

**Impact of a Self-Reflection, Expert Discussion, Self-Reflection Model on Pre-service
Secondary Mathematics and Science Teachers' Ability to Assess Their Classrooms**

Elizabeth Barrow

Georgia Southern University

Gregory Chamblee

Georgia Southern University

Abstract

Self-reflection using candidate teaching videos in early field experiences is a strategy that may help candidates enhance their teaching constructs and abilities. This study reports on how a self-reflection, expert discussion, self-reflection video feedback cycle changed three pre-service secondary (Grades 6 - 12 certification) teacher candidates' (two mathematics and one biology) ability to document specific targeted aspects of their teaching. Candidates submitted three separate videos of instruction and responded to a series of prompts modeled after edTPA task two and three prompts. Additionally, candidates were asked to place timestamps on their videos where they believed they answered each of the reflection prompts. The results show that while candidate responses remained brief there was a marked improvement in detail and depth of answers throughout each reflection cycle and after the submission each video. Candidates', however, still had difficulty using the "video interactions" (timestamps) to substantiate their comments. Future studies need to follow-up on this research with a larger sample size.

Introduction

Reflection about teaching practice has been a major topic of teacher development for many decades (Dewey, 1933; Schön, 1983, 1987). The Association of Teacher Educators (ATE) *Standards for Teacher Educators* (2009) Standard 4 (Professional Development) states “accomplished teacher educators help pre-service and in-service teachers with professional development and reflection, and model examples from their personal development, making transparent the goals, information, and changes for improvements in their own teaching.” The ATE Task Force on *Field Experience Standards in Teacher Education* (2012-2015) notes reflection on and analysis of teaching and learning is an essential component of learning to teach. In many states, today, prospective teacher candidates are now required to demonstrate via a high-stakes certification test, edTPA, they can self-reflect on their teaching/practice and document their effectiveness. edTPA posits it assesses prospective teachers’ ability to think about how to plan, instruct, assess, and reflect on student learning via its three task assessments (Planning for Instruction and Assessment – Planning Task 1, Instructing and Engaging Students in Learning – Instruction Task 2, and Assessing Student Learning - Assessing Task 3). edTPA Instruction Task 2, as described in *Making Good Choices* (2019), requires candidates to imbed video reflection analysis and timestamps when describing their instructional practices. Assessing Task 3, while not required, does note video analysis and timestamps can be used to document academic language use and support for that use. In order for preservice teachers to be developmentally ready to meet these high-stakes testing expectations targeted self-reflection activities need to begin early in their degree program field experiences.

Literature Review

Dewey (1933) defined reflection as the “active, persistent and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it and the further conclusions to which it tends” (p. 9). Schön (1983, 1987) posited practitioners use two interrelated processes when reflecting: reflect-in-action and reflect-on-action. Reflect-in-action denotes reflecting while an action is occurring while reflect-on-action denotes reflecting after an action has occurred. Zeichner and Liston (1996) assert reflective teaching is a socio-cognitive activity. Osterman (1998) asserts this activity is a constructivism activity. Osterman posits “learning, in the constructivism paradigm, is always developmental and occurs when new experiences lead to changes in understanding. ... The learner is the key agent: the learner constructs his/her own understanding” (pp. 4-5).

edTPA, a high-stakes certification test developed by Stanford Center for Assessment, Learning (SCALE) and scored by Pearson Education - <http://www.edtpa.com/>) asserts it assesses a teachers’ ability to think about how to plan, instruct, assess, and reflect on student learning. edTPA consists of three task assessments (Planning Task 1, Instruction Task 2, and Assessment Task 3). Each task consists of reflection prompts and is scored via rubrics. edTPA *Making Good Choices* (2019) Instruction Task 2 discussion notes in order to successfully complete Task 2 a candidate must reference video evidence that explicitly depicts the candidate addressing the subject-specific requirements and provide timestamps identifying evidence from the candidate’s video clip(s) in every response. Instruction Task 3, while not required, does note video analysis and timestamps can be used to document academic language use and support for that use.

Huston (2017) found completing the video component of edTPA deepened elementary pre-service candidates' understanding of the teaching process. Choppin and Meuwissen (2017) interviewed twenty-four teaching candidates who completed the edTPA process and noted “teacher education programs should leverage the use of video, as a condition of edTPA, to help candidates systematically reflect on their practice rather than positioning it as the determinant by which preservice teachers will be considered for entry into the field” (p. 51). Kleinknect and Groschner (2016) studied a self-reflection, peer feedback, expert feedback, and self-reflection “again” cycle using candidate teaching videotapes. Kleinknect and Groschner found this model enhanced self-reflection over journal writing. Kleinknect and Groschner concluded embedding video in a meaningful way via structured coursework can enhance the learning process. Barth-Cohen, et al. (2018) studied the impact of using video in an early pre-service teacher education course for mathematics and science teachers. Barth-Cohen et al. found candidates’ conception of teaching mathematics and science changed during the course.

Research Question

The purpose of this study was to investigate how a self-reflection, expert discussion, self-reflection video feedback cycle changed three pre-service secondary (Grades 6 - 12 certification) teacher candidates’ (two mathematics and one biology) ability to document specific targeted aspects of their teaching in an early field experience as preparation to complete the edTPA process for certification. The overarching research question for this study was: How does a video-based Self-Reflection, Expert Discussion, Self-Reflection cycle change pre-service teachers’ analysis of their own teaching?

Methodology

This multiple-case study (Yin, 2014) used archival data to assess the impact of a video feedback cycle on three pre-service secondary (Grades 6 - 12 certification) teacher candidates' ability to document specific targeted aspects of their teaching. Case study methodology was employed because the study is bound by the reflection cycle. Each student was given the exact same prompts, directions, and time. Variations in reflections can be attributed to phenomena outside of the case parameters (Yin, 2014).

All three participants in this project were female; two candidates were placed in a middle school mathematics setting and one candidate was placed in a high school biology setting. Candidates were enrolled in their second semester of an initial certification program. Candidates had never used video-based reflections in prior coursework. Data collection took place during the spring 2019 semester, and included videos and comments, candidate pre-/post- reflections, candidate interview data, and teacher educator responses to candidates' pre-reflections.

Videos One and Three video analyses consisted of six identical reflection prompts. Video Two video analysis consisted of five reflection prompts. Video One and Three prompt one required candidates to provide lesson background information (standards taught and lesson objectives). Video One and Three reflection prompts two – five and Video Two reflection prompts one – four were phrased to match 2018-2019 secondary mathematics and science edTPA Handbooks prompts. The last video analysis prompt for each video assignment required candidates to synthesize prior reflection answers to discuss future plans. Video One and Three prompts were based on edTPA Task 2 prompts which focused on instructional decision making. Video Two prompts were based on edTPA Task 2 and Task 3 prompts which focused on assessing student learning (Table 1).

Candidates videoed themselves teaching full lessons three times. Candidates used the Swivl Pro software to both video and provide timestamp commentary directly on the video. Candidates then used their video comments to answer the targeted reflection prompts using both timestamps and comments from the video. Video One was shared with a teacher educator who responded to and provided additional comments during a 30-minute debrief. After receiving teacher educator feedback, candidates watched the same video again and rewrote their answers to the reflection prompts. Video Two followed this same model. Video Three did not include a student-teacher debrief. Videos One and Three focused on content specific instructional pedagogy and engagement of students. Video Two focused on assessment.

Pre and post-reflection data were compared for depth of narrative answers and differences in timestamps used using the constant comparative method (Merriam, 1998). Data from initial comments and reflections in Video One were compared to final comments and reflections of Video One following the teacher educator debrief. This data was then compared with data collected from Videos Two and Three comments and reflections.

Table 1. *Video Reflection Prompts*

Prompt	Video One	Video Two	Video Three
1	What instructional techniques did you use during this videoed lesson?	Referring to the video, explain how you engaged [assessed] students in the use of the language function and academic language for the lesson.	What instructional techniques did you use during this videoed lesson?
2	Referring to the video clip, how did you demonstrate mutual respect for, rapport with, and responsiveness to young adolescents with varied needs...?	Referring to the video, how did you demonstrate mutual respect for, rapport with, and responsiveness to young adolescents with varied needs (academic and developmental) and backgrounds, and challenge young adolescents to engage in learning?	Referring to the video clip, how did you demonstrate mutual respect for, rapport with, and responsiveness to young adolescents with varied needs...?
3	(SCIENCE) Referring to the video clip (using timestamps), explain how you engaged young adolescents' during a scientific inquiry in using evidence and/or data and science concepts to construct explanations of OR predictions about a real-world phenomenon AND critiquing explanations OR predictions of peers.	Referring to the video, explain how you assessed student learning of course objective(s)?	(SCIENCE) Referring to the video clip (using timestamps), explain how you engaged young adolescents' during a scientific inquiry in using evidence and/or data and science concepts to construct explanations of OR predictions about a real-world phenomenon AND critiquing explanations OR predictions of peers.

4	Referring to the video clip (using timestamps), Explain how you elicited and built on student responses to promote thinking.	Referring to the video, explain how you used follow-up to student responses to encourage the student or his/her peers to explore or build on the ideas expressed?	Referring to the video clip (using timestamps), Explain how you elicited and built on student responses to promote thinking.
5	After reviewing the video, what changes would you make to your instruction and why do you think these changes are good for your students?	Using your answers from prompts 1 - 4, describe class readiness to move forward with lesson segment content and/or steps for remediation of content.	After reviewing the video, what changes would you make to your instruction and why do you think these changes are good for your students?

Note: Prompts are not presented in the order candidates completed the assignments. Prompts are arranged to demonstrate similarities and differences between video analysis assignments.

Findings

Video One

Video One prompt one analysis found candidates' initial ability to self-reflect was very brief and provided little rationale for their choice of timestamp. The revised reflection was more detailed and in-depth in its connections between timestamps and narrative (Table 2). Essential to the change in quality and depth of reflections was the teacher educator debrief. Before the debrief, candidates were not answering *why* the instructional technique they used was good. For instance, Student A simply stated that she was using effective questioning while at the SMART board. Student A's timestamps indicate that she knew she was asking students questions and asking them to use information to answer questions; however, she lacked specific pedagogical or discipline language to properly reflect on her techniques. In her revised reflection prompt Student A added that her questions made the students think. Again, she was not using the

specific language that we would expect or hope (e.g.: critical thinking skills) but she has acknowledged the relationship between what she says and the students do. Student A’s example is indicative of other Video One prompt analysis and the other candidates’ responses. No timestamps were changed as a result of the reflection cycle.

Table 2. *Sample Video One Prompt Response*

Question	Student A Video One	Example Video Comments	Student A Video One Final
What instructional techniques did you use during this videoed lesson?	I also used effective questioning when going over the problem on the SMART board (timestamp: 35:55)	<ul style="list-style-type: none"> •00:35:55; Student: Here I am asking the students to think about the question and the material to answer this. •00:36:37; Student: Here I am asking the students to retract information from the above questions to answer this. •00:37:07; Student: Here I am formally assessing the students. 	I also used effective questioning when going over the problem on the SMART board. I knew the questioning was as effective because the students were answering the questions and I felt like the questions made the students think (timestamp: 35:55).

Video Two

Video Two initial self-reflection prompts analysis mirrored Video One reflection depth changes. Candidates' initial self-reflection responses were primarily declarative sentences with little in-depth analysis and/or connection to the timestamp. Candidates continued to struggle with separating/documenting multi-part prompts. Revised self-reflections were more in-depth with more specific connections to the video (Table 3). Two of the three candidates changed their prompt two timestamps based on their debriefing session. Both candidates' timestamp changes

were better examples of documenting the prompt in action. Again, the teacher educator debrief was instrumental in promoting a deeper level of self-assessment by the candidates. Student B’s example is indicative of other Video Two analysis changes across candidates and prompts.

Table 3. *Sample Video Two Prompt Response*

Question	Student B Video Two	Student B Video Two Final
Referring to the video, explain how you assessed student learning of course objective(s)?	I assessed student learning of the course objective by having the student explain to me how he found his answer. (14:30 - 16:00)	I assessed student learning of the course objective by having the student explain to me how he found his answer (Find). I asked questions about how he found his answer and to justify how he got his answer (Apply). (14:30 - 16:00)

Video Three

Video Three reflection prompts were the exact same as Video One; however, candidates did not debrief with a teacher educator during the Video Three reflection cycle. Responses across all three candidates indicated they continued to struggle answering multi-question prompts; however, two of the three candidates showed an improvement in writing their initial reflections. Answers to the prompts became more specific over time and candidates began utilizing the language of the prompts in their answers (Table 4). Reflections for Video Three were shorter than the revised reflections for Video One; however, substance of the content and associated timestamps indicated candidates’ improved ability to assess their own instruction.

Table 4. *Sample Video Three Prompt Response*

Question	Student A Video Three
(SCIENCE) Referring to the video clip (using timestamps), explain how you engaged young adolescents' during a scientific inquiry in using evidence and/or data and science concepts to construct explanations of OR predictions about a real-world phenomenon AND critiquing explanations OR predictions of peers.	The instruction engaged students because the articles that the students were asked to read were real life scenarios about how humans are impacting the environment. The articles contained scientific evidence about how humans are impacting the environment in negative ways and they can connect to them because these are things that humans have done. They can then come up with explanations within their group about the topic of their article and to tell how these human impacts can be reduced in the environment. Also, going over the summary statements of the different articles allowed for any clarification on the articles that the students might have had (timestamp: 24:22 – end of video)

Discussion

Results indicate a video-based self-reflection, expert discussion, self-reflection cycle did change pre-service teachers' ability to analyze their own teaching. Candidates' initial self-reflection prompt responses were brief and not very in-depth. Candidates typically stated a strategy implemented in their classrooms from a teacher perspective (I not we). Candidates oftentimes only provided beginning or short timestamps to document their strategies in action. After the debrief with a teacher education expert, connections between timestamps and video and the description of *why* the instructional technique they used was good were consistently more meaningful. Timestamps used were generally longer in duration and better demonstrated the narrative in action.

Use of the same prompts for Video One and Three with differing prompts for Video Two were intentional. Candidates were able to transfer their post-reflection Video One knowledge learned to the initial Video Two self-reflection. Initial prompt Video Two self-reflections and timestamps when compared to initial Video One reflection responses were more in-depth and timestamps used were longer but still did not completely answer *why* for each prompt. Final prompt Video Two self-reflections and timestamps when compared to initial Video Two reflection responses better connected the narrative and teaching denoted in the timestamps but still did not completely answer *why* for each prompt. This knowledge transfer also was evident in the initial Video Three self-reflections and timestamp usage. In general, candidates' ability to provide in-depth self-reflections did increase over time. Length of narrative overall did not increase substantially for many of the prompts but the ability to connect narrative with timestamps did increase. The ability to choose appropriate timestamps did increase over time. Timestamps were typically longer and were better documents and teaching examples of the reflection prompts. These findings may mean transferability of knowledge learned using a specific set of prompts multiple times can enhance a candidates' self-reflection ability and can possibly transfer to another set of prompts; however, this transferability needs to be further researched given the small sample size.

Implications

These findings support the constructs that the art of reflection is a developmental and personal process (Zeichner & Liston, 1996; Osterman, 1998), a video reflection cycle can enhance self-reflections (Kleinknecht & Groschner, 2016) using reflect-on-action activities (Schön, 1983, 1987), accomplished teacher educators can impact pre-service teacher candidates' ability to self-reflect, and the Association of Teacher Educators Task Force on Field Experience

assertion that reflection is an essential component of learning to teach. While this study did not follow teacher candidates through the edTPA process, these findings do support the idea that understanding the teaching process as assessed by edTPA is needed (Choppin & Meuwissen, 2017; Huston, 2017).

These data demonstrate the expected level of reflection expected by edTPA is not evident in initial pre-service teacher self-reflections. This finding implies teacher education programs need to embed self-reflection assignments that require candidates to assess their teaching using video and reflection prompts across multiple field experiences.

As in-service teachers, these candidates may be required to complete teacher self-reflection assessments as part of their performance reviews and yearly professional goals. Repetitive practice of self-reflection using video evidence, while a teacher candidate, should promote more thoughtful and productive self-reflection later and help candidates connect their actual teaching to their perceived teaching thoughts as they become reflective practitioners.

Conclusion

Given these findings, our program is in the process of dedicating additional resources to purchase/use video software so faculty can integrate a self-reflection cycle into all practicum courses and student teaching using video analysis prompts. More research is needed to determine if a video self-reflection based process is effective and enhances edTPA scores. These data do support the assertion reflective practitioners are developed and does not automatically occur.

References

Association of Teacher Educators (2009). *The teacher educator standards*.

<https://ate1.org/standards-for-teacher-educators>

Association of Teacher Educators (2020, March 12). *Task force on field experience standards in teacher education (2012-2015)*.

<https://ate1.org/resources/Documents/Standards/Revised%20ATE%20Field%20Experience%20StandardsII.pdf>.

Barth-Cohen, L.A., Little, A.J. & Abrahamson, D. (2018). Building reflective practices in a pre-service math and science teacher education course that focuses on qualitative video analysis. *Journal of Science Teacher Education*, 29(2), 83-101.

doi: 10.1080/1046560X.2018.1423837

Choppin, J. & Meuwissen, K. (2017). Threats to validity in the edTPA video component. *Action in Teacher Education*, 39(1), 39-53. doi:10.1080/01626620.2016.1245638

Dewey, John (1933). *How we think: A restatement of the relation of reflective thinking to the educative process*. D. C. Heath and Company.

Huston, T. (2017). edTPA, videotape, and occupational identity: A study of pre-service teachers. *Teaching Education*, 28(2), 194-210. doi: 10.1080/10476210.2016.1237482

Kleinknecht, M. & Groschner (2016). Fostering preservice teachers' noticing with structured video feedback: Results of an online- and video-based intervention study. *Teaching and Teacher Education*, 59, 45-56. <https://doi.org/10.1016/j.tate.2016.05.020>

Merriam, S. B. (1998). *Qualitative research and case study applications in education*.

Jossey-Bass, Inc.

Osterman, K. F. (1998, April). Using constructivism and reflective practice to bridge the

theory/practice gap. San Diego, CA: American Educational Research Association. (ERIC Document Reproduction Service No ED425518).

Stanford Center for Assessment, Learning and Equity. (2019). *Making Good Choices* [PDF File].

<https://www.edtpa.com/Content/Docs/edTPAMGC.pdf>.

Schön, D. (1983). *The reflective practitioner: How professionals think in action*.

Basic Books, Inc.

Schön, D. (1987). *Educating the reflective practitioner*. Jossey-Bass.

Yin, R. K. (2014). *Case study research: Design and methods*. 5th edition. SAGE.