

Theoretical Cognitive Principles Observed in the Social Studies Classroom

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Abstract: Pre-service elementary social studies teachers in the south eastern United States participated in a mixed methods study to determine the degree to which they utilized critical thinking skills. Insight Assessments administered analysis of their reflections, critical thinking skills, and dispositions test. The researchers developed a post survey for the study based on Paul and Elder's (2009) work. Pre-service teachers initially believed that their critical thinking abilities were above average; however, after taking the skills and dispositions test and receiving feedback on their reflections, they developed a new appreciation and understanding of the components of critical thinking. They also made a commitment to help their future students develop their critical thinking skills. This study addresses the need to consider how our pre-service teachers think about their practice, how to help them think more critically, and how to help them teach critical thinking skills when they become teachers.

Key words: critical thinking, learning processes, intellectual interaction, application of knowledge

Introduction

In order to understand the past actions of different groups, we must examine the beliefs, attitudes, and information that guided their decisions. As social studies teachers, we can draw comparisons that consider how events and beliefs evolve in modern times. For example, why do conservatives and liberals champion particular causes? Why do some religious groups have a negative impression of a particular faith? In VanSledright's (2010) view, all cognitive tools are insignificant without an understanding of the theories that inform the different tools that result in students' learning.

According to Paul and Elder (2009), few people realize the role critical thinking plays in their lives, and even fewer understand the process of thinking critically. Poor thinking skills prevent individuals from recognizing opportunities and making informed decisions. The new national standards (Common Core State Standards Initiative [CCSSI], n.d.) and College, Career, and Civic Life (C3) Framework for Social Studies Standards (National Council for the Social Studies, n.d.) place strong emphasis on the development of students' critical thinking skills.

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As a research group, we agreed with Pinkney and Shaughnessy (2013), “modern mandates require that schools teach higher-level thinking, without really specifying what this means” (p. 346). Since this directive seems fairly standard in all classrooms, most people “generally need training to think reliably, deeply, critically, and well” (p. 346). Oftentimes the idea and concept of thinking is devalued or overlooked as humans are perceived as always thinking; however, the level at which they are thinking should be considered. Pinkney and Shaughnessy (2013) point out that “educators must teach critical thinking because critical thinking is a skill which makes people fully human” (p. 351).

To make the historical past come alive, students often seek personal meanings (Davis, Yeager, & Foster, 2001). As social studies methods professors and curriculum experts, we emphasize a strict cognitive view of learning and explore a blend of understanding and empathy for others. We encourage our pre-service teachers to facilitate consideration of various perspectives when seeking historical meanings. The pre-service elementary teachers’ knowledge base plays a key role in seeking historical meaning. If teachers lack critical thinking skills, how can they teach students to think critically? If teachers lack empathy for other cultures, how can they teach about kindness and justice? Skolnick, Dulberg, Maestre, and Stokes (2004) call for a blending of cognitive abilities with compassion for others. Intelligence and emotions must be considered as equal tools for critical thinking. Willingham (2012) notes that, when students are provided a mechanism for approaching problems from a critical thinking perspective, their ability to think critically and make connections improves.

Critical thinking is developed through active learning, as active learning involves the application of knowledge and skill to real-life situations. According to Smart, Witt, and Scott (2012), “active learning consists of more than just any activity that students participate in. The activities, experiences, or interventions must be focused around clear objectives” (p. 452). Smart et al., (2012) point out four steps in the active learning cycle: experiencing, reflecting, generalizing and applying (p. 453). By following these steps, students develop higher-order thinking skills as they become familiar with the necessary process to produce educated thoughts and opinions based on content and real-life experience. It is this practice that allows individuals to eventually develop informed opinions, helping them to develop a better system for thinking (Camilli, Vargas, Ryan, & Barnett, 2010).

If students can understand and apply the learning process to the content being covered, they can obtain the required skills to independently analyze any type of knowledge. According to Snyder and Snyder (2008), “critical thinking activities should be based on a structure that includes four elements: ‘ill-structured problems, criteria for assessing thinking, student assessment of thinking, and improvement of thinking’” (p. 94). It is imperative that students learn these steps and turn them into a second-nature thought process in order to develop strong opinions and educated ideas. It is also important for students to understand that they will not receive confirmation from the teacher on whether an idea is right or wrong. Right and wrong answers do not exist as long as logical reasoning—developed through the critical thinking process—supports the student’s choice.

Critical thinking skills are not developed through any specific content, but according to how the content is presented. To support this premise, focused attention needs to be placed on the application of content, the process of learning and methods of assessment. According to Snyder and Snyder (2008), “In terms of the application of content, teaching techniques that promote memorization do not support critical thinking. Some content, such as vocabulary definitions, does require memory; however, it is the application of the content that stimulates thinking” (p. 91). Students should be faced with a problem to

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solve, irrespective of the specificity of the content, e.g., “critical thinking uses questioning techniques that require students to analyze, synthesize, and evaluate information to solve problems and make decisions rather than merely to repeat information” (p. 91). Students must be able to question situations and problem-solve for answers rather than memorize steps or ideas that are not original.

In order to teach students to think critically, teachers must provide students with fodder while keeping them actively engaged. Sen (2013), echoing John Dewey (1938), states, “Learning by experience is a purposeful process. In this purposeful process, there is taking the knowledge and beliefs into consideration and ordering the ideas by reasoning” (p. 41). Critical thinking entails “doubting a situation, hesitating, being surprised, cognitive difficulties, and actions such as searching, hunting, questioning, and finding materials for removing suspicions” (Sen, 2013, p. 41). By allowing students to explore their experiences while addressing these skills, students are actively engaged in the learning process, which activates their development and their self worth.

Reasons for Outdated Assumptions

Although the research group differed on the reasons for the classroom teacher’s struggles, they did agree that from a neurological perspective, the brain could change in only one direction: degenerating from aging, injury or disease. Based on this antiquated understanding, teachers might not understand their students’ capacity for intellectual growth. It was also believed that after a certain age, no further brain development could take place. This is also incorrect. Recent cognitive research demonstrates that even at the adolescent stage, substantial development is taking place in the frontal cortex region of the brain. Without this cutting-edge research, 20th century teachers draw erroneous conclusions. If students are not performing well, the blame must have reside with the students. The widespread theory of flawed students supports a teacher-centered philosophy. According to Darling-Hammond (2010), factors such as the quality of instruction, motivation or organization are ignored by many teachers in the classroom. VanSledright (2011) contends that anemic approaches are acquired through practice and repetition. These inconsistent methodology techniques have been passed on for generations and the results are self-evident.

Teachers must provide a positive emotional environment for learning (Hardiman and Denckla, 2010). Another factor to consider is for teachers to truly care for their students and learning (Noddings, 2005). Building an environment that allows students to feel they are important in the classroom also matters. Further, all community members in a classroom have to be invested in the learning process. Hattie (2012) believes that teaching is more than just disseminating facts. Teaching is about creating change in a student’s cognitive system. Factors such as cognitively demanding careers, cognitively demanding leisure, and better schooling have led to a gain in intelligent test scores (Nisbett et al., 2012). Within this philosophy, “To think about the future, it is best to work backwards, tracing trajectories to the present moment, carefully working out the lineages that have brought current conditions into being” (Smith, 2013, p. 370). For teachers, we almost think of our students’ futures and reverse engineer the process of helping them to develop.

In this article, we made several suggestions for how to take a progressive neuroeducation approach to teaching social studies. Because teaching is a multifaceted construct including skills, dispositions, and metacognition, this presents several challenges to those seeking to comprehend 21st century teaching skills. To capture the multidimensional nature of critical thinking, we encourage teachers to renounce

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20th century techniques. In the future, more neurological and educational research may prove that teachers should seek to capture the dispositions and metacognitions of students as they perform thinking tasks versus following the usual practice of assessing lower-order skills. Teachers can also increase the validity of their approaches by conducting action research to better understand student learning and thinking. Furthermore, when outcomes are systematically studied in relation to instruction and teachers are willing to change instruction in response to students' needs, improvement is often considerable. In the process, we hope that teachers who examine their students' needs will realize that they are social scientists studying important social questions in an active learning environment that can inform their own content knowledge and pedagogy.

Rationale for Paul and Elder Framework

As a research group, we selected Paul and Elder's (2001) framework because it aligned with our views regarding critical thinking in education. Within their framework, they advocate reasoning, intellectual standards and intellectual traits. Neuroeducation is a new field that combines mind, brain and education research (Sparks, 2012). Research from these fields has practical application for social studies classroom instruction (Miller, 2010). By examining nature-nurture; by learning development, multiple codes, and modifications; by studying alternative paths to learning; and by offering alternative connections to the brain, we will allow students a better foundation for learning.

Selecting Paul and Elder's (2009) framework supported the original goal of this project, which was to deepen history teacher candidates' critical thinking skills—and those of their students—as a means of engendering intellectual curiosity in a globalized society. The project goals were met through the development of primary sources and curriculum activities for history teacher candidates to be delivered in the pre-service classroom prior to field placement. Primary sources are the raw materials of history—original documents and objects that were created at the time under study. They are different from secondary sources, accounts or interpretations of events created by someone without firsthand experience. Sam Wineberg (2001) defines primary sources as a portion of the past. Sources are often incomplete and provide little context; therefore, students must use prior knowledge and work with multiple primary sources to find patterns that matched the template established by Paul and Elder (2009). In analyzing primary sources, students move from concrete observations and facts to questioning and making inferences about the materials. Questions of creator bias, purpose, and point of view challenge students' assumptions.

In our study, the following outcome objectives were addressed:

1. How do pre-service teachers respond to the outsourced Insight Assessment organization?
2. How do pre-service social studies teachers in field placements rate their critical thinking skills (using a scale of *poor* to *excellent*) after participating in project activities using primary sources?
3. How successfully do the targeted pre-service teachers incorporate social studies units designed to improve students' critical thinking skills in their field placement classrooms, as measured by the graders?

Methods

Participants

Target Audience: We implemented the project with n=14 elementary grades social studies teacher candidates enrolled at in a large public university system in the southern United States who will be teaching elementary social studies (kindergarten to 5th grade level). Although the number of participants is small, triangulation of multiple data sources enhanced the trustworthiness of the analysis. For the currently enrolled pre-service teachers, the critical thinking activities employing primary sources were incorporated into required methods coursework (Early Childhood Social Studies Education II), which was taught by the project director.

Work Plan

The first task was to make primary and secondary sources accessible to the pre-service teachers. The kinds of primary sources—which provide authentic materials for students to practice the skills required by the Common Core State Standards, College, Career, and Civic Life (C3) Framework for Social Studies State Standards, and Georgia Milestone testing—that were assembled, included: photographs, newspapers, films, audio files, government documents, personal correspondence and economic data. The Library of Congress provided sources and materials. Assembled materials were posted to a project website that included guidance regarding their usage. The web page, Teaching Primary Sources (Augusta University, n.d.), was used by the targeted pre-service teachers and is maintained as an open source for other pre- and in-service teachers who wish to strengthen their critical thinking skills and/or develop activities intended to build their students' critical thinking skills. Methods included mock trials, propaganda posters, graphs, museums and charts.

The second major activity was the development of the critical thinking classroom activities. The curriculum focused on showing teacher candidates how to evaluate patterns, chronology, sequencing (including cause and effect), and the identification of historical periods that were influenced by frames of reference. Within Carr's (1991) framework, the critical thinker has to process the presence of the evidence and consider an endless possibility of meanings among texts or artifacts that are different from their everyday lives. We guided our future teachers accordingly:

This thinking recognizes changes in the features and patterns on the face of experience; it uses the familiar to examine the unknown. As information expands, perspectives change. Reflections may reframe the memories and assumptions of an entire life, or they may resolve unclarity, attuning dissonances and easing constraints in an evolving life (Carr, 1991, p. 10).

These mechanisms (primary and secondary sources) are valuable tools of communication from previous cultures to our modern culture.

This approach is further supported by Langer (1989) who presented his thoughts on the mindlessness of traditional education: "The individual becomes mindlessly trapped by categories that were previously created when in a mindful mode. This entrapment limits people both physiologically and behaviorally" (p. 139). Langer, then, encourages a free environment for intellectual interaction and a repudiation of

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traditional methods of learning. Doyle and Zakrajsek (2013) advocate for learning-center teaching (LCT), teaching which espouses that your learning is actively engaging with content. This modern neuroscience argument contradicts traditional social studies techniques. Instead of using a collective history approach, as Rochester (2003) proposes, based on neurological data, a history as mystery approach is better supported by modern science, asking the learner to consider context, perspective and significance of events (Zarnowski, 2003).

The third major project task was the implementation of the assigned teaching activities which incorporated primary and secondary sources to develop critical thinking skills. In the spring of 2014, pre-service teachers received in-class training during methods courses and used online assemblages of source materials. The teacher candidates completed a pre-survey regarding their views on critical thinking. The teacher candidates were given one critical thinking unit based on social studies activities to prepare lessons for their spring 2014 student- teaching placements. Their assignments included analysis of documents from key historical figures concerning historic events. For example, one teacher candidate examined George Washington's actions at Valley Forge which can be viewed through multiple lenses. The pre-service teachers submitted their lesson plans late in the spring 2014 semester, along with their field notes on a lesson, the list of documents used, and a description of critical thinking activities and guides developed for review prior to implementation during field placement. Thus, project participants taught their students using the same materials and guided approaches. All of these approaches were built to support the objectives of the Common Core State Standards and the C3 Framework. At the completion of the study, the pre-service teachers completed a post survey.

Procedure

The teacher candidates completed the California Critical Thinking Skills (CCTST) and Dispositions (CCSDT) tests after their field placements. All materials, including lesson plans (three-day teaching units), learning activities, assessments (formative) and discrete lesson reflections, were examined. The dispositions' component signifies an individual's desire to engage in certain activities. For our purposes, we asked if the pre-service teachers were predisposed toward critical thinking which includes being motivated to think beyond rote responses.

Four research members evaluated the data and offered conclusions. All aspects were examined from the (n=14) teacher candidates. They included: in-class training during methods courses, workshops and online materials from the Library of Congress. The researchers evaluated the teacher candidates' views of their critical thinking skills using a Likert scale from 1 to 5. In addition, the research team examined how the teacher candidates used the resources in class and evaluated best methods of usage. If we found there were concerns about the specified materials, we examined them to see if they had been correctly presented to the teacher candidates in addition to considering whether or not the teacher candidates possessed the necessary skills to implement them. The research staff used a modified version of Paul and Elder's (2009) rubric to measure the teacher candidates' critical thinking skills by examining lesson plans and journals to find common areas of success and areas of concerns. If we found that the activities were flawed, we reexamined them and reviewed them later. Only the activities that were deemed successful by a vast majority of teacher candidates and the research staff were included in the final online version of the critical thinking exercises.

The teacher candidates were provided a post survey regarding their perceptions of their critical thinking skills and dispositions. Instructing teacher candidates how to evaluate patterns, chronology, sequencing (including cause and effect) and the identification of historical periods are influenced by frames of reference. The researchers used the rubrics established by Paul and Elder (2009) to assess the teacher candidates' understanding. Paul and Elder's (2009) rubric was based on eight areas of cognitive functions: purpose, question at issue or central problem, point of view, information, concept and ideas, assumptions, implications and consequences, inference and interpretation. Each section had five questions relating to each critical thinking domain. All materials related to the lesson were examined: teacher candidates' lesson plans, assessments (formative) and individual lesson (reflections).

Data Analysis

The purpose of this study was to advance understanding of pre-service teachers' ability to think critically. This section discusses the analysis of the data collected from subjects. Participants were identified by pseudonyms assigned by the research team; only participants who responded to all survey questions and completed the consent forms were included in the study. Fourteen pre-service teachers responded to all survey questions throughout the 4-week data-collection period. The pseudonyms we selected were Students "A-N." Applying what Corbin, and Strauss (2008) refer to as "theoretical sampling," (p. 12) we chose to review the reflections of the pre-service teachers (n=14). Although the numbers of participants were small, triangulation of multiple data sources enhanced the trustworthiness of the analysis. Written assignments and questionnaire responses were read and coded by the researchers. We participated in a process of individual, open coding. Next, the researchers compared codes to develop categories or themes (Corbin et al., 2008), discussed in the next section.

Results of Dispositions and Skills

Our goal was to answer the first research question: (1) How do pre-service teachers respond to a rating system—poor, fair, good, excellent critical thinking skills—to compare surveys of the teacher candidates with the researchers and the outsourced Insight Assessment organization? As noted previously, one of the purposes of this study was to determine if the students, after their field placements, had the skills (as measured by the CCTST) and the dispositions for critical thinking (as measured by the California Critical Thinking Disposition inventory CCTDI). The mean scores for each inventory can be found in Table 1. (See Appendices)

According to the literature on the instruments, there should be a strong relationship between the candidates' dispositions for critical thinking and their critical thinking skills. However, for this small sample, there was no clear relationship (Table 1).

Because of the lack of correlation between the instruments, we decided that an internal look at each instrument would provide useful information about student dispositions and skills, respectively.

California Critical Thinking Disposition Inventory (CCTDI)

Using a correlation analysis, the CCTDI was analyzed to see where the strongest relationships were within the instrument. The results can be found in Table 2. (See Appendices)

As can be seen from this correlation table, there are many strong correlations within this instrument. However, there were quite a few items in the survey that did not seem to fit the overall purpose. For instance, Truth Seeking did not correlate highly with many of the other items. Confidence in Reasoning did not correlate highly either.

California Critical Thinking Skills Test (CCTST)

Much like the CCTDI, the California Critical Thinking Skills Test had strong internal validity. However, a few items, like the skills Explanation and Evaluation, did not correlate highly with the other items in the instrument (Table 2). (See Appendices)

Because of the relatively strong internal structure of both instruments with some anomalous results, the researchers determined that a factor analysis be run to create aggregated factors that would indicate the variables' relationship to each other.

Factor Analysis

The items from the CCTST and the CCTDI were put through a principal components analysis (PCA) using SPSS 21. Prior to the factor analysis, the data were analyzed to determine the factorability. Using a correlation matrix for each inventory, it was determined that there were numerous items with correlations above .3, with the majority above .6.

Because of the small sample size, the sample was artificially manipulated to create a larger group to produce both the Kaiser-Meyer-Olkin (KMO) and Bartlett's Test for Sphericity (see Table 3 in Appendices). The size of the sample was tripled only for the purposes of this analysis. The KMO was .62, slightly exceeding the recommended value of .6 (Reavley and Pallant, 2009, citing Kaiser, 1970, 1974) and Bartlett's Test of Sphericity was significant at the .00 level supporting the idea of being factorable.

The PCA revealed the presence of four components: two for each instrument (see Table 3). The eigenvalues exceeding 1 explained 38%, 23%, 14% and 10% (cumulative 86%) of the variance.

The Pattern Matrix reveals the composition of the four factors. These factors will be discussed later. For the purposes of this analysis, the factors will be presented out of order to pair the factors from each instrument together, thus offering a clearer delineation of each factor. The first two factors listed are both found in the Skills Instrument while the second two are from the Dispositions Instrument.

1. Factor 1 (Investigation Skills)—is composed on Analysis, Interpretation, Inference, Induction and Deduction.
2. Factor 4 (Court Room Skills)—is composed of Evaluation and Explanation.
3. Factor 2 (Open mindedness)—is composed of the dispositions of truth seeking, open mindedness, systematicity and maturity of judgment.
4. Factor 3 (Drawing conclusions)—is composed of inquisitiveness, analyticity and confidence in reasoning.

How do pre-service social studies teachers in field placements view their critical thinking skills of at least one level on a scale of *poor* to *excellent* after participating in project activities using primary sources? Data were gathered using a 5 point Likert scale survey with 1 indicating a *strongly disagree* measure and

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a 5 indicating a *strongly agree* measure. As such, the stronger the mean score for each item on the survey, the more perceptual confidence can be construed from the results. Furthermore, standard deviation scores were computed for each item to check for the tightness of scores. Given these parameters, when looking at the totality of the teacher candidate post survey results, the data suggest the subjects are confident in their ability to plan and implement a lesson that integrates meaningful critical thinking skills. This is especially true when subjects were asked about the foundation on which they created their lesson. The results show that the pre-service teachers believe the lesson, as it was planned and implemented, was relevant and responsive to the needs of the learners they taught (See results from Q1–10). They reported that their unit questions were sufficiently clear, their daily lessons followed a logical sequence, and the organization of the unit was properly scaffolded (Q7 and 8).

It is also clear that subjects were aware of how their own perceptions, values and biases influenced the lesson as it was built. This is supported by the survey results in Q11–25. In each of these items, the teachers indicated they were strongly aware of and could articulate the perspective they had approached as the themes and direction of the unit (Q11 M=4.14; Q13 M=3.93). They also reported that they purposely tried to build and present information from multiple points of view in a fair and honest manner (Q12, Q14, Q15, Q20 & Q23). What was interesting to note is that while the scores suggested they believed they constructed a balanced unit, there was more dissention in the scores as supported by a larger score in both Q14 and Q15. The claims made as part of the designed learning experiences were clearly stated (Q22) and strongly supported by evidence (Q16) which denotes a high level of confidence in the results. When examining how the subjects reported on their metacognitive process while building the lesson, the results strongly suggest they made an effort to be deliberate about their planning and practice. The results in Q26–40 led the researcher to infer that respondents understood how their thinking informed their unit design and were aware of some of the conceptual conflicts that could occur as a result of their assumptions. They were cognizant of the pitfalls of their lessons and some of the possible controversies that could arise. In the end, however, they reported their methods and assumptions were justified (Q29) and that the learning outcomes could be different if their own assumptions were changed (Q40).

All of the data indicated that the subjects thought about how they influenced their designed learning experiences and that in spite of their own biases and personal experiences, they believed they could build a unit for students that was focused on important issues presented in a fair and relevant manner. It supports the notion that this sample population of pre-service teachers was able to use their metacognitive processes to think critically about their own practice. Further, they evaluated their pedagogy and lesson plan designs allowing for their students to build upon the principles of democracy.

We approached the third research question using qualitative analysis, “How do pre-service teachers who completed the methods course successfully incorporate social studies units designed to improve students’ critical thinking skills in their field placement classrooms, as measured by the graders?” The researchers examined the pre-service teachers’ collective works, including the lesson plan design, journal reflections and assessments.

Results from Qualitative Findings

Finding 1: Highlighting the Importance of Complex Issues (Race and Gender)

Many of the candidates demonstrated an increased ability to design higher-order questions for their lessons. For example, Student A referred to her first lesson question as short sighted. By her third lesson, she had developed a more complex question for her students. Her critical thinking unit was focused on Abraham Lincoln's stance on slavery. Her first question was, "What events started the Civil War?" Her last lesson's question was, "What was Abraham Lincoln's personal view of slavery?" This candidate, along with other candidates, had articulated concerns about the topic of slavery since her classroom was largely African American. She said she felt awkward every time she discussed it. By having the students answer questions and investigate primary sources, the lesson allowed the students to examine documents from Lincoln at three distinct stages of his political career. She was confident in her ability to communicate the events for her 5th grade class. She was surprised by the students' positive reaction. She recounted how the students wanted to read each other's primary source documents. She stated, "I thought the lesson would be beyond my students, but their reaction surpassed my expectations." Other pre-service teachers (n=9) demonstrated concerns about addressing controversial issues. However, they did mention in their reflections that they believe they now have a better skill set and subsequently introduce controversial issues in their lesson plans. For example, issues of race were discussed with students, while the teacher candidate acted as moderator. Student G implemented the same lesson in a predominantly African American 5th grade classroom, but utilized a different approach. She decided to characterize slavery as a forgotten institution that had no impact on the present. After the lesson, the teacher candidate was asked to defend her statement, but relented when faced with the professor's list of current examples. She explained that her approach was to spare the students' feelings since she knows that race is a touchy subject. She thought that by presenting race as insignificant, the students would not be uncomfortable. Within Epstein's (2009) approach, controversial issues in a classroom should not be avoided. Based on Epstein's view, teaching history as one united theme is less combative for teachers. Teaching that others were oppressed during America's rise to prominence, could be viewed as divisive by some students. These teachers may try to actively avoid angry parents and administrators. Teachers may not be informed enough to discuss controversial matters in a meaningful way. According to Beineke (2011), we are a divided nation. Teachers need to use sensitivity, knowledge and wisdom when they approach controversial issues. For the classroom teacher, this approach should be well thought out and implemented in a way that is fair and honest. Exploring controversial issues should not incite students, but rather serve as a platform for critical exploration and meaningful dialogue.

Finding 2: Building Strategy for Instructional Activities

Not all of the responses from our sample were positive. Student D, who had low CCTDI skill scores, reported that her experience was not beneficial. For this study, all pre-service teachers were required to develop a high-level ability question for assessment purposes. After numerous submissions, her lessons were returned because all the questions were low level. For example, while discussing Jim Crow laws, she asked the students if they thought Jim Crow was a good or bad decision; she then had the students debate the question. All of her students said it was bad during the two-minute discussion. After discussing why this was a poorly designed question, the pre-service teacher stated that she thought it was effective. After the professor provided examples of higher-order questions, the student remained

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unconcerned about her inquiry skills. In her reflections, she referred to her questioning skills as “advanced.”

Student M, who posted a high CCTDI skills score, recounted that her skills were low, however, her lesson plans and activities suggested that her skills were advanced. A theoretical reasoning for this might be that she is an advanced critical thinker, thus allowing her to be more discerning about her abilities. Student D, who spoke very highly of her skills (but her scores suggested otherwise) was not utilizing high critical thinking skills. While examining lesson plans and reflections from Student M, she recounted several incisive views about her teaching including how to improve her questions, lesson design, and assessments. Her reflective piece was eight pages, whereas Student D only wrote three pages. This is not to suggest that by writing more she is a more in-depth thinker; however, she did give evidence for her rationale and decisions, while Student D provided little thought about her lessons and held her work in higher regard. Within in the CCTDI disposition score, Student D had the highest score. Her skills and dispositions were not correlated based on the CCTDI and the researcher’s grading.

Finding 3: Combining Theoretical and Experiential Knowledge to Better Understand Assessment Concerns

A perception held by the teacher candidates within the reflections (n=11) was the pre-service teachers’ view that high-level questioning interfered with pre-packaged questions provided by textbook companies. Student I recounted, “You can understand how frustrating it might be when I see all these questions in the textbook and you tell us we can’t use them.” Pre-service teacher G stated, “I liked some of the questions that were in my textbook. I actually submitted a few to you and you rejected all of them.” Student E offered the critique, “Why is it so hard to come up with good questions?” After numerous discussions about poorly formed questions found in textbooks, we consulted other testing systems for accurate measures (portfolios, stealth testing and informal measures), the purpose of assessment, in addition to exploring our own experiences with assessments. After reading through the reflections, it was clear that the teacher candidates weigh the need to develop sustainable questions for students with the time constraints they will face as teachers.

Based on the graders’ findings, most teacher candidates (n=10) learned and understood the principles of critical thinking, problem solving, knowledge acquisition and reflective thinking through assigned readings and discussion. They understand how inference, evaluation, metacognition, interest and motivation influence problem solving. Finally, they learned how cognitive principles influence a teacher candidate’s critical and reflective thinking when acquiring knowledge for social studies instruction and classroom activities.

Conclusions

In teacher-preparation programs, it is not uncommon to focus on the format of each lesson plan, instead of the learning outcomes that lesson plans provide for students. Consequently, the reflections become mechanical and isolated from the lesson. From this study, we concluded that teacher candidates should be taught to reflect on all the class activities that result in learning outcomes. Social studies teacher candidates need to be taught to incorporate critical thinking activities in their lesson plans. They need models of social studies lesson plans that utilize critical thinking activities and discussions. Finally, teacher candidates need to be taught strategies to anticipate student conflicts in class discussions about

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race and social class. Connecting historical events to contemporary culture is part of the critical thinking component that teacher candidates (and their supervisors) frequently avoid.

Further research is needed to determine how to encourage teacher candidates to implement critical thinking activities into their lesson plans. Teacher educators must convince teacher candidates that critical thinking skills do not interfere with test preparation; on the contrary, they help students to become more actively engaged in the learning process.

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APPENDICES

Table 1: Descriptive Statistics for Overall Scores, CCTDI and CCTST Correlations

	N	Mean	Std. Deviation
CCTDIOverall	15	291.8667	30.92125
CCTSTOverall	13	66.8462	6.02559
Valid N (listwise)	13		

		CCTDIOverall	Overall
CCTDIOverall	Cor.	1	-.202
	Sig.		.508
	N	15	13
Overall	Cor.	-.202	1
	Sig.	.508	
	N	13	13

Table 2: CCTDI Correlations and CCTST Correlations

		CCTDI Overall	TruthSeeking	OpenMindedness	Inquisitiveness	Analyticity	Systematicity	ConfidenceReasoning	MaturityofJudgement
CCTDIOverall	Cor.	1	.558*	.870**	.801**	.667**	.840**	.639*	.759**
	Sig.		.031	.000	.000	.007	.000	.010	.001
	N	15	15	15	15	15	15	15	15
TruthSeeking	Cor.	.558*	1	.597*	.117	-.100	.754**	-.144	.611*
	Sig.	.031		.019	.677	.722	.001	.610	.015
	N	15	15	15	15	15	15	15	15
OpenMindedness	Cor.	.870**	.597*	1	.531*	.484	.801**	.423	.629*
	Sig.	.000	.019		.042	.067	.000	.116	.012
	N	15	15	15	15	15	15	15	15
Inquisitiveness	Cor.	.801**	.117	.531*	1	.691**	.542*	.778**	.479
	Sig.	.000	.677	.042		.004	.037	.001	.071
	N	15	15	15	15	15	15	15	15
Analyticity	Cor.	.667**	-.100	.484	.691**	1	.221	.843**	.295
	Sig.	.007	.722	.067	.004		.428	.000	.286
	N	15	15	15	15	15	15	15	15
Systematicity	Cor.	.840**	.754**	.801**	.542*	.221	1	.274	.732**
	Sig.	.000	.001	.000	.037	.428		.323	.002
	N	15	15	15	15	15	15	15	15

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Confidence Reasoning	Cor.	.639*	-.144	.423	.778**	.843**	.274	1	.129
	Sig	.010	.610	.116	.001	.000	.323		.647
	N	15	15	15	15	15	15	15	15
Maturity of Judgment	Cor.	.759**	.611*	.629*	.479	.295	.732**	.129	1
	Sig	.001	.015	.012	.071	.286	.002	.647	
	N	15	15	15	15	15	15	15	15

*. Correlation is significant at the 0.05 level (2-tailed).

** . Correlation is significant at the 0.01 level (2-tailed).

		CCTSTO verall	Prece ntile	Analys is	Interpre tation	Infe rence	Evaluati on	Explanat ion	Inducti on	Deducti on
CCTSTO verall	Cor	1	.906**	.806**	.758**	.965**	.618*	.468	.957**	.915**
	Sig		.000	.001	.003	.000	.024	.107	.000	.000
	N	13	13	13	13	13	13	13	13	13
Prece ntile	Cor	.906**	1	.718**	.568*	.904**	.556*	.454	.872**	.784**
	Sig	.000		.006	.043	.000	.049	.119	.000	.002
	N	13	13	13	13	13	13	13	13	13
Analys is	Cor	.806**	.718**	1	.568*	.818**	.203	.007	.715**	.845**
	Sig	.001	.006		.043	.001	.505	.983	.006	.000
	N	13	13	13	13	13	13	13	13	13
Interpre tation	Cor	.758**	.568*	.568*	1	.757**	.249	.264	.702**	.738**
	Sig	.003	.043	.043		.003	.412	.383	.007	.004
	N	13	13	13	13	13	13	13	13	13
Infe rence	Cor	.965**	.904**	.818**	.757**	1	.507	.345	.934**	.869**
	Sig	.000	.000	.001	.003		.077	.249	.000	.000
	N	13	13	13	13	13	13	13	13	13
Evaluati on	Cor	.618*	.556*	.203	.249	.507	1	.901**	.640*	.471
	Sig	.024	.049	.505	.412	.077		.000	.018	.104
	N	13	13	13	13	13	13	13	13	13
Explanat ion	Cor	.468	.454	.007	.264	.345	.901**	1	.479	.342
	Sig	.107	.119	.983	.383	.249	.000		.098	.252
	N	13	13	13	13	13	13	13	13	13
Inducti on	Cor	.957**	.872**	.715**	.702**	.934**	.640*	.479	1	.763**
	Sig	.000	.000	.006	.007	.000	.018	.098		.002
	N	13	13	13	13	13	13	13	13	13
Deducti on	Cor	.915**	.784**	.845**	.738**	.869**	.471	.342	.763**	1
	Sig	.000	.002	.000	.004	.000	.104	.252	.002	
	N	13	13	13	13	13	13	13	13	13

** . Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

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Table 3: KMO and Bartlett's Test and Pattern Matrix^a

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.620
Bartlett's Test of Sphericity	Approx. Chi-Square	649.695
	df	105
	Sig.	.000

	Component			
	1	2	3	4
TruthSeeking		.953		
OpenMindedness		.819		
Inquisitiveness			.772	
Analyticity			.923	
Systematicity		.925		
ConfidenceReasoning			.969	
MaturityofJudgement		.810		
Precentile	.818			
Analysis	.976			
Interpretation	.805			
Inference	.944			
Evaluation				.921
Explanation				.980
Induction	.807			
Deduction	.905			

Extraction Method: Principal Component Analysis.

Rotation Method: Oblimin with Kaiser Normalization.

a. Rotation converged in 5 iterations.