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Improving Pre-service Teacher Assessment Competencies through Robert Moses' Five- Step Framework

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Since the pandemic, the United States has faced tremendous teacher shortages (Riser-Kositsky, 2021) and national organizations have called for measures to address barriers related to teacher hiring and retention (NEA, 2022a., b; White House, 2022). Many states – including California – require pre-service teachers to pass state performance assessments to demonstrate professional competencies for certification. Unfortunately, scores on the California Teaching Performance Assessment (CalTPA) have steadily declined from 2018-2022 resulting in a high failure rate. In effort to improve pre-service teachers' CalTPA scores at our diverse Hispanic-serving state-university, I closely analyzed the competencies assessed in our lowest performing rubric and realized students need to better understand the concept of evidence to effectively annotate videos of classroom instruction. After recognizing the promise of Robert Moses' framework (Ahn et al., 2018; Ahn, I, & Wilson, 2011), I decided to replace my traditional direct teaching approach with Robert Moses' framework to teach the concept of evidence. Students in my fall 2021 seminar and my colleague's comparison fall 2021 and spring 2022 sections were prepared to demonstrate competencies measured by the low-performing rubric using traditional teacher directed presentations and teacher generated examples; whereas, students in my spring 2022 seminar were prepared using Moses' framework. This pilot study examined the impact of Moses' framework on students' state performance assessment scores to inform program improvement. While both instructors' fall 2021 to spring 2022 course improvement efforts resulted in 24.8% and 8.2% CalTPA score improvements, only my course with the Moses' framework intervention reached statistical significance. The study highlights important differences between traditional teacher-centered approaches and student-centered approaches using Moses' framework and calls for further research to support the efficacy of the framework.

Keywords: student-centered pedagogy, pre-service teacher education, Teaching Performance Assessments (TPAs), Higher-Order Thinking (HOT), Assessment for Learning (AFL), and formative assessment

Introduction

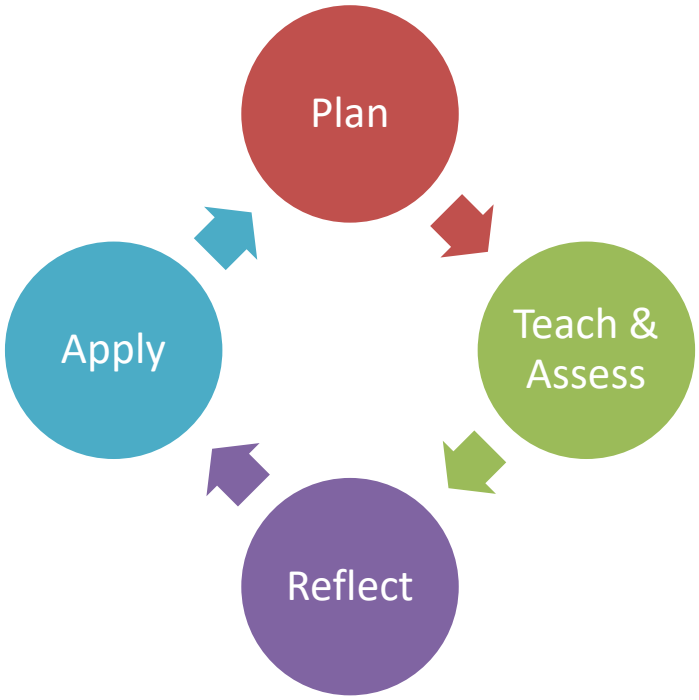
Conceptions Since the pandemic, public schools and universities in the United States have faced especially large teacher shortages (Riser-Kositsky, 2021; U.S. Department of Education, 2022). Data from the most recent U.S. Bureau of Labor Statistics' Job Opening and Labor Turnover Survey (JOLTS, 2022) show there were 0.606 and 0.497 hires in June and July 2022 for every open public elementary, secondary, and postsecondary education positions one to two months from the start of the new 2022-2023 academic year. Furthermore, a recent 2022 survey by the National Educational Association (NEA) found over 55% of members reported they planned to leave the profession earlier than they had originally intended. The imminent need to prepare teachers is resulting in extensive efforts from federal, state, and local governments and educational organizations to bolster the pipeline to recruit and retain qualified teachers. Organizations such as NEA, the American Federation of Teachers (AFT) the National

Governor's Association (NGA) and the Council of Chief State Officers (CCSS) are calling for measures not to lower standards but to identify and address barriers to ensure students have qualified teachers (NEA, 2022a, b; White House, 2022).

Struggles in a Pre-service Teacher Preparation Program

Educator preparation programs require pre-service teachers to demonstrate rigorous professional competencies for certification before entering the profession. Many states, including California (where the author is a university professor), have adopted teaching performance assessments to measure competencies related to *Planning*, *Teaching and Assessing*, *Reflecting* and *Applying* – the teacher inquiry cycle (see Figure 1) that ideally occur in teaching.

Figure 1.
Teacher Inquiry Cycle



Prior to earning their credential, pre-service teachers are required to demonstrate these professional competencies on the California Teaching Performance Assessment (CalTPA) through written responses and classroom artifacts, such as lesson plans, instructional materials, assessments, student work samples and classroom videos. Since the pandemic, pre-service teachers' CalTPA scores have declined. According to the California Commission on Teacher Credentialing's (CTC) edReport data, in 2020 – 2021 and 2021-2022 respectively, only 75% and 52% of state CalTPA first attempt averages were above the passing threshold compared with 100% and 87% in 2018 -2019 and 2019-2020, the first two years of implementation. A similar pattern occurred at the Hispanic-serving institution where the author works as a professor. In 2020-2021 and 2021-2022 respectively, 92% and 79% of pre-service teachers' CalTPA first attempt averages at this institution were above the passing threshold, compared with 100% during the first two years of implementation in 2018-2019 and 2019-2020. Due to this decline,

the CTC and pre-service educator preparation programs throughout California have sought ways to enhance pre-service teachers' CalTPA pass rates.

In fall 2021 and spring 2022, my colleague and I taught a seminar course with a total enrollment of 91 students, designed to prepare secondary pre-service teachers for the CalTPA. Since its inception in 2018-2019, we have opted to co-plan the course and maintain parallel syllabi, readings, assignments, schedules, and grading to best utilize our areas of expertise and provide consistent communication to student teachers and their supervisors during their student teaching experience. During our co-planning sessions, we reflect on the prior term, share insights about student experiences and performances, and discuss ways to improve the course. As we co-planned our 2021-2022 courses, we reviewed CalTPA annual report data and state coordinator meeting presentations, and discussed the fact that pre-service teachers across the state have consistently earned the lowest score on a rubric that measures the *Teaching and Assessing* portion of the inquiry cycle (see Figure 1 above). For this step of the inquiry cycle, pre-service teachers select and upload several 5-minute video clips of their instruction and provide time-stamped annotation titles with an explanation of their *Teaching and Assessing* practices. After reflecting on our data and teaching, for fall 2021 we decided to provide students with both high and low-performance video annotation examples, rather than just high-perforamnce examples (as described, e.g., in Booth et al., 2013).These efforts led to slight improvements in our students' overall scores, but scores on the targeted *Teaching and Assessing* rubric remained low. For spring 2022, we decided to provide more explicit guided practice with videos. After thinking about how to more effectively guide students, I realized I needed to look more closely at the low-performing *Teaching and Assessing* rubric (i.e., Rubric 1.6). My work analyzing and unpacking the competencies assessed by the rubric and analyzing our teaching practice, were the impetus for my decision to apply Moses' five-step framework presented in the editorial of this special IJTL issue.

Unpacking the Rubric Competencies

As shown in Appendix A, Rubric 1.6 measures pre-service teachers' abilities to "implement instruction and informal assessment that actively engage students in deep learning/Higher Order Thinking (HOT)." It also measures pre-service teachers' abilities to "monitor student understanding throughout the lesson" and "explain to students the next steps for learning." I noticed our pre-service teachers' struggles are consistent with research on HOT and Assessment for Learning (AFL) practices as described below.

Higher Order Thinking (HOT). National and international reform efforts (e.g., Battelle for Kids' Partnership for 21st Century Skills, 2019; Retnawati et al., 2018) have pushed educators to teach and assess more rigorous competencies, including critical thinking and problem solving. Higher Order Thinking (HOT) was first introduced by Arthur Lewis and David Smith (1993) as an umbrella term to cover the critical thinking skills used in humanities and the problem-solving skills used in the sciences. According to the authors, "higher order thinking occurs when a person takes new information and information stored in memory and interrelates and/or rearranges and extends this information to achieve a purpose or find possible answers in perplexing situations" (p. 136). Consistent with this definition, most educators in the United States consider the top four skills of Bloom's revised taxonomy (see Anderson et al., 2001) as HOT, and our state's CalTPA assessors are trained to look for evidence of these top four skills. However, research has found teachers often do not understand and apply these levels -- i.e.,

analysis, synthesis, evaluation, creation in the cognitive dimension, and conceptual, procedural, metacognitive in the knowledge dimension -- to teach and assess Higher Order Thinking (HOT) (Anderson & Krathwohl, 2001, Retnawati et al., 2018, Thompson, 2008). While teachers often believe they are teaching and assessing application, reasoning, and HOT (see, for example, McMillan, 2001; McMillan, Myron & Workman, 2002), decades of research convey that most teaching and assessing focuses on lower-level skills, such as recall and comprehension (see Brookhart, 2010; Marso & Pigge, 1993). Thus, understanding, planning, identifying, and explaining evidence of HOT can be a significant challenge for teachers and their instructors.

Assessment for Learning (AFL). Along with the push for HOT, both national and international reform efforts have pushed teachers to engage in more ***assessment for learning (AFL)***, which emphasizes the use of formative feedback to inform teaching and learning processes (McDowell, Sambell & Davison, 2008). The British Educational Research Association's Assessment Reform Group and Caroline Gipps (1994) pioneered AFL efforts, including sponsoring Paul Black and Dylan Wiliam's (1998) review of classroom formative assessment practices. The authors' seminal studies (1998a & 1998b) emphasize the role frequent formative feedback plays in supporting student learning gains. Contrary to *assessment of learning* –a more teacher-centered practice that focuses on using evidence to evaluate student learning outcomes to assign grades (i.e., summative assessment) --AFL is a student-centered process that focuses on both teachers and students using evidence and feedback to improve instruction and learning (Black & Wiliam, 2009, 2018; Gibbs & Simpson, 2004; Sekulich, 2020; Winter, 2003). Effective teachers engage in a continuous process of monitoring student needs and understanding by posing effective open-ended questions with appropriate wait time, observing student responses, engaging students in peer and self-assessment, and using summative assessments in a formative manner so students receive feedback on their learning (Black et al, 2003; Popham, 2010; Webb & Jones, 2009).Teachers use feedback from informal observational data to determine appropriate next steps based on the questions: Where am I going?, Where am I at?, and How do I close the gap? (Chappuis, 2015; Sadler, 1989; Wiliam, 2011). If they find a gap, they will ideally *stop* to address a missing foundation, misconception, or question or *slow down* to clarify content, practice skills, to deepen student understanding or differentiate for diverse learners. If not, they *move on* to the next topic or activity. Likewise, it is important for students to ask the same questions and use feedback to monitor their progress and regulate and adapt their learning (see Allal & Mottlier Lopez, 2005; Black & William, 2009, 2018; Gibbs & Simpson, 2004). More recent contributions to AFL practices within the past decade include: an expansive repertoire of strategies and technologies for gathering evidence from all students in the moment of teaching; using feedback to identify learning differences and differentiate learning; and providing multiple means for action and expression (monitoring progress) within the Universal Design for Learning (UDL) framework (Allal & Mottier Lopez, 2005; Black & William, 1998a., 1998b., 2009, 2018; CAST, 2011 & 2018; Gibbs & Simpson, 2004). While AFL practices are desirable, research conveys they are not easily implemented nor consistently applied by teachers (Hall & Burke 2004; Torrance & Pryor 2001; Webb & Jones, 2009)

After further reflection, the author noticed that teachers' struggles with HOT and AFL primarily center around the concept of evidence**.** To effectively teach and assess HOT, teachers must first understand what evidence of HOT entails, beginning with the verbs aligned with the top four levels of Bloom's taxonomy. Then, they must establish learning goal(s) using these

verbs and align their instruction and assessments accordingly. Likewise, to effectively engage in AFL, teachers and students must observe evidence of student progress and use this feedback to determine appropriate next steps for teaching and learning,

Analyzing Our Teaching Practice

After unpacking the course rubric competencies and realizing how central the concept of evidence is to both HOT and AFL, I decided to look more closely at the state performance assessment requirements and how we were preparing pre-service teachers to demonstrate their *Teaching and Assessing* competencies. I realized the CalTPA requires pre-service teachers to effectively observe and analyze their teaching practice and apply the Claim, Evidence, Reasoning (CER) framework to annotate videos of their classroom instruction (Moje et al., 2004). They must: (1) make a competency-based *claim* (C) about HOT or AFL by selecting an appropriate title from a pull-down menu, (2) notice and time stamp compelling relevant *evidence* (E) within their video, and (3) provide a clear, compelling explanation of their *reasoning* (R) linking the evidence to the selected competency. Next, I decided to watch and listen to my students during class time as they practiced annotating video samples in small groups. I noticed that when they were asked to identify evidence for a particular rubric element (i.e., a selected competency), my students were often unsure what to look or listen for in the videos and frequently presented irrelevant or indirect (inference based) evidence over direct (observable) evidence. I realized they struggled with the concept of evidence and lacked a shared common understanding of the most compelling direct (observable) evidence versus the least compelling indirect (inferred) evidence. Thus, I decided I needed to ensure my students had a shared understandings of the concept of evidence so they could better demonstrate their competencies using the CER framework.

After analyzing how we prepared pre-service teachers in their seminar courses, I noticed we never explicitly taught the concept of evidence which is fundamental to understanding assessment. Instead, we simply assumed students had a shared common understanding of this prerequisite knowledge. I also noticed that despite efforts to model student-centered learning practice, we had been modeling and teaching HOT, AFL and video annotation skills through traditional teacher-led presentations that included teacher selected definitions, examples/non-examples, visuals and occasional auditory, kinesthetic and/or tactile enhancements. Although we presented content in a “chunk, chew and check” fashion to allow multiple opportunities for pre-service teachers to interact with and process content (see Marzano, 2007), the essential contents (e.g., key concepts, definitions, examples/non-examples, visuals, and enhancement) within our presentations were teacher generated.

Moses’ Framework: A Potential Solution

After reading about and observing the potential of Robert Moses’ five-step framework as a program evaulator (Ahn et al., 2018; Moses & Cobb, 2001; Teaching Academy for Professors, 2022), I decided to pilot the scaffolding framework with my class to teach the concept of evidence. As explained in thie editorial of this special IJTL issue, Robert Moses, a civil rights activist, developed his scaffolding framework to make challenging, abstract math concepts and vocabulary accessible to African American students. The benefit of instructional scaffolding is that the teacher intentionally supports student learning by accessing students’ prior knowledge and experiences to introduce new concepts and skills and then gradually removes the supports as students gain confidence and proficiency. Scaffolding is particularly helpful in lowering the

affective filter for second or multi-language learners so they can work within their Zone of Proximal Development or ZPD (Vygotsky, 1986; Walqui, 2006). Low motivation and self-confidence combined with high anxiety can impede language acquisition and content learning for second or multi-language learners (Krashen, 1989). Through Moses' original framework (refer to Figure 1 in the editorial) the teacher scaffolds learning by 1) engaging students in a common physical experience representing complex concept(s), 2) having students draw, and then 3) discuss in common everyday language what they experienced before 4) introducing the academic vocabulary. In the final step, 5) students symbolically represent what they learned through gestures (See Appendix B). Hallmarks of Moses' original and expanded frameworks include experiential learning, student-centered collaborative learning, multimodal learning, and formative assessment.

Moses' original five-step framework (see Figure 1 in the editorial) has demonstrated promising results with underserved populations, including Latino/Hispanic students and English language learners (Ahn, I, & Wilson, 2011), pre-service teachers (Ahn et al., 2018) and students in biology courses taught by graduate teaching associates (Teaching Academy for Professors, 2022). The original framework is now being expanded (see Figure 2 in the editorial) to include introductory and exit skits (Steps 0 and 6) to build interest and cement learning for students. Further research is needed to assess the original and expanded frameworks' efficacy with other contexts, content areas, and populations. The present study sought to determine if piloting Moses' original five-step framework with my class of pre-service teachers (n=23) to teach the concept of evidence made a difference in our students' CalTPA scores, with the additional goal of informing overall course and program improvement. During the spring 2022 term, I replaced my teacher-led presentations with Moses' framework and then compared the results to my fall 2021 (n=27) section and my colleague's fall (n=12) and spring 2022 (n=29) sections which used traditional teacher-led presentations. The pilot study demonstrated the efficacy of Moses' original framework for preparing pre-service teachers to engage in effective *Teaching and Assessing* practices as demonstrated through their CalTPA scores.

Methodology

Participants

The pilot study took place during the 2021 – 2022 academic year at a diverse Hispanic serving state-university in California. According to fall 2021 enrollment data, 58% of students identified as first generation, 52% as ethnic minorities, 50% as Hispanic/Latino, 22% as Asian, 15% as White 3% as Black/African American, 3% as two or more races, and 3% as unknown. The study included secondary pre-service teachers enrolled in the author and her colleague's fall and spring seminar courses designed to prepare pre-service teachers for the state's teaching performance assessment.

Study Design

A control group pretest posttest design – specifically involving a 2-course section (author vs colleague) x 2 methods (*traditional teacher led presentations* vs *Moses' five-step framework*) -- was used to see if applying Moses' five-step framework to teach the concept of evidence made a difference in pre-service teachers' state performance assessment scores on *Teaching and Assessing*.

Traditional Teacher-Led Presentations (Baseline Fall 2021 Course Section).

In fall 2021, as a baseline for this study and as discussed previously, my colleague and I attempted to prepare our pre-service teachers to identify and apply evidence to demonstrate *Teaching and Assessing* competencies. We both used *traditional teacher-led slide presentations* to introduce essential terms, definitions, and concepts and followed the steps of Madeline Hunter's (1982; 2004) 7-step lesson plan, a common lesson plan template used in the United States. We began with a slide that informed students of the lesson objective(s) and then presented slides to capture their attention, build interest, and connect with prior knowledge.

The next set of slides presented content, in a deductive manner moving from broad concepts to specific details. We frontloaded important language and definitions and supported essential concepts and terms with selected visuals, examples, and non-examples. Our slides included preplanned talking points to ensure we elaborated upon essential concepts and details related to HOT and AFL that we felt were important. We were mindful to present content in a *chunk, chew, and check* fashion (Marzano 2007): we presented and modeled new content in manageable *chunks* to not overwhelm pre-service teachers and allowed time for them to discuss and process (*chew*) the content at various points through structured cooperative activities, such as sharing classroom practices, viewing high performance exemplars, and brainstorming ideas for their state assessment. Throughout the presentation, we closely monitored students' understandings and shared with the class important points and misconceptions before moving to the next topic.

After presenting the essential content, we engaged students in structured guided and independent practice activities to prepare for the state performance assessment. During *guided practice* we went over the performance assessment guidelines and rubrics, walked pre-service teachers through high scoring performance assessment examples and non-examples, and provided opportunities for them to practice annotating videos with their peers. Afterwards, students practiced annotating videos on their own and received formative feedback.

Traditional Teacher-Led Presentation (Comparison Spring 2022 Course Section).

In spring 2022, my colleague continued using the same traditional teacher-led slide presentations as described above. After reviewing fall 2021 pre-service teachers' scores on the CalTPA, we made a few common course improvement changes to our spring 2022 courses sections, which included: (a) updating the performance assessment samples used for guided and independent practice with more recent submission samples; (b) periodically pausing our instruction to explain (make explicit) our rationale behind the strategy or skill we used while *Teaching and Assessing,* and (c) conducting think alouds so pre-service teachers could witness the evidence and reasoning they used in the moment of teaching to decide next steps for content-specific teaching (e.g., reteaching a different way, addressing misconceptions or, moving to the next topic).

Moses Five-Step Framework (Intervention Spring 2022 Course Section).

After realizing pre-service teachers lacked a shared understanding of the concept of evidence and the Claim, Evidence, Reasoning (CER) framework, I decided to try teaching these concepts to students in my spring 2022 seminar using Moses' original framework as an intervention (see Appendix B). I engaged students in the first four steps of Moses framework. For step 1 (physical event), students participated with peers in a common experience simulation in which each team was charged to convince the North Atlantic Treaty Organization (NATO), to

aid Ukraine and their guiding question was, "what will be the most compelling?" The NATO panel's charge was to observe the team presentations and determine what was most compelling. For step 2 (pictorial representation), students were asked to draw what they felt was most compelling as they listened to the team's NATO presentations. Then, for step 3 (people talk), students shared their pictures with their teams and discussed what they felt was most compelling and why. After deliberating, the NATO team shared and explained their decision to the class. During the first three steps, I closely monitored (observed) students' drawings and discussions and actively looked and listened for relevant terms such as: observations, evidence, what was seen, what was heard, data, facts, inferences, proof, truth, logic, explanations, and reasoning. For step 4 (feature talk), I used the same slides I used for my fall course, but intentionally used the pre-service teacher generated language, definitions, examples, and non-examples that emerged during steps 1 to 3 to introduce and deepen the content. I planned to engage students in the fifth step (symbolic representation), but ran out of time so the step was excluded. (See Appendix C to view the full lesson plan).

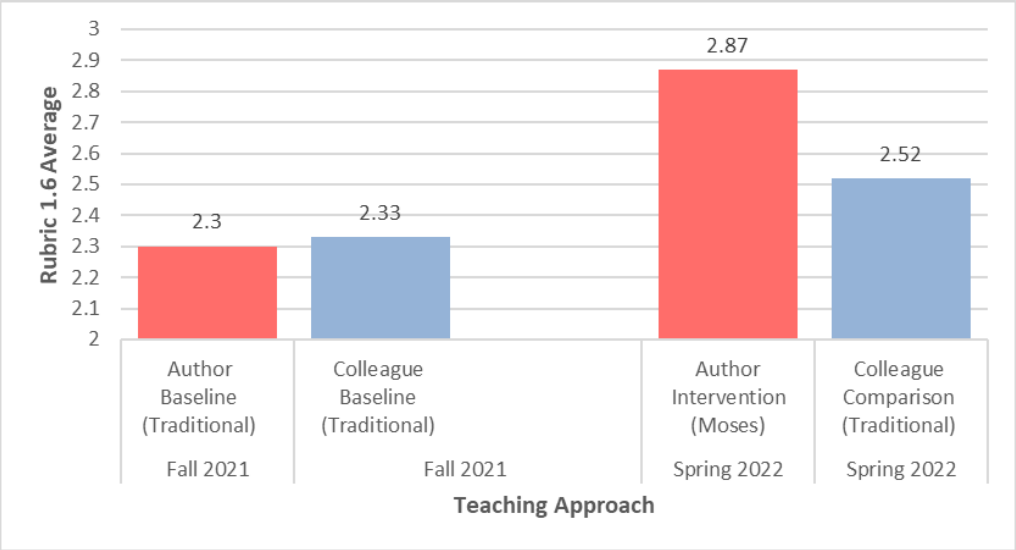
Data Collection and Analysis

Pre-service teachers' state performance assessment scores were used to determine if applying Moses' framework impacted their *Teaching and Assessing* performance. Although the CalTPA includes two instructional cycles, this study focused on Cycle 1 "Learning about Students and Planning Instruction," because students in the program and across the state struggle the most with this Cycle. The Cycle requires pre-service teachers to: 1) learn about their class and focus students to *plan instruction*, 2) *teach and assess* and annotate video recordings of their instruction, 3) reflect, and 4) *apply* evidence of teaching of learning. Pre-service teachers submit their Cycle through the state's ePortfolio system where it is blindly scored by certified state assessor(s). Pre-service teachers' *Teaching and Assessing* competencies are evaluated using a five-point analytic rubric where 1 = the lowest score and 5 = the highest score. As shown in Appendix A, Rubric 1.6 measures pre-service teachers' abilities to provide instruction and assessment that actively engage students in deep learning of content/higher-order thinking, monitor student learning throughout the lesson, and explain to students next steps for learning. First attempt scores for students that submitted their Cycle fall 2021 or spring 2022 were used to determine if there was a difference between the author's spring 2022 intervention course (n=23) and baseline fall 2021 (n=27) Rubric 1.6 scores and her colleagues' comparison (control group) fall 2021 (n=12) and spring 2022 (n=29) scores. Only students that attended the author's class the day of the Moses' lesson were included in the study.

Results

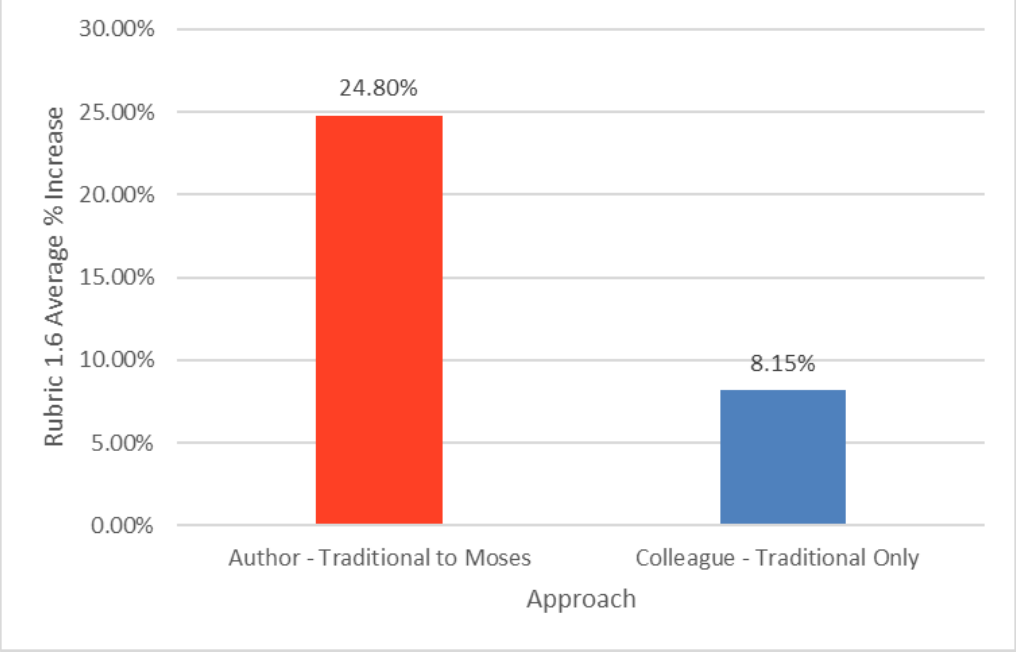
Results reveal Moses' original five-step framework significantly impacted pre-service teachers' state performance assessment scores. As shown in Figure 2, our fall 2021 baseline course average scores for Rubric 1.6 were similar after using traditional teacher-centered presentations (author's course: $\bar{x}$ = 2.3, SD =0.912, n=27 vs. colleague's course: $\bar{x}$ = 2.33, SD = 0.778, n=12).Also, both spring 2022 course average scores for Rubric 1.6 increased after our course improvement efforts (author's course: $\bar{x}$ = 2.87, SD = 0.626, n=23 vs. colleague's course: $\bar{x}$ = 2.52, SD = 0.871, n=29).

Figure 2.
Comparsion of Rubric 1.6 Averages After Using Traditional vs. Moses' Teaching Approaches



As shown in figure 3, the author's Rubric 1.6 course average increased 24.8% (from $\bar{x}$ = 2.3, n=27 in fall 2021 to $\bar{x}$ = 2.87, n=23 in spring 2022) after applying the Moses' framework intervention. In comparison, my colleagues' Rubric 1.6 course average increased 8.2 % (from $\bar{x}$ = 2.33 in fall 2021 to $\bar{x}$ = 2.52 spring 2022) after applying traditional teacher-led presentations and course improvement efforts.

Figure 3.
Fall 2021 to Spring 2022 Author's Course Improvement (After Intervention)



A one-way analysis of variance (ANOVA) was used to determine if the difference among pre-service teachers' Rubric 1.6 performance in comparison with traditional approaches (author and colleague fall 2021 and colleague spring 2022) versus Moses' framework (author, spring 2022) was significant. The Welch test was used to correct unequal sample sizes and homogeneity of variance assumption violations [Levene F (3, 87) = 2.76, p <.047)]. Results indicated the framework had a significant effect on pre-service teachers' Rubric 1.6 performance [F (3, 39.93) =2.87, p=.049] and post hoc analyses using the Games-Howell test indicated the only significant difference was between the author's fall 2021 (traditional) and author's spring 22 (Moses) framework (p = .05) sections.

Several limitations are worth noting. First, while the Welch test helps correct for low, unequal sample sizes and unequal variations around the means -- and the results indicated the use of Moses' five-step framework had an effect on pre-service teachers' Rubric 1.6 performance -- post hoc analyses indicated only scores from my fall 2021 (traditional) and spring 2022 (intervention) Moses' framework sections were significantly different (p = .05), and these scores were just at the (p<.05) significance threshold. Thus, further studies with larger sample sizes are needed to potentially allow for more generalizable results. Also, while the two-group pretest posttest model is a strong researcher design, adding a pretest to assess pre-service teacher competencies would have ensured their knowledge and skills were equivalent before applying Moses' framework. More longitudinal research is warranted, and the results would be more compelling if my colleague and I experience similar results after applying Moses' framework.

Discussion

This comparison study examined the impact of using Moses' original framework versus traditional teacher-centered presentations on pre-service teachers' *Teaching and Assessing* performance. Both instructors engaged in course improvement efforts from fall 2021 to spring 2022, that included: providing pre-service teachers with more examples and non-examples of higher order thinking (HOT), explicitly modeling more formative assessment practices, clarifying which practices were most and least effective, and conducting think-alouds to explicitly model how to use evidence to determine next steps in the moment of teaching. However, only the author used Moses' original framework in her spring 2022 course. While these efforts led to 24.8% and 8.2% respective improvements in pre-service teachers' performance assessment scores, only the author's 24.8% improvement reached a level of statistical significance.

Table 1 highlights important differences between my traditional teacher-centered presentation approach versus my student-centered approach after applying the first four steps of Moses' original framework. As discussed below, these differences included: the role of the teacher, the intended use of the presentation slides, the manner of presenting content, academic content language, and multimodal inputs (Metri Group, 2008; Ginns, 2005; Mayer, 2001; Mayer & Moreno, 2003).

Table 1.
Key Differences in Teacher-Centered Presentations and Moses' Scaffolding Framework

	Traditional Teacher-Centered Presentation	**Moses Student-Centered Scaffolding Framework**
Teacher role	***Presenter*** ***Expert***	***Facilitator (guide)*** ***Learner***
Intended use for the presentation slides	A **script** to be followed in predetermined linear manner	A **guide** through Moses' framework with flexible (non-linear) topics for step 4 improvisation.
Manner of presenting content	Deductive – Broad essential topics introduced before preplanned the details. Essential topics predetermined	Inductive – details from student drawing and conversations (prior knowledge experiences, and everyday language) used to guide participants to essential learning and broaden and deepen understandings. Essential topics predetermined
Academic content language	The teacher frontloaded formal terms and definitions.	The teacher used students' drawings, symbols. and informal everyday language to bridge (introduce) formal academic terms.
Multimodal inputs	Pre-planned teacher visual and auditory inputs, including examples and non-examples, selected to illustrate and elaborate essential concepts, skills, and understandings. No planned kinesthetic or tactile activities.	Step 2 student drawings (visual, kinesthetic, and tactile input) and step 1 and 3 discussions (auditory input) were used as "scaffolds" to co-construct essential concepts, skills, and understandings. Planned step 5 gestures (kinesthetic input) – eliminated due to time constraints.

In the former teacher-centered approach, I maintained control of instruction as the "presenter" of content and did so in a linear fashion. The presentation slides were carefully planned to include all the essential knowledge, skills, and details (e.g., definitions, visuals, steps, examples, non-

examples, reminders) I believed would ensure students met the learning goals. They included pre-planned talking points and structured activities to allow students time to engage with the content and develop essential skills. The slides became a script I followed to ensure my students obtained the essential knowledge, skills, and understandings within the time constraints of the class.

When applying Moses' original five-step framework, I transitioned from controlling and presenting content to facilitating student learning. The first step provided a common shared experience that laid the foundation for subsequent learning. During steps 1- 3, I closely monitored students' drawing and discussions to identify relevant prior knowledge, experiences, and everyday language I could use as "scaffolds" during step 4 to connect students' informal everyday language and experiences to formal academic language and concepts (see Ahn & Lassila reported in this issue; Cummins, 2000). During the step 4 discussion, I added student generated examples onto the presentation slides to elaborate and deepen conceptual understandings. Consistent with pre-service teachers' experiences as reported in Ahn et al.'s (2018) study, the emphasis of the presentation slides shifted from presenting content to co-constructing, discovering, and ultimately validating and empowering all learners within our classroom community.

Insights Gained While Applying Moses' Five-Step Framework

The lesson began with a slide providing instructions for the step 1 (physical event) experiential learning activity designed to engage and guide students to discover and connect the most important and relevant learning content to desired learning outcomes. I framed the experience by charging teams with the task of convincing the North Atlantic Treaty Organization (NATO) to aid Ukraine. As I applied the original framework, I noticed the most challenging aspect of planning was coming up with a question to guide students to important understandings without including formal academic language that might increase students' anxiety or affective filter (Vygotsky 1986; Walqui, 2006). I selected "What will be most compelling?" as the framing question.

The next slides were easier to prepare and included instructions for completing the step 2 (pictorial representation) non- verbal, drawing and step 3 (people talk) verbal, peer discussion activities. These activities allowed students time to reflect and make meaning of the step 1 activity by accessing and sharing their prior knowledge, experiences, and funds of knowledge in n a non-threatening manner (through drawing and small group rather than whole group discussions). During these steps, I circulated the classroom, closely monitored students' drawings and discussions to understand their thought processes and frames of reference, and selected key words, phrases and pictures to refer to during step 4 to scaffold and guide students to important understandings. My students were highly engaged in these activities and it was fascinating to see how the teams developed compelling arguments in very different ways. For instance, a group of math preservice teachers provided data on numbers of Ukrainians displaced by the war, a group of science preservice teachers presented a picture of a nuclear power plant and described the potential disaster, and a group of social science preservice teachers linked NATO's mission statement. While a few teams, such as those previously described, provided direct evidence (e.g., photographs and links to articles) to support their claims, I noticed most presented claims without supporting evidence (e,g, "NATO should support Ukraine because children are suffering"). To prepare them to later connect the concept of evidence to the activity, I began to probe the teams by asking, "How do you know?"

My step 4 (feature talk) slides were more difficult to prepare because I usually introduce new content by defining terms, add lots of details (e.g., videos, bulleted explanations, examples) and sequence slides in a manner I feel will most benefit my students. As I prepared my Moses' lesson slides, I intentionally pulled back on the content. I asked myself, "What is most essential for students to know?" and included just those terms for later discussion and elaboration(i.e, the Claim, Evidence and Reasoning [CER] framework and the difference between direct and indirect evidence). As I taught, I fought back my tendency to present content in a deductive, linear, pre-determined or "scripted" fashion from my own perspective. Instead, I used an autonomy-supportive teaching approach (see Reeve & Cheon, 2021), drawing from my observations in the moment of teaching (steps 1 – 3) to introduce and bridge new topics to students' prior knowledge and experiences and ultimately build and deepen their conceptual understandings. Consistent with Vygotsky's (1986) sociocultural theory and Walqui's (2006) scaffolding framework, my students and I co-constructed knowledge together through the step-by step structural supports I had thoughtfully planned. My step 4 presentation slides served as a template to record relevant student-generated words, phrases, pictures, examples and non-examples. Together we co-constructed knowledge which led us to broader and deeper understandings. Once students understood difference between direct and indirect evidence and the CER framework, I engaged them in a think-pair-share activity to explore how the lesson connected with their upcoming TPA submission. I was pleased students came to their own realization that to successfully demonstrate *Teaching and Assessing* competencies, they needed to 1) make a claim by selecting a video annotation title (e.g., engaging students in HOT, monitoring for student understanding, 2) identify time-stamped evidence for the claim, and 3) explain their reasoning with compelling direct evidence in their written annotation. Overall, I believe their deep understanding and own discovery contributed to the increase in their Rubric 1.6 performance.

Conclusion

Moses' original five-step framework appears to be promising model for extending and deepening students' understandings of complex concepts, such as evidence, which lay the foundation for essential course skills, such as applying the CER framework. After taking a step back to look closely at the state performance assessment and unpack the competencies that are assessed, I realized my colleague and I never explicitly taught the concept of evidence or the CER framework itself, which are fundamental to documenting evidence of HOT and AFL competencies. Instead, we simply assumed students had a shared common understanding of this prerequisite knowledge. I also noticed that we were teaching in a teacher-led rather than a student-centered manner. The essential content within our presentations, such as definitions, concepts, and visuals, were teacher directed rather than student generated, thus possibly preventing students from engaging with the content in deeper, more meaningful, and more autonomous ways (Cheon et al., 2020; Reeve & Cheon, 2021). Although this was a small pilot course improvement study, the 24% increase in pre-service teachers' state performance scores is noteworthy, especially at a time when the need for teachers is greater than ever (NEA, 2022; Riser-Kositsky, 2021; U.S. Bureau of Labor Statistics, 2022) and national organizations are calling for measures to address barriers to ensure students have qualified teachers (NEA, 2022; White House, 2022). The results of this study have inspired me to apply Moses' original and expanded frameworks and more student-centered approaches in my courses, and to engage in further research. I am hopeful they inspire others to do the same.

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Appendix A: CalTPA Rubric 1.6

CalTPA Performance Assessment Guide
Single Subject

Instructional Cycle 1
Learning About Students and Planning Instruction

Rubric 1.6 — Step 2: Teach and Assess

Essential Question: How does the candidate actively engage students in deep learning of content, monitor/informally assess their understanding, and explain to students next steps for learning?

Level 1	Level 2	Level 3	Level 4	Level 5
Candidate's instruction and informal assessment demonstrate lack of attention to the levels of student engagement with content **and/or** classroom management necessary for student learning. **OR** There are inaccuracies in presented content. **OR** Next steps for learning are not provided.	Candidate's instruction **and/or** informal assessment require students to engage in lower-order thinking about content, or strategies engage students in passive learning of content during the lesson (e.g., candidate primarily talks throughout the lesson while students listen or take notes). Candidate's next steps for learning are not clear.	Candidate's instruction and informal assessment require students to actively engage in deep learning/higher-order-thinking (i.e., analysis, synthesis, evaluation, interpretation, transfer) about content. Candidate monitors student understanding throughout the lesson. Candidate explains to students the next steps for learning.	**All of Level 3, plus:** Candidate's instruction and informal assessment provide students opportunities to actively develop their own understandings linked to learning goal(s). Candidate monitors student learning throughout the lesson and adjusts instruction as needed (for whole class, small groups, pairs, or individuals).	**All of Levels 3 & 4, plus:** Candidate's instruction and informal assessment promote inclusion for all students by providing opportunities to participate in classroom discourse and as members of the community. Students independently facilitate their own work either in the whole class, in small groups, in pairs, or individually, choosing how to advance their learning.

Source of Evidence:

- **Part E:** 3 Annotated Video Clips (no more than 5 minutes each)

Note: Excerpt from the Commission on Teacher Credentialing (2021). CalTPA California Teaching Performance Assessment Performance Assessment Guide, Single Subject - Instructional Cycle 1: Learning about students and planning instruction. Version 4.0. p. 30.

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Appendix B: Moses' Original Five-Step Framework

Step 1: Physical Event	Students engage in a concrete participatory experience.
Step 2: Pictorial Representation	Students draw pictures or model the event and the teacher helps students identify important features of the experience.
Step 3: People Talk	Students talk about the event using familiar everyday language.
Step 4: Feature Talk	Students learn the formal academic content language.
Step 5: Symbolic Representation	Students use/apply what they learned in a formal manner.

Adapted from Moses, R. P., & Cobb, C. E. (2001). *Radical equations: Civil rights from Mississippi to the Algebra Project*. Boston: Beacon Press. (p.78-91)

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Appendix C: Moses' Lesson on Evidence and the CER Framework

Objective(s):	For students to effectively support claims with clear and compelling evidence • Students will understand the difference between direct and indirect evidence. • Students will analyze exemplars for claims, evidence and reasoning and evaluate the strength of the claims based on direct vs indirect evidence and reasoning (explanation). If weak, students will provide suggestions for improvement. • Students will evaluate claims of lesson effectiveness. If vague or weak, they strengthen through direct evidence and explanation. • Students will apply/transfer what they learned to their TPA reflect and apply responses.
Step 1 Physical Event	Your charge is to convince NATO to aid Ukraine. Guiding Question: What will be most compelling? Team Charge: Complete the following: 1. Select UN panel member (someone who has provided timely, constructive feedback to teammates) - member will join UN panel group. 2. prepare presentation (max 2 minutes) to share with panel using Google slide **UN Charge:** As you are presented with evidence, how will you determine what is most compelling? What will you be looking for? Listening for? Etc.
Step 2: Pictorial Representation (2 minute)	As you observe the presentations ... what did the presenters convey that was most "compelling or convincing" to you? Draw/map/diagram what you found compelling/convincing.
Step 3 People Talk (3 Minutes)	Share your pictures and discuss with your team … What was most compelling to you? Why? **NATO Deliberations and Verdict - what did they see/hear and decide. Why?** Monitor for understanding and choose 2-3 to share. Listen for key terms: Claim, Proposition, Argument (Building a case)

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	Evidence, Evident, “I see,” “I hear.” (What is observed - 5 senses) Speculation, Inference, Building a case, consistency (reliability) Analysis - do the parts support the whole True, Factual, Proof, Valid. Logical
Step 4: **Feature Talk** (5 minutes) -	Evidence - What is “evident” based on the information Direct vs indirect Judge/Jury/Assessor(s), “Weigh” the evidence to see if a claim is true, do the parts support the whole - what supports the assertion? Introduce Claim, **Evidence,** Explanation
Step 5: Symbolic Representation (2 minutes)	” Come up with a hand motion, gesture for evidence.
Guided Practice	Pair share activity to connect Moses’ lesson to the TPA Analyzing TPA video and annotation examples from high performers. • Understanding and identifying direct vs indirect evidence • Evaluating claims as strong or weak
Independent Practice	Practice annotating a video of your teaching, share practice examples with two peers and provide and receive feedback. Apply what you learned to your official TPA submission