were videoed for 30 minutes while they were teaching with active learning strategies.	Teachers used a reflective framework that focused on intentions, self-awareness, practical and technical reflection, perceptual awareness and critical reflection.	The reflective dialogues were audiotaped and transcribed. Transcriptions were coded using NVIVO.	Teachers' tacit assumptions about active learning were made explicit. Video sequences provided teachers with a context for investigating dimensions of their professional practice.

*Video Analysis Studies Reviewed (Continued)*

Authors, Date	Participants	Video Procedures	Reflection Method	Data Collection	Results
Preston, M. (2004)	39 students from various departments	Recorded lesson and embedded clips directly in the body of an essay	Wrote multi-media essays for each of the first nine weeks (connected video content with the readings, identified implications for classroom practice, and asked questions that could be addressed in class)	14/39 students felt writing the essays was helpful and appreciated the ability to view, excerpt, and annotate the videos.	Students were universally positive about having the ability to watch the videos wherever and whenever they chose. Students were better prepared for lectures each week.
Preston, M. D., et. al (2005)	Graduate students in a development of mathematical thinking course	Designed a mathematical activity; recorded themselves carrying it out with a child and interviewing the child afterward	Used Video Interactions for Teaching and Learning (VITAL) to analyze their video; wrote multimedia essays	Students completed a self-evaluation.	Student should be more accustomed to obtaining evidence and using critical thinking skills to support decision making.

*Video Analysis Studies Reviewed (Continued)*

Authors, Date	Participants	Video Procedures	Reflection Method	Data Collection	Results
Prusak, K., et al., 2010.	Pre-service teachers enrolled in PE teaching courses	While one student teacher was teaching, another student teacher videoed the lesson.	Used Studio Code to code their own teaching videos with 15 codes that were previously introduced when they analyzed expert teaching videos	Researchers randomly selected 15 coded instances. For each instance, the researcher determined whether or not the code label was an accurate representation of the video segment.	Students could only moderately code their video like an expert, but they still obtained valuable insights into their own teaching practice.
Rich, P. J., & Hannafin, M. J. (2008a)	4 elementary education student teachers	Used Video Analysis Tool (VAT) 3 times throughout their student teaching to analyze their instructional decisions	Used the Video Analysis Tool (VAT) to upload video and reflect on their teaching; looked at instructional decisions and changes, but determined their own focus	VAT comments and participant Interviews	Instructional Decisions were student-centered when they focused on pedagogical strategies and were teacher-centered when focusing on administrative issues.

*Video Analysis Studies Reviewed (Continued)*

Authors, Date	Participants	Video Procedures	Reflection Method	Data Collection	Results
Rich, P. J. & Hannafin, M. J. (2008b)	4 elementary education student teachers	Used Video Analysis Tool (VAT) 3 times throughout their student teaching to analyze their instructional decisions	Reflected using the VAT; consulted with their mentor teacher; recorded another video where they were to make changes; coded their video; reflected on the video with their mentor	VAT comments; participant interviews w/ preservice and mentor teachers; archival documents (e.g., lesson plans, student work)	Teachers preferred to choose their own focus for reflection. Participants chose to defer judgment until they could view their videos. Suggestions/recommendations made by mentors were most influential.
Rich, P. & Hannafin, M. J. (2009)	3 elementary education preservice teachers	Recorded themselves; reflected on their video; identified specific changes; recorded themselves again; analyzed it; presented their findings	Teachers used the Video Analysis Tool and their own self-created lens as a guide to reflect on their teaching.	Video Analysis Tool comments; interviews; class presentation; teaching documents	Video analysis allowed teachers to "step back and see" their teaching in a non-cognitively threatening way.

*Video Analysis Studies Reviewed (Continued)*

Authors, Date	Participants	Video Procedures	Reflection Method	Data Collection	Results
Romano, M., & Schwartz, J. (2005)	10 first year teachers	Videotaped 3 times during their first year	Used different technologies (electronic portfolios, online discussion board, and video) to reflect on their own teaching	3 Open-ended interviews (following video-taping), electronic portfolios, surveys, online discussion board transcripts	Teachers indicated that videotaping was the most important means for facilitating reflection because it helped them to "see mannerisms" and make changes in their teaching.
Rosaen, C. L., et al (2008)	3 elementary interns (2 first grade and one 3rd grade)	Taped twice in eight weeks	Wrote reflections on lessons without watching the video; watched videos and chose excerpts to analyze (No prompt was given to focus reflection)	Teacher interviews; reflection (reflections were chunked into ideas or topics, then segmented and divided into two categories, management and instruction, and then into two sub categories)	Video-based reflection was more specific. It discussed instructional elements rather than behavioral and paid more attention to students rather than self.
Rosaen, C. L., Lundeberg, M., Terpstra, M., Cooper, M., Fu, J., & Niu, R. (in press)	4 four interns earning a baccalaureate degree	Created a video case of their discussion-based science teaching	Created a video case of teaching; reflected on it	Baseline interview (allowed interns to share ideas on reflection and their perceptions of the tasks); design interview (allowed for open ended questions); final interview	Teachers benefited both in terms of what they noticed and in how they reasoned about their teaching. There were changes in their frame of mind towards using video as a tool to facilitate change.

*Video Analysis Studies Reviewed (Continued)*

Authors, Date	Participants	Video Procedures	Reflection Method	Data Collection	Results
Saxena, A., & Stevens, R. (2007)	Preservice (student teachers) and inservice teachers	Student teachers were videotaped.	Video Traces were used to review the videos and make comments and ask questions. In-service teachers and faculty responded to the video and comments with their own ideas.	Looked at and analyzed the conversation that came about from the videos	Video Traces supported novice teachers in their actual classrooms. Video Traces creates a "third space" to bring preservice and inservice teachers together.
Schmidt, C. P. & McCutcheon, J. W. (1994) as cited in Wang & Hartley (2003)	180 preservice teachers	Eight preservice teachers were videotaped, and 180 preservice teachers helped evaluate their performance.	Preservice teachers assessed the videos using the Classroom Procedures Evaluation Form and Adjective Checklist.	Not described	The self-videotaped assessments were effective in helping preservice teachers capture and assess the teaching behaviors.



*Video Analysis Studies Reviewed (Continued)*

Authors, Date	Participants	Video Procedures	Reflection Method	Data Collection	Results
Senger, E.S. (1998)	2 elementary school teachers	The researcher observed and recorded 10 mathematics lessons.	Previewed their lesson and made note of segments they wanted to discuss; met with the researcher to reflect on their video lessons	Video and Theory reflection methods were compared. Reflection sessions were videotaped, and follow up interviews were conducted. The data were analyzed for common themes.	Both methods were useful in understanding teachers' tacit beliefs and the relationship of belief to practice and for encouraging teacher change.
Sharpe, L., et. al (2003)	Preservice teachers	Teachers recorded themselves and selected a three minute clip to share.	Teachers had a live video conference with peers and university supervisors.	Pre-service teachers filled out a questionnaire about the technical and pedagogical advantages and disadvantages of Multipoint Desktop Video Conferencing (MVDC).	Felt that the video clips should have been longer; watching themselves and their peers was beneficial; it was necessary to scaffold the teachers' reflections

*Video Analysis Studies Reviewed (Continued)*

Authors, Date	Participants	Video Procedures	Reflection Method	Data Collection	Results
Shepherd, C. E., & Hannafin, M. J. (2008)	3 preservice social studies teachers (2 female and 1 male)	Recorded an entire class session of themselves teaching; analyzed active engagement; repeated the process three times	Reflective questions helped participants to review how their instruction was supposed to influence active engagement, whether or not it did, and what they would do differently next time to promote it.	Video recordings; answers to reflection questions; teacher interviews	Considered diverse classroom perspectives that had not been considered previously; developed improvement plans; change their opinions of teaching outcomes based on examination of video evidence
Shepherd, C. E., & Hannafin, M. J. (2009)	6 preservice social studies teachers during their final semester of the program	Recorded their teaching when they implemented an active learning technique; repeated the process minimum of three times	Reflective questions helped teachers to identify an area of active engagement to focus on. A rubric regarding techniques was completed. Teachers indicated what they would do differently next time.	Video recordings; portfolio answers; self-completed rubrics; teacher interviews	Examined classroom events from a different vantage point; considered alternative causes of classroom phenomena; identified missed actions from students; reconsidered strategies to increase student engagement

*Video Analysis Studies Reviewed (Continued)*

Authors, Date	Participants	Video Procedures	Reflection Method	Data Collection	Results
Sherin, M. G. & van Es, E. A. (2005)	2 studies--a: 4 middle school math teachers b: 12 preservice high school math and science teachers.	a: Year-long series of video club meetings (10 meetings) b: used VAST to analyze student thinking, teacher roles, and classroom discourse	a: Open ended questions with all teachers involved during meetings b: narrative essay discussing video from own classroom one month prior to and one month after VAST exposure	Coded transcribed videos and narrative essays	Focus shifted from pedagogy to student thinking and identified specific features instead of the overall chronology of the clips. Analysis became more interpretive instead of evaluative and more evidence-based.
Sherin, M. G. & van Es, E. A. (2009)	Group 1: 4 middle school math teachers; Group 2: 7 4th and 5th grade math teachers	Math lessons were recorded and then watched and discussed at monthly meetings.	Video clubs: teachers met monthly to watch and discuss video clips from their classes.	Observed changes in conversations; examined the influence of the video club in regards to thinking outside of the meetings; coded discussions	Increased focus on interpreting student mathematical thinking over time; looked at a wider range of factors rather than just pedagogy; knowledge based reasoning was developed
Spurgeon, S. & Bowen, J. L. (2002)	22 student teachers	Student teachers were recorded.	Student teachers used video editing (iMoive) to critique their teaching performance.	Student teachers identified one competency they wished to have evaluated. The teachers' written reflections were examined and compared with the control group.	Although the difference between the groups was not significant, researchers still believe that using multimedia portfolios will increase teachers' critical reflections.

*Video Analysis Studies Reviewed (Continued)*

Authors, Date	Participants	Video Procedures	Reflection Method	Data Collection	Results
Stadler, H. (2003)	Pre-service teachers	Not described	Not described	Interviews with teachers, reflective papers, video analysis of group work, feedback from students, classroom observations, student-teacher discussions during video feedback sessions	The quality of reflective papers improved. Teachers felt that the experience was a valuable part of their professional development.
Storeygard, J. & Fox, B. (1995)	Fifth grade teacher	Videotaped her math lessons for three years	Reflected on her lessons with her colleagues during their seminars; specifically looked for ways to increase student talk during her lessons	Interviews with the teacher, journal writings, classroom and seminar observations	The teacher felt that she made progress toward her goals. Word count of teacher talk compared to student talk revealed that after three years the teacher dominated the students' discussions less.
Struyk, L. R. & McCoy, L. H. (1993)	Preservice teachers	Classroom teachers videotaped the preservice teacher's lesson by panning the camera across the classroom in 20 second time sweeps.	Teachers watched the video and recorded behaviors that appeared during each 20 second interval and tallied the total number of occurrences.	Not described	Allowed teachers to focus on strengths and weaknesses; evaluate teaching as often and as many times as desired; did not need a supervisor to receive feedback; less threatening than evaluation by a supervisor

*Video Analysis Studies Reviewed (Continued)*

Authors, Date	Participants	Video Procedures	Reflection Method	Data Collection	Results
Thomson, W. S.(1992) Reported on two studies (study a)	Student teachers	Teachers videotaped themselves and mailed the tapes to a faculty supervisory team	The tapes were evaluated by the team using the Florida Performance Measurement System (FPRMS). After the conference the supervisor called the student teacher to provide feedback.	Not described	Student teachers who used video feedback performed in a comparable and in some cases a superior manner to those who received the conventional treatment.
Thomson, W. S.(1992) Reported on two studies. (study b)	26 preservice teachers	The students were observed by a content specialist from their field and recorded while teaching.	Teachers evaluated their video using behaviors defined in North Carolina's Teacher Performance Appraisal Instrument (TPAI).	Compared and contrasted the effectiveness of supervisor feedback and self-criticism using videotapes	There were more positive reactions than negative reactions to the process. Participants felt that optimal learning occurred when they were able to view and discuss their video with their supervisor.
Tripp, T. R. (2009)	1 student teacher and her supervisor	Recorded three lessons and analyzed them with Media Notes	Used several INTASC standards to guide her reflection. After analyzing her video, she met with her instructor to discuss her analysis.	Observations of video and traditional conferences and interviews were used to compare the video conferences with traditional post lesson conferences.	Video helped the teacher notice things in her teaching that she had not remembered, focused the analysis on specific teaching areas, and provided evidence to support discussions

*Video Analysis Studies Reviewed (Continued)*

Authors, Date	Participants	Video Procedures	Reflection Method	Data Collection	Results
van Es, E. A., & Sherin, M. G. (2002)	4 middle school mathematics teachers	Teachers met monthly for a year to watch and discuss video clips	The researcher facilitated the meetings using open-ended questions.	Video clubs were videotaped and discussion was analyzed.	There was a shift in what the teachers noticed. There was a shift in how the teachers discussed what they noticed.
Viiri, J. & Saari, H. (2006)	4 student teachers, 2 experienced teachers, 1 tutor	Recorded a 45-minute lesson	Watched lesson with researchers; explained reasons for changes in talk type	Categorized the type of teacher talk	New teachers used monotonous talk type and didn't plan for teacher talk type during lessons. They needed more time to practice and discuss teacher talk.
Warden, B. J. (2004)	15 preservice teachers	Teachers were videotaped teaching a lesson.	Teachers identified each indicator of the Oklahoma Criteria for Effective Teaching and Administrative Performance.	Researchers looked at the level of significance between the pre- and post-tests.	There was a significant difference between the video group's pre- and post-tests, but there was not a significant difference between the groups that used video reflections and those that did not use video.
Wedman, J. M., Espinosa, L. M., & Laffey, J. (1999)	2 undergraduate students, 8 elementary teachers, 1 secondary teacher	Recorded two teaching episodes that were 15 minutes in length	Reviewed videos for the influence class setting and the lesson had on students ; met with the researcher to discuss video; responded to questions	Teaching beliefs questionnaire, videotapes of two teaching events, videos of the reflective conference, two post teaching reflective conferences, and a portfolio presentation	Teachers grew in their abilities to learn from experience and begin new practices. Videos helped teachers focus on behaviors that needed to change.

*Video Analysis Studies Reviewed (Continued)*

Authors, Date	Participants	Video Procedures	Reflection Method	Data Collection	Results
Welsch, R. G., & Devlin, P. A. (2004)	Preservice teachers in a special education course (26 Undergraduates and 6 graduates)	The experimental group was videotaped teaching, and then they reviewed the video after they taught.	Teachers answered six reflective questions. The control group did memory based reflection, whereas the experimental group used the video in conjunction with their reflection.	Responses to each question were reviewed and given a score using a common scoring sheet by multiple reviewers.	There was a slightly higher mean score on reflective practices when doing video based reflection than those doing memory based reflections. Teachers reported that the videos were useful in their reflective practices.
Wright, G. A. (2008)	Pilot study = 7 inservice teachers; main study = 6 inservice teachers (1 principal in both)	Recorded 5 teaching evidences and then analyzed their performance using media notes.	Used the Utah Professional Teaching Standards and the Alpine SD SET (Scales for Effective Teaching Standards)	Compared paper reflections with video based reflections: analyzed teacher surveys and observations	Teachers believed the video enhanced process increased the amount of things they noticed about their teaching, increased the ability to reflect by focusing their reflections, and consequently helped them set goals.
Yerrick, R., Ross, D., & Molebash P. (2005)	Preservice teachers	Teachers made the videos from their own teaching (5 minute digital video products were made from 90 minute clips of teaching).	Reflected on their teaching through the videos they created; picked out important aspects they wanted to point out or discuss	Collected personal video reflections that showed individual learning outcomes; performed a final exit interview with each pre-service teacher	Digital video projects shifted preservice teachers' thinking from themselves to children's thinking. Teachers adjusted their planning and instruction based upon lessons learned.

**Article 2: The Influence of Video Analysis on the Process of Teacher Change**

Running head: VIDEO ANALYSIS AND TEACHER CHANGE

The Influence of Video Analysis on the Process of Teacher Change

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### **Abstract**

There is limited research addressing how video analysis influences the changes teachers make to their teaching practices. Since the purpose of reflection is to improve teaching, it is essential to understand how video influences teacher change. The purpose of this study was to gain an in depth understanding of how video influences the process of teacher change. The results of this study may help researchers and educators understand how video can be used to encourage teacher improvement. Each teacher made changes to their teaching practices after participating in the video analysis process. Six-overarching themes emerged throughout the change process. Teachers reported that video encouraged change because it helped them: (a) focus their analysis, (b) see their teaching from a new perspective, (c) trust the feedback they received, (d) feel accountable to change their practice, (e) remember to implement changes, and (f) see their progress.

## **Introduction**

Since Schön (1983) published “The Reflective Practitioner,” reflection has been an integral part of most teacher training programs. Currently, the National Council for Accreditation of Teacher Education (NCATE), the Teacher Education Accreditation Council (TEAC), and the Interstate New Teacher Assessment and Support Curriculum (INTASC)— three organizations that are at the vanguard of certifying and assuring teacher quality—all include reflective practice as a key component to improving teacher quality (Rich & Hannafin, 2009). Despite the preponderance of reflective practices in assuring teacher quality, research on reflective practices has not generated a solid base for understanding the effect that reflective practices have had on teaching. There is a need to explore not merely the content of reflection, but the effect reflection has on teachers changing their practices (Korthagen & Wubbels, 2001). The purpose of this study was to examine how video analysis influenced the process that led teachers to change their teaching.

## **Video Analysis Review**

Researchers and educators have reported that video reflection can be an effective feedback strategy for helping instructors to improve their teaching (Penny & Coe, 2004). Recently, several institutions have developed video analysis tools that make the process of viewing, analyzing, and sharing videos easier for instructors (Rich & Hannafin, 2009). Video analysis tools are emerging as an increasingly viable and accessible tool to facilitate teacher reflection. Consequently, there has been an increase in research studies focused on the benefits of using video to reflect on teaching. These studies have consistently reported that video is beneficial for helping instructors reflect on their teaching. Reported benefits typically fall under two general categories: improved ability to evaluate teaching and changes made to teaching.

### **Improved Ability to Evaluate Teaching**

Most studies reported that using video to reflect was beneficial for helping teachers to evaluate their teaching. After using video to reflect, teachers were able to: (a) identify gaps between their beliefs about good teaching and their actual teaching practices, (b) articulate their tacit assumptions and purposes about teaching and learning, (c) notice things about their teaching that they did not remember, (d) focus their reflections on multiple aspects of classroom teaching, and (e) assess the strengths and weaknesses of their teaching.

Several studies reported that using video to reflect helped teachers to identify gaps between their beliefs about good teaching and their actual teaching practices (Bryan & Recesso, 2006; Miyata, 2002; Pailliotet, 1995; Griswold, 2004; Grainger, 2004; Rich and Hannafin, 2008). For example, student teachers in Bryan & Recesso wrote a belief statement about what they considered to be good teaching. Throughout the semester, teachers videoed themselves and used the Video Analysis Tool (VAT) to identify contradictions or confirmations of their teacher belief statement. Researchers reported that, “prospective teachers became cognizant of tensions in their teaching” (p. 36), pointing to specific examples of when preservice teachers’ actual teaching conflicted with their conception of ideal teaching.

Video analysis also helped teachers articulate their tacit assumptions and purposes regarding teaching and learning (Meade & Meriman, 1992; Powell, 2005). Teachers in Powell reviewed a video of their teaching and marked three segments to share with the researcher. Powell reported that video analysis helped teachers articulate their feelings about their teaching and make their tacit assumptions about learning explicit. The teacher in Meade and Meriman also became better at articulating his purposes for making specific instructional decisions as he used video to review his teaching.

Other studies reported video allowed teachers to notice certain aspect of their teaching which they did not remember (Dye, 2007; Griswold, 2004; Pailliotet, 1995; Rich & Hannafin, 2007). Teachers often commented, “I never saw that before” (Pailliotet, p. 155). Studies reported that video analysis was beneficial because it allowed teachers to compare their teaching videos to what they remembered about their lesson.

Halter (2006) and Sherin and van Es (2005) noticed that the focus of teachers’ reflections changed when they used video analysis. The teachers in Halter completed a reflection guide as they viewed their videos. The focus of the teachers’ reflections shifted from purely pedagogy to both pedagogy and classroom interactions. The teachers in Sherin and van Es met once or twice a month with other teachers to review their videos. Researchers facilitated discussions by using the videos as a springboard to ask the teachers questions about their teaching and their students’ thinking. Over time, the teachers’ comments focused more on interpreting classroom events rather than evaluating their practices.

Several studies also reported that video helped instructors assess the strengths and weaknesses of their teaching (Rich & Hannafin, 2007; Schmidt & McCutcheon, 1994; Struyk & McCoy, 1993; Tripp, 2009). For example, teachers in Struyk and McCoy watched a video of their teaching and coded the number of times certain behaviors occurred. Teachers were able to use the information they gained from the evaluation to prioritize problem areas in their teaching. Teachers also reported that video was beneficial because it allowed teachers to evaluate themselves as many times as they wanted, and teachers did not need a supervisor or colleague present to receive feedback on their teaching (Tripp, 2009).

Overall, past studies indicated that video was beneficial for helping instructors evaluate their teaching. Teachers felt that video improved their ability to identify their assumptions about teaching and learning, understand the strengths and weaknesses of their teaching, and prioritize the improvements they needed to make to their future teaching.

### **Changes Made to Teaching**

Previous studies also reported that teachers increased effective teaching behaviors as a result of video reflections. Teachers in Houghman (1992) viewed videos of their teaching and evaluated their question-asking strategies using an observation form. Teachers who used video evaluations improved their question-asking strategies to a greater degree than teachers who did not receive video evaluations. Sherin and van Es (2005) reported that teachers who participated in video clubs changed their questioning strategies and provided more time for students to share and comment on each other's work. Brawdy and Byra (1994) noticed that preservice teachers increased the frequency of their positive specific statements and modified the frequency of their positive general statements they provided to the learners. Additionally, Rich, Recesso, Alleksaht-Snider, and Hannafin (2007) felt that video analysis helped teachers develop a course of action for future teaching situations. Although previous studies reported that teachers increased effective teaching behaviors as a result of participating in video reflections, studies did not describe how video influenced the process that led teachers to change their teaching.

### **Unaddressed Issues and Future Research**

Most studies that examined the impact of using video analysis to reflect on teaching reported that video analysis was beneficial for helping teachers evaluate their teaching. Yet, few studies actually described how video impacted the teacher change process. Schön (1983) stated that reflection involves more than understanding the teaching situation; reflection should also

lead the teacher to action. Teachers must “determine the directions in which they will try to change” (Schön, 1983, p. 165). Many prominent reflection theories also claim that reflection should involve change and an evaluation of the change (Taggart & Wilson, 1998). Currently, we do not know very much about how video analysis influences the process of teacher change. The primary focus of this study was to examine how video reflection affects the process that led teachers to change their teaching. The results of this study may help researchers and educators understand how video can be used to encourage teacher improvement.

### **Method**

A multiple case-study approach was used for this study. Stake (1995) described case studies as “the study of the particularity and complexity of a single case, coming to understand its activity within important circumstances” (p. xi). A multiple case study approach was appropriate for this research project because it allowed the researcher to focus on understanding the depth of a few cases where instructors used video analysis tools to improve their teaching. Seven cases of teachers engaging in video reflection practices were used in this study. The data collection and analysis was focused on understanding how the use of video tools influenced the process that led teachers to change their teaching.

### **Procedures**

This study took place over two months. Figure 3.1 shows the steps that were used during the study.

**Set up.** The first week of the study was spent setting up the process. The researcher met with the teachers to explain the procedures. The researcher also discussed goal setting with each of the participants. Media Notes was downloaded to the teachers’ computers, and they were trained to use the tool.

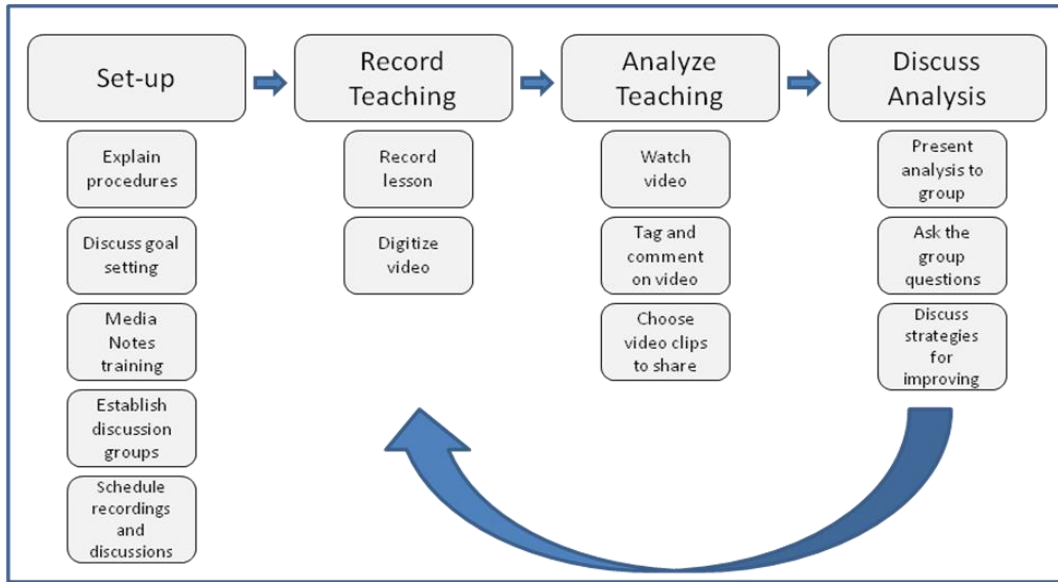


Figure 1. Procedures used during the study.

Media Notes is a video analysis tool that allows users to upload, tag, and annotate segments of the video (see Figure 3). Media Notes was chosen over other video analysis tools because the coding and search options make it better for data mining. Additionally, it is free for BYU students and faculty who are conducting research with teachers.

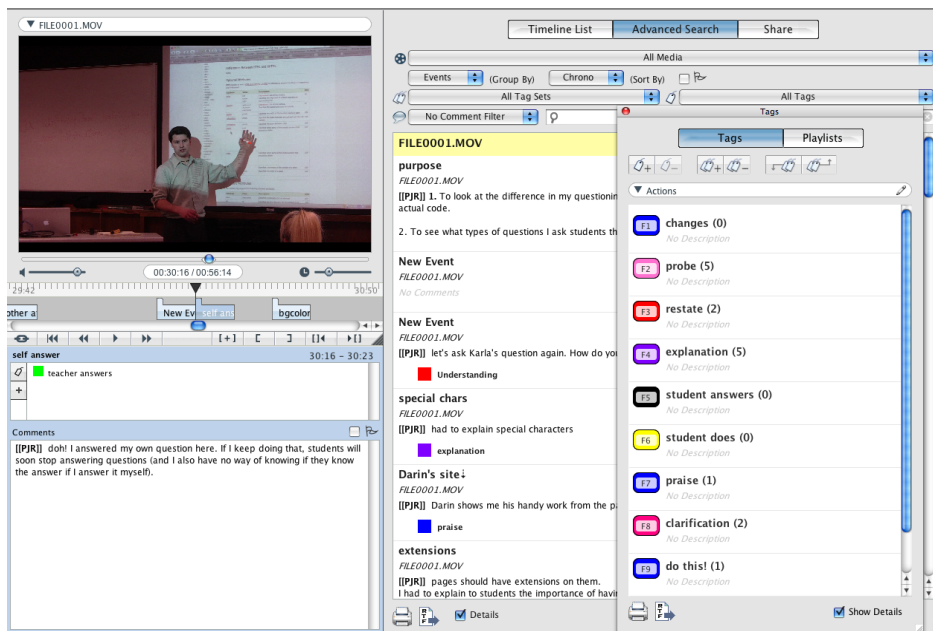


Figure 2. Screenshot of a Teacher’s Self-Analysis in MediaNotes

After teachers became familiar with MediaNotes, they selected peer(s) or supervisor(s) to meet with them to discuss their video analyses. Finally, the teachers set a flexible, regular schedule (e.g., every other Monday) for recording their teaching and discussing their analyses.

**Record teaching.** During the following weeks, the teachers continued to work on their teaching goals. Teachers recorded a lesson with digital cameras provided by the researcher. Teachers were allowed to record any lesson they felt would be beneficial to analyze. After recording the lesson, the teachers imported the video into MediaNotes.

**Analyze teaching.** Teachers used MediaNotes to analyze their video. The teachers chose three to four codes to use during their analysis. These codes were based on the goals they set for improving their teaching. Some examples included checking for understanding, pacing, active participation, student cues, etc. As the teachers analyzed their videos, they coded and commented on video clips that provided evidence of when they met or did not meet their goals. A reflection guide was provided to the teachers. Teachers then chose specific clips to share with their discussion group.

**Discuss analysis.** Discussions were usually held in a casual setting in the teacher's workplace. The teachers often sat on the floor or a couch next to each other and shared their video clips from their laptops. During the discussions, teachers gave a brief explanation of the background of their lesson and introduced the video clips they planned to show. Teachers often presented a question about their teaching and then showed a few video clips that highlighted the question. The group discussed the clips with the teacher and offered suggestions for future teaching situations. Researchers also provided a discussion guide to facilitate conversation. After group feedback, teachers refined their goals, set a new goal, or continued working on the same goal. The researchers tried to remain a non-participant observer during the discussions.



However, the teachers often asked questions and shared their experiences with the researchers before and after their discussions.

### **Participants**

Teachers were chosen from several instructional settings in order to identify common patterns across a variety of teaching contexts. There were seven participants in all: Three Special Ed teachers, two Religious Ed teachers, and two English Language Learner (ELL) teachers. The teachers were Caucasian females between 23-35 years of age. Their teaching experience ranged from one to eight and a half years, and their students ranged in age from 3-18 years. All of the teachers volunteered to participate in the video analysis process.

**Special education teachers.** Rachel<sup>1</sup>, Jen, and Amy taught autistic children at a private school. Rachel had been teaching special education students for eight years, and this was her second year teaching at the school. This was both Jen and Amy's first year teaching at the school. Previously, Amy was a volunteer at the school, and Jen taught fourth grade in a public school. Students at the school were divided by their developmental level. Rachel taught students functioning at the highest level. Amy taught students functioning at the middle level, and Jen taught the lowest functioning students. The three teachers chose to meet together to discuss their analyses.

**Religious education teachers.** Erin and Kathryn were employed by the Church of Jesus Christ of Latter day Saints to teach religious education classes to high school students. At the time, they were teaching New Testament to four classes each day. Kathryn had been teaching for almost nine years, and Erin had been teaching for ten years. After a casual conversation about the

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<sup>1</sup> All names are pseudonyms

video analysis tool, MediaNotes, Erin and Kathryn asked if they could use it to analyze their teaching. Erin and Kathryn chose to discuss their analyses together.

**English Language Learner (ELL) teachers.** Melissa and Betsy taught at an English Language Center, and this was their first time teaching ELL students. Melissa had experience teaching in small group settings, but was a little nervous about how her teaching experience would transfer to a new situation. In addition to teaching at the ELL, Betsy taught English to Japanese students online. This was her first time teaching in a face to face environment. Betsy was nervous about teaching and thought video analysis would help her improve. Melissa and Betsy chose to discuss their videos with their supervisors. Betsy also discussed her videos with another colleague.

### **Data Collection**

**Observations.** The researcher observed the teachers' video discussions with their peers or supervisor. During this time, the researcher was a non-participant observer who made observational notes during the video meetings. During the observations, the researcher sought to understand how teachers were using the video analysis tool to change their teaching practices. The conversations during the observations were recorded and transcribed. Written notes were also used to answer the observation questions. The researcher asked participants follow-up questions after each observation in order to clarify additional questions that arose.

**Interviews.** The researcher conducted semi-structured interviews with participants after they had repeated the video analysis process four times. The interviews lasted between 20-45 minutes. The purpose of the interview questions was to understand how the use of the video analysis tool influenced the process that led teachers to change their teaching. The interview questions were flexible to allow the participants to discuss additional points of interest.

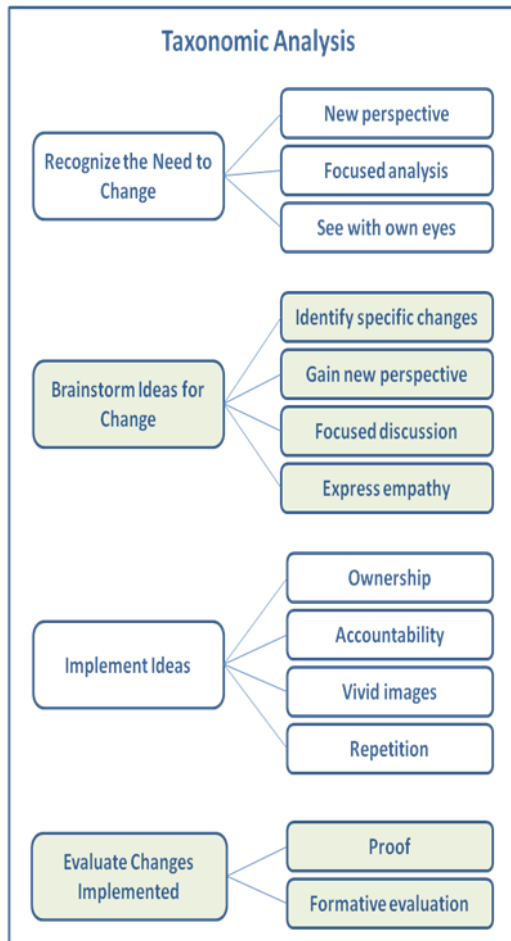
**Artifacts.** The researcher reviewed the video analysis clips and written comments in order to understand how teachers used video analysis to change their teaching. Video clips were also reviewed to look at how the instructors implemented the changes they decided to make to their teaching.

### **Data Analysis**

Domain and taxonomic analysis, as recommended by Spradley (1980) for analyzing case studies, was used for this project. The data were reviewed to look for common themes that appeared. Then NVIVO was used to code the data according to the domains that were identified. The data were re-coded to identify sub-themes for each of the domains. The researcher reviewed the data to identify issues that were consistently raised by participants or appeared to be very important to a participant. These themes became the sub domains. During the analysis process, the researcher looked for negative cases that contradicted the sub domains. When negative cases were identified, the researcher adjusted the themes and recoded the data. After a final list of domains and sub domains was created, the data were re-coded a final time. The resulting taxonomic structure is represented in figure 3.

### **Findings**

As teachers used video analysis to reflect on their teaching, they reported a change process consisting of the following steps: (a) recognizing the need to change, (b) brainstorming ideas for change, (c) implementing the ideas, and (d) evaluating changes that were implemented. Teachers said that video analysis was beneficial at each of these stages (see Table 1) and that they were more likely to change their teaching practices when they used video analysis to reflect than previous feedback methods they had used to improve their teaching (e.g., personal reflections, classroom observations, workshops, etc.). The following sections discuss how video



*Figure 3.* Taxonomic Analysis of the Change Process

analysis influenced each of the four steps in the change process. Each section begins with a brief summary. Then a table of common themes that emerged from the data is presented, followed by evidence to support each of the themes.

### **Recognize the Need to Change**

The first step in the change process was for teachers to recognize the need to change. Teachers felt that it was beneficial to analyze their video in MediaNotes because the tool allowed them to watch their video multiple times, gain a new perspective on their teaching, and focus their reflection. After using MediaNotes, teachers commented that they were more likely to change

Table 1

*Reported Benefits of Video Throughout the Change Process*

Group	Participant	Recognize Need	Brainstorming	Implementing Ideas	Evaluating
Religious Education	Erin	If you have the video, you can watch yourself again and see oh, I didn't realize I do that.	Video is so much easier than trying to explain it all and then ask for suggestions.	As I'm teaching, and I'm standing by my podium, I'll see the video in my head, and I'll move because the scene comes to my mind of just standing there and thinking I need to be moving.	Video gave me more concrete examples to whether I had done good or bad so it was more than just a feeling
	Kathryn	The video analysis helps me be more...recognize reality.	I think getting other people's input helps the most because you can only see yourself so much and then after awhile you're like I'm doing great. But then someone will give you a little more to make it that much better	Specifically because of watching something that Erica did and a recommendation she made when she watched mine, the last couple weeks went so much better.	I think it's proof. It's physical proof right there where you could actually see it and address it.
Special Education	Rachel	It helped you see certain things that you weren't realizing before.	I think the video really helped me to give feedback on specifically what they were trying to target and specifically what they were trying to look at.	After the first video I thought well, let's try something like this, and it worked really well. There's a little bit of that pressure to say, see look I can take your suggestions.	And then obviously, obviously there were changes made because you can see from video to video the difference in the participation level.

Table 1 (Continued)

Group	Participant	Recognize Need	Brainstorming	Implementing Ideas	Evaluating
Special Education	Amy	Video analysis causes you to really look. Really, really, look and realize that that's not good or that wasn't a smart choice to make.	When you take one general problem to another teacher, but they can't see it, and you can't really explain it to them the way you saw it, their suggestions are too general.	It almost forces you to have to set goals and follow through with the things that you said and things that other people commented on because they'd like to see a change but you want to see a change and you want to see the change in the child. I want to see change in my teaching but then more importantly I want to see the kind of changes that occur in the child because of the changes that I make.	I was just more pleased when the video was done and I saw that I was fun.
	Jen	This was a good way to actually pinpoint things.	You can see it and their suggestion is more relevant right at that very moment because you remember what it felt like to be in there at that very moment.	When you just think, 'Hey, I should make that change,' it's harder to actually do it than if you see yourself do it and say, 'Oh I really need to do that.' Knowing that you're going to be videoed again, and you have to watch it again, I think makes me more apt to change.	After showing her video she said, "That was ten times better."
English Language Learners	Melissa	If I watch it, I realize it, and I take notes about it, and I'm trying.	I think the video helps because we can say, 'Oh, stop, rewind, let me see that again,' or we can all say, 'Remember that part when . . . ' so having it on the video, it's all focused on whatever the camera was focused on at that time, so we can all reference the same things	It gives you an opportunity to change specific things that you want to change, and it's not something that a mentor is telling you to change or something that a teacher is telling you to change, but it is something that you are really looking at in your own teaching and finding that you want to change.	I felt like I was doing one thing, but I wanted to see, actually see, what was happening.

Table 1 (Continued)

Group	Participant	Recognize Need	Brainstorming	Implementing Ideas	Evaluating
English Language Learners	Betsy	I don't think I can change it if I don't notice it.	I can tag little parts of the video and then have someone watch it and the other people might see something different that I didn't see myself.	Without video I might have just gone the whole semester not really focused on anything specific and just kind of taught and tried to get better at teaching in general, but not really able to change anything specific.	It can boost my confidence because I think oh good, I am teaching alright, I am getting to be a better teacher than I thought I was. So it is a good thing for my self confidence. That and people can't really show me without me seeing myself.

their practices than after participating in other feedback methods because video allowed them to literally “see” the need to change with their own eyes. Table 2 identifies the factors that seemed to affect teachers’ abilities to recognize the need to change and benefits that were mentioned about each of the factors.

Table 2

*Recognize the Need to Change*

Factor	Explanation	Reported Benefits
Gain new perspective	Teachers gained a new perspective on their teaching.	Using video analysis was easier than reflecting in action.  Teachers were able to identify issues of which they were not previously aware.
Focus the analysis	The analysis was focused on specific aspects of teaching.	Video analysis was more specific than feedback teachers had typically received on their teaching.  Teachers were able to focus their reflections on two or three aspects of teaching.
See with own eyes	Teachers were able to see both their strengths and weaknesses with their own eyes.	Teachers trusted video analysis feedback because they were able to see the need to change with their own eyes.  Video analysis helped teachers recognize issues that they were not previously willing to accept.

**Gain new perspective.** Teachers reported that reflecting via video analysis was easier than trying to reflect in action because they were able to see themselves from a new perspective. Reflecting in action is often difficult for teachers because there are many things that compete for their attention while they are teaching. Jen explained, “When you’re in the moment, you don’t realize what’s happening, but when you can step back as an observer, you see more things and



have a desire to change.” Gaining a new perspective on the teaching situation helped teachers to identify issues of which they were not previously aware. For example Jen said, “After watching the video, I noticed a lot about myself, but even more about the kids. I thought, ‘Wow, that’s why they weren’t reading.’ I noticed little cues or little things that you miss while you are interacting with them.” Rachel who was working on praising her classroom helpers said, “The funny thing was that I felt like I was making a really big effort to say thank you, but I watched the video, and the few times that I actually did praise them, I had to go back and rewind and go, ‘I swear I said something in here somewhere.’ Although Rachel thought she had improved, the video helped her realize that she needed to continue to work on the issue.

Erin, who focused her analysis on checking for understanding, told Kristy during their discussion,

The sad part is that not once, not once, did I check for understanding. I assumed that they understood, but I didn’t ever say, “Now does that make sense? Or is this clear? Do you have any questions?” Anything like that.

As the teachers watched their videos, they often seemed surprised when what they viewed was different from what they remembered.

**Focus the analysis.** Prior to this study, the teachers reported that they typically received feedback on their teaching from classroom observers, reflecting from memory, student ratings, or workshops. Teachers said that the feedback they received from these methods tended to be very general. For example, Erin said that she had been observed every year for the last five years, but the feedback she received was not specific enough to help her make improvements to her teaching.

The person observing would say, “Oh, it was so great. You did such a good job.” And that’s about it. But I can look through MediaNotes and say, “Oh that was a poorly asked question,” or “Look at that right there. That was good, but I should have followed up with this.” I think using MediaNotes is more beneficial because I’m more honest with myself than sometimes critiquers would be.

Participants also commented that the issues they remembered from their lessons tended to be very general. Erin said, “I think the one thing I love with the video analysis is that I can see myself, and I don’t have to remember.” The teachers often realized that several things in their lessons did not go as planned. However, at the end of the day, when they actually had time to stop and reflect, they couldn’t remember everything they had recognized throughout the day. Amy compared trying to reflect from memory to going grocery shopping without a list.

If you try and go to the grocery store, and you are like “These are the things that I need.” And you go without a list and are just trying to remember, you may forget some things. As opposed to if you write it all down and take it with you. With reflecting from memory, I get done, and I’m like, “There was this thing that got one of the students upset, but I don’t remember why.” But when you watch it back you can say, “Well at that specific time right there, I did that and lost a kid. And this is what I did.” I don’t have to remember everything.

Several teachers mentioned that when they reviewed their teaching with a classroom observer, it was difficult to remember everything the observer identified about their teaching. Erin said,

If a teacher comes in on any given day to watch and then they say, “Okay tell me what you thought,” and, “They say remember this part?” Sometimes I’m trying my best to

recall it, but I can't. Whereas if you have the video, you can watch yourself again and see "Oh, I didn't realize I do that." There is value in seeing rather than just hearing.

When teachers were unable to remember the events described by the classroom observer, they felt that it was difficult to recognize the need to change. In contrast, replaying video clips seemed to help teachers to better understand the comments made about their teaching. Betsy said, "Without video I might have just gone the whole semester not really focused on anything specific and just kind of taught and tried to get better at teaching in general, but not really been able to change anything specific."

**See with own eyes.** Teachers also said that they were more likely to change their teaching when they saw the need to change with their own eyes because they trusted their own eyes more than other feedback methods. Amy said, "Sometimes you know you are supposed to change something, but you don't really do it. You don't really recognize the need to change until you see it on the video." After doing video analysis, the teachers often recognized issues in their teaching that they were not previously willing to accept. For example, Melissa had been told several times by her supervisors that she did not teach to the whole class, but she never addressed the issue. After watching her video she said, "I noticed, especially through watching the video, I always turn to the left side of the class and stand on the right side. I just talk to the left side of the class." Melissa said she finally addressed the issue because "every time I got in front of the class I thought: Who am I standing by? Where am I standing? Where am I in the classroom?" As a result of the changes she made, she no longer has "students that are sleeping or not participating."

Erin mentioned that she would be also more likely to change her behavior in situations outside the classroom if she could use video analysis. She said, "Someone can tell you that you

are a bad driver, but you may not believe them. However, if you watch yourself on video, you will recognize specific instances where you're driving needs to improve."

Amy explained that sometimes she recognizes when an activity is not going well, but does not address the issue because she convinces herself that it isn't too bad or that it does not matter because there is not much time left for the activity. She said, "Teachers don't want to critique themselves or say they could do better because it's easier to say that you are already perfect." Amy explained that watching her videos forced her to accept the need to change.

If you actually videotape it, and you go back and watch it, then you are forced to see yourself actually making the mistake. As I watch myself, I think the whole time, "I really need to do something differently."

### **Brainstorm Ideas for Change**

After teachers recognized the need to change their teaching, they brainstormed ideas to improve future teaching situations. Teachers brainstormed individually as they analyzed their teaching videos in MediaNotes and then collectively as they met with other teachers or a supervisor. Teachers commented that the ideas suggested during the video analysis process were better than the ideas generated when they tried to reflect on their teaching from memory because video helped everyone understand the situation. As a result, the ideas individually brainstormed and the group suggestions usually addressed their specific teaching needs. Table 3 lists the factors that seemed to influence teachers' abilities to brainstorm ideas for change.

**Identify specific changes.** Some teachers commented that the suggestions they typically received about their teaching were too general to help them improve. Teachers said that they often went to other teachers for advice, but they were only able to describe the general problem with which they were struggling. Amy explained, "When you take a general problem to a

Table 3

*Brainstorm Ideas for Change*

Factor	Explanation	Benefits
Identify specific changes	Teachers were able to brainstorm specific ideas	Teachers were able to identify specific ideas to address their individual challenges.
Gain new perspective	Group brainstorming sessions helped teachers gain a new perspective on their teaching.	Discussion groups were able to help the teachers see their teaching from another perspective and point out things teachers missed when they reflected individually.
Focused discussion	Discussion was focused around specific clips which the teachers marked.	Teachers felt that discussions were better because the group was able to offer more personalized suggestions.
Express empathy	Discussion group was able to express empathy.	Teachers felt like the group could relate to their situation. Therefore, they were more open to their suggestions.

teacher, they can't see it, and you can't really explain it to them the way you saw it. Then when you go back to try and fix the problem, it doesn't help as much. It doesn't help you think of specific changes." Teachers said the suggestions during the video analysis conferences were more relevant and specific to their needs. "The group could see exactly what was happening, and they wouldn't just assume. They could see the way that I handled it, instead of me just explaining how I handled it or what I thought was going on." After watching a clip, teachers would pause the video and ask, "What do you think? What thoughts do you have for that?" The teachers seemed to use the video to demonstrate specific situations that they had questions about. For example, after showing a video clip, Erin said, "I found that's the way I check for understanding. Do you think that was a good way? Do you think I am making people feel dumb?" At the conclusion of one of Jen's clips she said, "There again after watching this, you

can tell that this is where I struggled.” Then she put her hands up in the air and said, “Suggestions?” The other teachers were able to offer suggestions that dealt with the teachers’ specific situations. As a result, teachers commented that they were more likely to implement the suggestions. Melissa said, “When there’s not video to back up a suggestion, I think it’s a little harder to take those suggestions.”

**Gain new perspective.** Teachers felt that sharing their teaching with others helped them to gain a new perspective on their teaching because the group was able to “see different things than I saw.” Kathryn said, “My best ideas come out of talking to other people.” In particular, Rachel who was trying to improve story time in her classroom said, “Discussion for me was the most helpful. I don’t think I would have thought to look at my book choice had we not had that discussion.”

**Focused discussion.** Video analysis seemed to allow teachers to focus their discussions around specific issues where they might need change. Kathryn commented, “If you had three teachers in a classroom observing, you’d probably all see something different because everyone’s eyes would be going to different places at different times. The video helped everyone focus on the same situation and allowed us to reference the same things.” Video also allowed the teachers to review specific clips several times. Teachers often said, “Stop. Rewind. Let me see that again.” Then they would discuss and clarify what was happening in the video. Video seemed to help the teachers to anchor their conversations around specific clips. Additionally, the discussion groups felt like video analysis helped the group to understand the teachers’ rationales for their instructional decisions. As teachers showed the video clips, the other teachers read the written comments on each clip. Often the group would say, “Stop. What do you mean right there?” Then the teacher would explain what she had written and why she

had made the comment. Amy said, “Being able to read the comments kind of made us be able to get into each others’ heads a little bit more, kind of think about how they were thinking about the situation.” As a result of being able to understand the context of the teaching situation, the discussion groups felt like they could offer better suggestions.

**Express empathy.** The video seemed to help the teachers relate to each other. After watching the video clips, the discussion groups typically empathized with the teacher. They would say things like, “That’s really difficult. If I recorded myself, I would probably do it more than I realize.” Then the teachers would offer suggestions. “I do that too, so what I want to try to do is...” or “I have that problem too, so one thing I think I’ll try is...” It seemed important to the teachers to know that the group had struggled with similar problems. After showing a video clip, Kathryn asked, “Do you ever do that?” It seemed like she wanted to know that the teachers could relate to her issue. Teachers said they were more open to taking suggestions when they felt like the group could relate to their specific situation.

### **Implement Ideas**

The next stage in the change process was for the teachers to implement some of the ideas that were brainstormed. Teachers commented that they typically implemented ideas that were generated during the video analysis process because the ideas usually addressed their specific needs and because they were allowed to select the ideas that they felt were best for their particular situations. Teachers also commented that vivid images from the video and repetition of watching themselves on video helped them to remember the ideas they wanted to implement in future teaching situations. Table 4 lists the factors that appeared to influence the changes teachers implemented in their future teaching.

Table 4

*Implement Ideas in Future Teaching Situations*

Factor	Definition	Reported Benefits
Ownership	Teachers reported that they were more likely to implement ideas that were generated because they felt ownership over the reflection process.	Teachers felt like they had ownership over ideas that were generated because they chose the focus of their reflection, selected the video clips and situations they wanted feedback on.
Accountability	Teachers felt accountable to implement ideas that were generated in their discussion groups.	Teachers often implemented ideas that were generated in their discussion groups because they felt accountable to show the group that they were trying to improve their teaching.
Vivid images	Videos created vivid images in teachers' minds which helped them remember the changes they wanted to make.	Teachers remembered the changes they wanted to make while they were writing their lesson plans and while teaching future lessons.
Repetition	Teachers were able to look at their video and analysis multiple times.	Looking at the videos and analyses multiple times, helped teachers remember changes they wanted to in future teaching situations.

**Ownership.** Teachers reported that they were likely to implement the ideas that were generated during the video analysis discussion groups because they felt ownership over the reflection process since they had chosen the focus of their reflection and selected the video clips and situations they wanted feedback on. Jen felt that classroom observations have not been very effective for her. She said, “I always feel like I have to make the goal they want me to make and it’s not very personal, and so I feel like I just don’t try very hard to change when it’s someone



else setting the goal.” In contrast, Jen said that video analysis, “made it a lot more personal. I actually analyzed myself doing that rather than someone else telling me what I did wrong. Maybe that’s the stubborn side of me, but I don’t necessarily want to do something just to please other people.”

Melissa said,

[Video analysis] gives you the opportunity to change specific things that you want to change and it’s not something that a mentor is telling you to change or something that a teacher is telling you to change, but it is really something that you are really looking at in your own teaching and deciding you want to change.

Even though many of the ideas that the teachers implemented came from the suggestions during the discussion groups, teachers seemed to feel ownership over the ideas they implemented.

**Accountability.** After brainstorming with the discussion group, teachers said they felt accountable to show the group they had implemented some of the suggestions that were offered.

Rachel commented,

I would definitely be more likely to change because they know I’m working on this, and I know I’m working on this, and I want to show that I really did make an effort. There is a little bit of pressure to say, “Look, I can take your suggestions.”

Amy said, “You wanted to hear [the group’s] approval of “That was really good. You took the things that we said, and you followed through with them, and it worked, and we see it.”

Additionally, Betsy commented, “I want to see that it is better, and want to see that they can see some improvement.”

**Vivid images.** The video images appeared to help the teachers remember to implement changes into their lesson plans. For example Melissa, who was trying to use more open-ended

questions in her lessons said, “In preparing for class I’ve been more aware of making open-ended questions in my preparation and not just waiting until I get to class and thinking that I can just come up with the questions.” Teachers also said that the video images popped into their minds while they were teaching and reminded them to make changes. Amy said, “All of the sudden you are replaying the last video in your mind. I can see the kids start to do the same thing. Then I remember, ‘Oh, I saw that in the last video and this is what the teachers suggested that I do and this is what I suggested that I do. Then I try to fix it.’” Kathryn said, “I would be teaching, and I would actually see myself on this little screen, and I see myself dragging the tags over and I remember, ‘Oh, I did that,’ or ‘Oh, I did that.’ And it has helped me to remember what I wanted to change.”

Teachers mentioned that after watching their videos they were more conscious of what was happening while they are teaching. Melissa said, “It makes me more conscious in class because when I saw it on the video, then during class I realize, “Oh, I remember seeing this on the video, and I don’t want to do this.” Amy explained, “I pay more attention to what is going on while I’m teaching. I would replay the video in my mind.” Teachers said, that “even when [they] are not recording, [they] notice the things that [they] tagged in [their] videotapes.”

**Repetition.** Teachers liked recording their teaching because it created a “permanent product that could be reviewed as many times as you need.” The teachers said that reviewing the video helped them remember the changes they wanted to implement. Amy reviewed one of her videos 10 times. She said, “It wasn’t like I was trying to beat myself up even more every single time, but it helps. It reminds me of something I’m forgetting, and so the next time I do the activity, I remember the video.”

## Evaluate Changes

Teachers typically evaluated the changes they implemented by reflecting from memory or by using video analysis. Teachers usually recognized when their teaching improved by reflecting from memory, but it seemed that video was used as proof to themselves and to others that their teaching actually improved. Teachers also liked the formative nature of the video analysis process because it focused on improvement rather than applying a final judgment. Table 5 shows factors that the teachers felt were beneficial in helping teachers evaluate the changes they made.

Table 5

### *Evaluate Changes*

Factor	Definition	Reported Benefits
Proof	Teachers felt that the video evaluations served as proof that their teaching improved.	<p>Teachers liked seeing their teaching improve in each of the videos.</p> <p>Teachers liked knowing that the discussion group could see their progress.</p>
Formative Evaluation	Teachers were able to evaluate themselves prior to any final judgments being made about them.	<p>Formative evaluation was motivating for the teachers because there was still time to change their teaching practices.</p> <p>Formative evaluations were motivating because the teachers could see their progress.</p> <p>Teachers felt like the video analysis process focused on helping them improve rather than applying a final judgment to their teaching.</p>

**Proof.** Although teachers often recognized that their teaching was improving, it seemed as if they used video to prove to themselves that their teaching actually improved. After Amy finished her second lesson she said, “I was so happy. I was really happy that [a student] was with me the whole time, but after the video was done, I was just more pleased that I was fun. I was like, ‘Oh, I was fun!’” It was as if Amy used the video to prove to herself that she really was better. Betsy said, “Video can boost my confidence because I think, ‘Oh good. I am teaching all right. I am getting to be a better teacher than I thought I was.’” Erin explained that “video gave more concrete examples to whether I had done good or bad, so it was more than just a feeling of ‘Did I do well? I think I did okay.’ It was more concrete.”

It also appeared that teachers used video to prove to their discussion groups that their teaching was getting better. For example Erin introduced one of her clips by saying, “This is what I tried to do...Let’s see how I did.” Then she showed the clip to Kathryn. Although Erin already knew she had done well, it was as if she wanted the video to prove it Kathryn. Kathryn responded, “I like that. That’s cool. I like how you got them moving.” Discussion groups also seemed more excited to see rather than listen to the teachers describe what they did well. As Betsy and her supervisor watched the videos together, the supervisor would occasionally blurt out, “That was great!” The supervisor seemed to have a lot more excitement as she watched Betsy do something great compared to when Betsy told her what went well in her lesson. It seemed like it was clearer to the supervisor that Betsy really had done something well. Erin said that her job was completely based on her student teaching evaluations. Then she said, “I wish I had had the video [earlier].” Erin described the video as “proof.” She said, “It’s proof. It’s physical proof right there where you can actually see.”

**Formative evaluation.** The formative nature of video analysis was motivating for the teachers because there was still time to change their teaching practices, they could see their progress, and the process was focused on helping them improve rather than assigning a final judgment about their teaching. Kathryn mentioned that she thought student evaluations were beneficial, but she had “to wait for the end of a full term to get the feedback. She said, “With the video, you can do it one day and say, ‘Oh you know, that was not good.’ Two weeks later you can do it again and say, ‘Okay, I’m improving. I’m doing better.’”

Amy said, “I was able to see a huge change from my very first videos to my last video even though the very first time I tried video analysis, I was thinking to myself, ‘there’s not going to be a huge change.’ At least I don’t think because four weeks isn’t enough time to make a huge difference, but maybe I’ll make a couple of changes or small changes or the kids will progress a little bit. But because of the constant week by week changes that we are trying to work on, little by little I was able to make huge progress.”

Teachers were motivated when they could see themselves improving. Rachel watched story time change from “part of the day that everyone viewed as not very fun” to “a really fun time.” She said,

Before, when it was story time, the kids would go everywhere and everybody was trying to re-gather them. But by the time we got to that fourth video, we’d say, “story time,” and half the class was, boom, over there in their seats before the staff could tell them to go. They were so involved in the stories and so excited about the stories, where before they hated story time.

Teachers also appeared to be motivated when their discussion group complimented them on their progress. The groups said things like, “Wow! That was just amazing. That was

heads and tails above the last time. Look at that. Look at that! I think we should keep that video on file. I think that's a good example." The compliments motivated the teachers to continue to work on their goals.

### **Discussion**

Previous studies reported several benefits of using video for teacher reflection. However, few studies addressed how video analysis influenced the process that led teachers to change their teaching. Since the purpose of reflection is to improve teaching, it is essential to understand how video might influence the process of teacher change. The results of this study may help researchers and educators understand how video can be used to encourage teacher improvement.

#### **Positive Effects of Video Analysis**

Each teacher made changes to their practices after participating in the video analysis process. Six over-arching themes emerged throughout the change process. Teachers reported that video encouraged change because it helped them: (a) focus on key aspects of their teaching, (b) gain a new perspective, (c) trust the feedback they received, (d) feel accountable to change their practice, (e) remember to implement changes, and (f) see their progress.

**Ability to focus on key aspects.** Teachers felt that video analysis was beneficial because it helped them narrow the focus of their reflection. This is not surprising since (Brinko, 1993) claimed that narrowing the reflection focus can help teachers avoid a shallow analysis of their teaching. The use of video analysis enabled a tightened focus by slowing down the fast pace of the classroom and allowing teachers to focus on specific aspects of their teaching. Since teachers chose two or three aspects of their teaching to focus on, it was easy to identify both positive and negative examples in their videos. Teachers compared video analysis to a grocery list which helps individuals stay focused on particular tasks in the store; video analysis helped

teachers remember to focus on specific aspects of their teaching rather than getting lost in the complexity of the classroom environment.

Participating in a focused analysis also helped teachers identify specific changes they wanted to make to their teaching. Teachers commented that the feedback they typically received on their teaching was too general to make specific changes. Brawdy and Byra (1994) stated that specific information is essential when providing feedback to teachers. Video allowed the teachers to see specific examples of how they were doing with each aspect of their reflection focus. Additionally, video allowed the discussion groups to see and understand the teachers' individual needs. As a result, the group was able to offer specific suggestions that addressed their individual teaching needs. Carroll and Goldberg (1989) stated that narrowing the reflection focus can help others make relevant observations and recommendations. Since the discussion was focused on specific video clips, teachers were able to receive relevant suggestions that addressed their individual needs. Receiving specific and relevant suggestions made it easier for teachers to change their future teaching.

Interestingly, despite (or perhaps due to) the increased focus on specific aspects of teaching, teachers in this study regularly reached a saturation point. After repeating the analysis process three times with the same codes, teachers felt that they had "improved enough" and were ready to move to another aspect of their teaching. Therefore, many of the teachers felt like the fourth round of video analysis was not very helpful, and some teachers actually decided to change the focus for their fourth analysis. Furthermore, though teachers in this study focused on two or three aspects of their teaching, some researchers suggest further narrowing reflection to a single goal or skill (Brinko, 1993). Additional research is needed to determine the ideal number

of items teachers should focus on during their video analysis and across how many lessons teachers should focus on those items.

**Gain a new perspective.** When individuals are entrenched in their environment it is difficult for them to consider their situation from another perspective (Hamilton, Pinnegar, Russell, Loughran & LaBoskey, 1998). As teachers watched their videos and discussed their teaching with others, they were able to gain a new perspective on their teaching. This is a common finding of many video analysis studies (Grainger, 2004; Miller & Carney, 2008; Rich & Hannfin, 2009; Tripp, 2009). Video allows teachers to become an observer of their own classroom (Seong & Broderick, 2003). Bryan and Recesso (2006) described this as the ability to “step back from the practice” (p. 34) in order to review the event. Teachers in this study also reported the ability to “step back as observers” and notice issues in their teaching which they could not recall from memory or which they had not attended to during their lesson. Loughran (2006) noted that unless an issue is recognized as a problem, teachers are unlikely to change. As teachers recognized problems in their teaching videos, they were more willing to accept the fact that their teaching needed to change.

**Increased trust in feedback.** Throughout the study, teachers continually talked about trusting video analysis feedback more than previous feedback methods they had used. Brinko (1993) reported that feedback is most effective when teachers view the source as credible. In this case, video served as a credible source which allowed teachers see with their own eyes, and perhaps more importantly, believe in the need to change. Although teachers trusted the video more, it is possible that combining video with other feedback methods would increase their trust in the feedback received from those methods. Future research should



investigate whether combining video with other feedback methods increases teachers' trust in the feedback.

Brinko (1993) indicated that instructors need to view feedback sources as "knowledgeable enough to make an accurate judgment" (p. 577). Teachers trusted the ideas that were suggested during their discussion groups because the group had a common frame of reference and could see their specific challenges. Teachers felt like the groups' suggestions were based on "objective information." Brinko (1993) indicated that "feedback is more effective when it contains irrefutable evidence" (p. 579). In the teachers' minds, video served as "irrefutable evidence" on which the group based their suggestions. Since teachers trusted feedback given by the group, they were more open to implementing the suggestions offered.

Teachers in this study selected their own discussion groups. The teachers selected their supervisors, colleagues, and in some case both. It is possible that the trust teachers felt toward their group's suggestions was partially due to who they selected to be in the group. Future research might investigate whether teachers feel the same level of trust when they use video to discuss their teaching with individuals they did not self select.

**Motivated to improve.** Participating in a video analysis process helped teachers feel accountable to improve their teaching. After watching their own videos and sharing their videos with others, it was difficult for teachers to deny that certain aspects of their teaching needed to change. Teachers felt accountable to themselves and to their discussion group to show progress. Each time teachers recorded a lesson, they wanted to see improvement. Ilgen, Fisher & Taylor (1979) indicated that feedback associated with rewards or punishment can motivate individuals to change. Seeing improvement in the videos and hearing the compliments from the discussion group served as a reward to encourage teachers to change. Teachers were also motivated by fear

of seeing the same mistakes in consecutive videos or having the discussion group recognize that their teaching did not improve. Similar to Rosaen et al. (in press), teachers in this study put more effort into their analysis because they knew they would be sharing it with others. Teachers wanted to be able to show their discussion group that they listened to their ideas, made changes, and actually improved their teaching.

**Improved memory of desired changes.** While instructors were teaching, the images seen in their videos often appeared in their minds. The images reminded them of the suggestions they had written during their analysis, as well as the suggestions offered during their discussion groups. As the images and suggestions entered their minds, they were able to make immediate adjustments to their teaching. Teachers felt that video helped them “think on their feet.” Schön (1983) described this ability as “Reflection in Action” or “building new understandings to inform our actions in the situation that is unfolding” (p. 83). It is important for teachers to be able to reflect both after the lesson and in the moment (Schön, 1987). It is possible that video is not only beneficial for helping teachers reflect after their lessons, but is also an effective means for helping teachers develop the ability to reflect in action. Future research should investigate whether teachers improve their ability to adjust their teaching in the moment when they **use** video to reflect.

**Ability to see progression.** Teachers liked the formative nature of the video analysis process better than evaluations they typically received because they had time to make adjustments to their teaching, and they could see their progress across their videos. Rezler & Anderson (1971) stated that feedback is more likely to lead to lasting change when repeated exposures are used. Repeating the video analysis process several times allowed teachers to see their progress. Although they often recognized that their teaching was improving, video served

as additional proof to themselves and to their discussion group that they were actually getting better. Additionally, watching the video to evaluate their progress allowed teachers to identify specific things that improved in their teaching, as well as specific things they still needed to work on. Teachers in this study participated in the video analysis process four times. Future research might look at the ideal amount of times the process should be repeated or the amount of time between each analysis.

### **Conclusion**

Teachers reported that video analysis was beneficial at each stage in the change process: (a) recognizing the need to change, (b) brainstorming ideas for change, (c) implementing the ideas, and (d) evaluating the changes that were implemented. Teachers felt that video analysis was beneficial in helping them recognize the need to change because the video allowed them to watch their lesson multiple times, gain a new perspective on their teaching, and focus their reflection on specific aspects of their teaching. Teachers also reported that they were more likely to change their practice after using video analysis because video allowed them to literally “see” the need to change with their own eyes. After teachers recognized the need to change their teaching, they brainstormed ideas to improve future teaching situations. The teachers commented that the ideas brainstormed during the video analysis process were better than the ideas generated when they tried to reflect on their teaching from memory because video helped the discussion group better understand the situation. As a result, the suggestions teachers received addressed their specific needs. Teachers also felt that vivid images in the video and repetition of watching themselves on video helped them remember the suggestions they wanted to implement. After making changes to their teaching, teachers used future videos as proof to themselves and their discussion group that their teaching actually improved. Teachers liked the

formative nature of the video analysis process because the focus was on improvement rather than a final judgment, they received feedback in time to make adjustments to their teaching, and they could see their progress across their videos.

It should be noted that this study was conducted with teachers who volunteered to participate in the video analysis process and were excited to explore a new technology to improve their teaching. This may have contributed to the overly positive reaction teachers had regarding the influence of video analysis on the teacher change process. To ensure that both strengths and weaknesses of video analysis were represented accurately, researchers asked the teachers questions such as “How does video analysis compare to other methods you have used to analyze your teaching? and What do you perceive to be the strengths of using video analysis to reflect on your teaching?” Although researchers tried to encourage teachers to discuss both strengths and weaknesses of video analysis, teachers always focused on the strengths. Teachers’ responses included, “Other [feedback] methods haven’t been very successful for me. I like video analysis a lot better. I just think it’s a great way to go, and I think that there’s a lot of benefit in using video to analyze teaching.” Future research is needed to determine if teachers who are not voluntarily trying to improve teaching have a similar experience with video analysis.

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## Final Conclusion

### Article 1

The first article in this dissertation reviewed the dimensions of the video analysis process that varied across past studies. The paper is organized around six questions educators may want to consider when establishing a video reflection process. The intent of this paper is to help educators make more informed decisions as they begin conducting their own video analysis studies. The conclusions regarding each of the video analysis dimensions are briefly discussed below.

**Reflection tasks.** There are a variety of reflection tasks which teachers can engage in during the video analysis process. Past studies asked teachers to complete codes and checklists, participate in interviews or conferences, write reflections, and edit their videos. The majority of studies reported that these tasks were valuable for facilitating reflection. However, teachers preferred conferences over the other reflection tasks. Teachers felt like video discussions helped them see their teaching from a new perspective. Video also provided a common frame of reference on which the discussions were based. As a result, teachers felt like the suggestions and recommendations made during the video conferences were the most important factor in the changes they made to their teaching. Although the reflection tasks appeared to be beneficial for helping teachers reflect on their teaching, there are several aspects of these tasks that need further investigation: (a) the ideal number of items to include on coding sheets and checklists, (b) how the logistics of video conferences should be carried out, (c) the most effective way to use video editing, and (d) whether combining video discussions with the other tasks increases the perceived value of those tasks.

**Reflection facilitation.** Past studies used reflective questions, rubrics, checklists, and category codes as frameworks for the reflection process. Researchers reported that providing a framework enhanced the quality of teachers' reflections. However, teachers reported that they wanted to choose their own reflection focus. Therefore, researchers might consider allowing teachers to select the focus of their reflection and then helping teachers to narrow the focus to a structured framework.

**Individual/collaborative reflection.** Teachers overwhelmingly reported that they preferred discussing their reflections with others to individually reflecting on their videos. This was especially prominent in preservice teachers who trusted others' opinions more than their own. A couple of studies indicated that asking teachers to discuss their video individually and then collectively improved the collective discussions because teachers were more prepared. Additional research is needed to investigate the benefits of using both individual and collaborative reflection as part of the video analysis process. Future research might also investigate the number of conferences necessary for optimal growth and how frequently the conferences should be held.

**Length of videos and number of reflections.** Although the length of video teachers reflected on and the number of times teachers reflected on their videos varied across the studies, none of the studies investigated how these characteristics impacted teachers' reflections. Therefore, future research is needed to determine the optimal length of video teachers should use for reflection, as well as the number of times teachers should reflect on their videos.

**Measuring reflection.** Examining the benefits of video on teachers' reflections can help researchers determine whether the benefits teachers receive from participating in video analysis are worth the investment of time and money required to conduct the process. There are various

ways that past studies measured the effect of video on teacher reflection. Studies examined teachers' reflection comments, changes in teaching practices, self-assessment of reflection ability, perceptions of effectiveness, pre- and post-test scores, and coding accuracy. Researchers who are interested in using video for reflection will need to determine which combination of these methods will help them effectively answer their specific questions about the video analysis process.

By looking across several studies, we synthesized several dimensions of the video analysis process. Presented as practical considerations, these enable educators to understand how their approach to video analysis might yield varying results. Careful consideration of each of these dimensions does not guarantee that a successful process will be developed. However, these can serve as a framework for those who are interested in using video to facilitate teacher reflection.

## **Article 2**

The second article examined the how video analysis influenced the process that led teachers to change their teaching. Teachers reported that video analysis was beneficial at each stage in the change process: (a) recognizing the need to change, (b) brainstorming ideas for change, (c) implementing the ideas, and (d) evaluating the changes that were implemented. Teachers felt that video analysis was beneficial in helping them recognize the need to change because the video allowed them to watch their lesson multiple times, gain a new perspective on their teaching, and focus their reflection on specific aspects of their teaching. Teachers also reported that they were more likely to change their practice after using video analysis because video allowed them to literally “see” that their teaching needed to change. After teachers recognized the need to change their teaching, they brainstormed ideas to improve future teaching

situations. The teachers commented that the ideas brainstormed during the video analysis process were better than the ideas generated when they tried to reflect on their teaching from memory because video helped the discussion group better understand the situation. As a result, the suggestions teachers received addressed their specific needs. Teachers also felt that vivid images in the video and repetition of watching themselves on video helped them remember the suggestions they wanted to implement. After making changes to their teaching, teachers used future videos as proof to themselves and their discussion group that their teaching actually improved. Teachers liked the formative nature of the video analysis process because the focus was on improvement rather than a final judgment, they received feedback in time to make adjustments to their teaching, and they could see their progress across their videos. One of the limitations of this article was that all the teachers were volunteers who were excited to use a video analysis tool to improve their teaching. Future research is needed to determine whether the findings apply to teachers who are not voluntarily trying to improve their teaching.

Overall, both articles in this dissertation found that video analysis was beneficial for teachers. Teachers reported that video analysis allowed them to gain a new perspective on their teaching, watch their lesson multiple times, focus their reflection on specific aspects of their teaching, see the need to change with their own eyes, and evaluate their progress across consecutive videos. Additionally, video allowed discussion groups to understand the teachers' individual situations and therefore offer suggestions that addressed their specific needs.

Although both studies reported that video analysis can help teachers improve their teaching, there are many aspects of the video analysis process that need investigation. For example, there are many logistical questions that have not been answered, such as the number of opportunities teachers should be given to reflect, how frequent the reflection should be, the

optimal length of the videos that should be used for reflection, or how discussion groups should be organized. Additionally, further investigation is needed to determine whether teachers who do not voluntarily choose to use video analysis still improve their teaching after participating in the video analysis process.

## **Appendix: Methods**

Due to the article format of this dissertation, there was limited to space to describe the research methods that were used in this study. Listed below are the methods that were approved in my prospectus defense. These methods were used with the following exceptions: (a) I did not need to digitize the teachers' videos because we allowed teachers to borrow cameras which recorded in a format that was compatible with Media Notes, (b) participants were teachers of autistic students, English language learners, and seminary students, (c) due to limited space, vignettes were replaced with participant's direct quotes and brief experiences, and (d) participants were given the opportunity to review their quotes, but not the final list of themes or the entire findings section.

### **Method Rationale**

I will use a multiple case-study approach for this project. Stake (1995) described case studies as "the study of the particularity and complexity of a single case, coming to understand its activity within important circumstances" (p. xi). A multiple case study approach is appropriate for this research project because it will allow me to focus on understanding the depth of a few cases where instructors use video analysis tools to improve their teaching. Four cases of teachers engaging in video reflection practices will be used in this study. I will focus my data collection and analysis on understanding how the use of video tools influence the changes teachers make. This will enable me to focus on providing a rich description. Van Manen (1990) indicated that rich descriptions of lived experiences increase our understanding of the meaning of pedagogy. He stated, "When someone has related valuable experience to me then I have indeed gained something even though the 'thing' gained is not a quantifiable entity" (p. 53).

## Procedures

This study will take place over four months. Figure 3 shows the steps that will be used to complete the study.

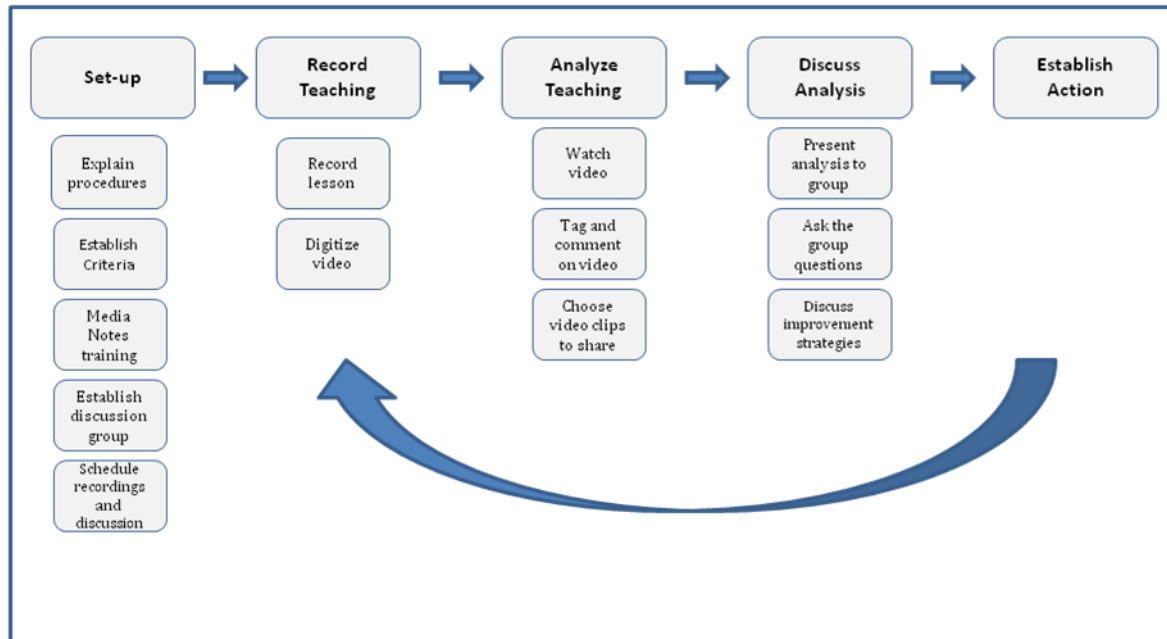


Figure 3. Steps that will be used during the study.

**Set up.** The first month of the study will be spent setting up the process. I will meet individually with each of the teachers to explain the procedures they will use to analyze their teaching. Then the teachers will identify the criteria they believe constitutes good teaching, and I will ask them to compare their teaching to the criteria they identified. Then we will discuss which criteria the teachers would like to focus on during their video analyses and how they will know if their teaching is improving. Allowing teachers to choose their own criteria for analyzing their teaching gives them ownership over the reflection process and allows them to focus on the areas of their teaching that they have the greatest desire to improve.

During the initial meeting, I will download the video analysis tool, Media Notes, to teachers' computers and show them how to use it. I chose to use Media Notes over other video

analysis tools because Media Notes' coding features and search options make it easier for teachers to analyze their teaching. Additionally, it is not a web-based application, which eliminates the concern about posting videos of students on the web. Media Notes is also free for BYU students and faculty who are conducting research with teachers.

Next, the participants will choose peer(s) or supervisor(s) who will meet with them to discuss their video analyses. It is important for teachers to be able to choose their discussion groups because they will be able to select people they feel comfortable sharing their teaching with and whose opinions about teaching they respect. At the end of the meeting, the participants will set a flexible schedule for recording their teaching and discussing their analyses.

**Record teaching.** During the following months, the teachers will video four 30 to 45 minute lessons. After each recording, I will pick up the video from the teachers and digitize it. I will upload the digitized videos to a secure server during the same week they are recorded. This will allow participants to analyze their lessons while the lesson is still fresh in their minds. I have chosen to digitize the videos myself to avoid technical difficulties that would take extra time for the teachers to address.

**Analyze teaching.** After the teachers receive their digitized video, they will upload it into the Media Notes program. As the teachers analyze their videos, they will code it according to the criteria they selected for improving their teaching. When teachers focus their reflections on specific criteria they tend to be more reflective and realistic about their teaching skills (Jensen, 1994). The teachers will mark and comment on video clips that provide evidence of when they met or did not meet the criteria. I will also provide the teachers with a reflection guide to encourage them to think about different levels of reflection. Then the teachers will choose specific clips that they want to share with their discussion group.



**Discussion.** The teachers will consult with their peers or supervisor to discuss their analysis. Penny and Coe (2004) reported that discussing teaching with others is one of the most important features of a teacher feedback system. During the consultation, the teachers will give a brief explanation of the background of their lesson and introduce the video clips they will be showing. The teachers will present a question about their teaching and then show a few of their video clips. The peers or supervisor will discuss the clips with the teacher and offer suggestions for future teaching situations. After teachers receive feedback from their peers or supervisor, they will decide what action they want to take to improve their teaching, and they will implement the action in future lesson. Then the teachers will video another lesson and repeat the process three more times.

### **Context and Participants**

There will be five main participants in this study: an elementary public school teacher, two college instructors, and two religious education teachers. All of the participants asked if they could be part of the study because they were interested in using video to improve their teaching. The teachers come from different instructional settings, which may allow me to identify important and common patterns across a variety teaching situations. Additionally, the teachers or supervisors involved in the discussion groups will also be participants in the study. These participants will be identified by the teachers who are using video analysis.

**Elementary public school teacher.** The public school teacher participating in this study has taught fourth grade for eight years. She currently teaches at an elementary school in a rural town in Utah. After hearing about the video analysis tool, Media Notes, she expressed interest in using it to determine how she can improve her teaching.

**College instructors.** This study will include two college instructors from a religious, business college. Both teachers volunteered to use video to analyze their teaching when hearing about MediaNotes from a colleague. One of the instructors mentioned that he is excited about participating in this study because he is interested in using video analysis with the teachers he supervises. He is one of only 17 full-time instructors at his institution, which employs over 130 instructors. The other instructor is a part-time instructor that teaches college mathematics at this and another local community college.

**Religious education teachers.** There will be two religious education teachers participating in the study. They are employed by the Church of Jesus Christ of Latter Day Saints. The instructors teach religious education classes to high school students. Currently, they teach four sections of New Testament each day. One of the instructors has been teaching for 8.5 years, and the other instructor has been teaching 5 years. After I explained the video analysis tool, Media Notes, to the teachers, they asked if they could use it to analyze their teaching. When I asked them why they were interested in using it, one of the teachers said:

It is always helpful when you are videotaped and see yourself on camera. You learn a lot about yourself and your teaching. The Media Notes software sounds like an amazing tool to enhance the evaluation experience and will help one be more effective in analyzing their teaching and skills. One will also have a chance to have more people view and evaluate your teaching and be able to comment on it. I think it will be a great chance to improve my teaching. A teacher should always be improving and never be content with where they are at. One can always improve.

**Discussion group participants.** Each of the teachers will select their own discussion groups. Members of this group will watch the video clips that the teacher chooses to share and provide feedback and suggestions to help the teacher improve.

### **Data Collection Procedures**

In order to create a rich description, I will collect a variety of information. The following section describes the type of data and manner of data collection strategies.

**Observations.** I will observe the teachers' discussions of their video analyses with their peers or mentors. During the observations, I will seek to understand how the teachers are using video analysis tools to identify changes they want to make to their teaching practices. The conversations during the observations will be recorded and transcribed. Written notes will also be used to answer the observation questions. The participants will be asked follow up questions after the observations in order to clarify some of the researcher's observations.

**Interviews.** I will interview the instructors after they have had an opportunity to implement the changes they identified through video analysis reflection. The purpose of the interview questions will be to understand how the use of the video analysis tool influenced the changes the teachers decided to make to their teaching, how the instructors implemented the changes to their teaching, and how they evaluated the changes they made. The interview questions will be flexible to allow the participants to discuss additional points of interest. I will also interview the discussion group participants to try and understand if and how they feel the teacher has changed.

**Artifacts.** I will review the video analysis clips and written comments in order to understand how the teachers used the video analysis tools to identify changes they wanted to make to their teaching. I will also review the video clips to look at how the instructors

implemented the changes they decided to make to their teaching. If other artifacts are referred to by the participants during interviews or discussion groups, I will collect them to provide further proof that the teachers are making changes to their teaching.

### **Data Analysis Procedures**

I will use domain and taxonomic analysis as recommended by Spradley (1980) for analyzing case studies. This will allow me to identify important and common themes in the data. For each of the research questions, I will review the data to look for common themes that appear. Then I will use NVIVO to code the data according to the domains that are identified. Then I will re-code the data to identify sub-themes for each of the domains. I will look through the data to identify issues that are consistently raised by the participants or appear to be very important to a participant. These themes will become the sub domains. When a final list of domains and sub domains is created, I will re-code the data to make sure I am satisfied with the coding.

### **Data Reporting**

For each research question, vignettes will be presented, which describe how the instructors used video analysis tools to determine the changes they want make to their teaching, what changes the instructors implemented in future teaching situations, and how the instructors evaluated the changes they make to their teaching. The purpose of the vignettes will be to present the reader with rich descriptions about how instructors change(d) their teaching practices after using video analysis tools to reflect. Following the vignettes, I will present a table of common themes and sub themes that relate to each research question. Then, evidence to support each of the themes will be presented. I will use direct quotes from the participants to describe each of the identified themes. I will use member checking to improve the accuracy and credibility of the report. Participants will be given the opportunity to review the findings to

confirm whether the findings reflect their experience using video analysis to improve their teaching.

### **Standards Followed**

To ensure the trustworthiness of the study, I will use the following standards recommended by Lincoln and Guba (1985):

**Credibility.** I will increase the credibility of the study by doing the following tasks:

1. Persistent observation: I will use persistent observations by spending the semester observing the participants discuss their video analyses and interviewing the participants about their experiences.
2. Triangulation: I will use multiple interviews with the teachers, observation notes, and literature on video analysis tools for information sources. The conclusions of this study will be based on common themes found in the data collected.
3. Negative case analysis: During data collection and analysis, I will look for cases, or examples that are exceptions to the identified themes. When negative cases are identified, I will continue to look for similar exceptions.
4. Progressive subjectivity checks: Throughout the study, I will periodically record my perspective of what I am learning and feeling in my field notes.
5. Member Checks: The participants will be asked to confirm or disconfirm the sub domains that are identified and their quotes that are used in the findings

**Dependability.** I will increase the dependability of the study by including detailed descriptions about the sampling, data collection, and analysis procedures that are used to conduct

the study. The descriptions will be included in the final report. This will allow readers to judge the trustworthiness of the study.

**Confirmability.** I will increase the confirmability of the study by tying the findings to literature and to others who had similar experiences. I will support the interpretations with direct quotes from the participants. I will also keep an audit trail that includes the dates of each of the observations, interviews, coding, and personal notes.

**Transferability.** I will include thick descriptions about the experience of the participants by using their own words and stories. I will also provide a detailed description of the context of the case. Although thick description will not ensure transferability of the findings because the readers ultimately make the decision about whether the findings transfer to their own situations, Williams (2006) stated that thick description “is the most powerful technique for facilitating transferability.”

**Ethical treatment.** Participants will be treated ethically and will be allowed to withdraw from the study at anytime. Pseudonyms will be used to present each participant’s case. The researcher will respect the participants’ schedule and try to refrain from intruding on their normal schedules.

### **Assumptions**

Van Manen (1990) suggests that researchers reveal their assumptions about the phenomenon they are studying. The paragraphs on the following pages describe my assumptions about the study and teacher reflection.

**Transferability.** Although the results will not be generalizable to all situations where instructors use video analysis tools to make changes to their teaching practices, I assume the results will be transferable to many situations where instructors use video to improve their

teaching, because I will provide rich descriptions of a various cases where instructors used video analysis to reflect on their teaching. Transferability will depend on my ability to make connections between the researcher's descriptions in this study and their own experiences.

**Technical difficulties.** I assume that the participants will encounter some technical difficulties either setting up the video analysis tool, using the tool, or with the video equipment that may influence their feelings about Media Notes.

**Ability to attend to multiple things.** I assume that many teachers have a difficult time attending to multiple things in their lessons and that it is difficult for teachers to reflect on events that they did not attend to. Because video provides the opportunity to revisit certain aspects of a lesson, it may help teachers to notice things that they had not attended to before.

**Ability to remember the teaching event.** I assume that teachers' abilities to reflect on their lessons are influenced by their ability to remember the lesson. Video may improve teachers' abilities to reflect by helping them remember specific events in the lesson.

**Opportunity to discuss reflections.** I assume that teachers will gain more insights about teaching when they discuss their reflections with others than when they reflect on their own. In Penny and Coe's (2004) meta-analysis of teacher feedback strategies, they reported that discussing teaching with peers is an essential feedback strategy. Therefore, teachers should be given the opportunity to discuss their reflections with their peers or mentors.

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