An Instructional Model to Support Problem-Based Historical Inquiry: The Persistent Issues in History Network

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An Instructional Model to Support Problem-Based Historical Inquiry: The Persistent Issues in History Network

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For over a decade, we have collaborated with secondary school history teachers in an evolving line of inquiry that applies research-based propositions to the design and testing of a problem-based learning framework and a set of wise practices that represent a professional teaching knowledge base for implementing a particular model of instruction, problem-based historical inquiry (PBHI). PBHI centers history instruction on decision-making about persistent societal problems as they occur in particular historical periods. In order to prepare future teachers to be better able to implement this model in their classrooms, we have integrated components of this model throughout our secondary social studies teacher education program and incorporated a suite of digital tools and resources to facilitate modeling and implementation of PBHI strategies.

In an attempt to evaluate the effectiveness of the implementation of our model with pre-service teachers, a scenario-based survey was administered to 120 pre-service social studies teachers to examine their knowledge regarding problem-based historical inquiry (PBHI) teaching strategies. Results of data analysis suggest that pre-service teachers were able to recognize and incorporate core components of the PBHI curricular framework into the scenario-based activity more effectively on the post-survey than on the initial survey. In addition, participants were able to better articulate their reasoning for their instructional choices on the post-survey, and their reasoning tended to align with the core components of PBHI. Implications for the use of scenario-based instruments to measure knowledge of curricular innovations are also discussed.

Keywords: history, scenario survey, technology, teacher education

Introduction

Problem-based learning (PBL) represents an innovative instructional strategy that is receiving increasing attention in K–12 educational settings (Means, Padilla, DeBarger, & Bakia, 2009; Patrick, 2008). PBL provides learners with authentic ill-structured problems without a clear solution path. Using this student-centered approach, the teacher guides students through the problem-solving process (Barrows, 2002). There is a growing body of research that suggests PBL to be more effective than traditional instruction in increased student achievement (Hmelo-Silver, 2004; Ravitz, 2009; Strobel & van Barneveld, 2009; Walker & Leary, 2009; Wirkala & Kuhn, 2011). For example, in a recent study examining the effectiveness of PBL with middle school students, Wirkala and Kuhn (2011) found that students performed significantly better on a multitude of outcome measures when they engaged in PBL instruction versus lecture-based instruction. Similarly, Strobel and van Barneveld (2009) found that "PBL

was superior when it comes to long-term retention, skill development and satisfaction of students and teachers, while traditional approaches were more effective for short-term retention as measured by standardized board exams" (p. 44).

Based on the demonstrated effectiveness of PBL, more K–12 schools are integrating technology-supported PBL into their curriculum, including whole-school integration such as the "New Tech High" model currently in place in numerous high schools across the country. In most secondary history classrooms, however, problem-based curriculum reform has not been widely accepted and adopted by teachers (Onosko, 1991; Saye & SSIRC, 2013; Shaver, 1996; Shaver, Davis, & Helburn, 1979; Zukas, 2000). This is despite the fact that social educators have advocated that history instruction move away from the goal of mere retention of historical information.

In order to increase the integration of problem-based inquiry into classroom practice, we have collaborated on an evolving line of inquiry that applies propositions emerging from this research literature to the design and testing of a

problem-based learning framework—known as the *Persistent Issues in History Network* (http://pihnet.org)—that includes a set of digital resources and video-based wise practice cases that represent a professional teaching knowledge base for implementing a particular model of instruction, problem-based historical inquiry (PBHI). PBHI focuses instructional activities on the examination of persistent societal problems in a particular historical context (Callahan, Saye, & Brush, 2009–2010; Saye & Brush, 2004).

The PBHI curricular design we have adopted incorporates specific research-based practices and components that are necessary for successful implementation of PBHI units and activities (see Figure 1). These include authenticity of experience, incorporation of multiple intelligences, effective collaboration, and scaffolded supports throughout the experience (Saye & Brush, 2004).

Researchers suggest that the authenticity of the learning experience can have a major positive influence on student engagement (Land, 2000; Newmann, Wehlage, & Lamborn, 1992; VanSickle, 1991). Research also suggests that students may fail to become engaged when placed in circumstances that do not provide them with reasonable opportunities to be successful (Doyle, 1983). Often, school-based tasks are viewed by learners as utilizing skills and knowledge that are not needed in the "real world." In addition, school-based tasks tend to reward only those learners who can demonstrate their knowledge either linguistically or logically. Gardner's

(1999) theory of multiple intelligences proposes that learners should be provided with opportunities to demonstrate their knowledge in alternative ways (other than linguistically or logically). Thus, learners need to be provided with a variety of authentic assessments that require collaborative effort and call for a wide array of student abilities in order to produce a successful final product.

In addition, researchers believe that implementing collaborative tasks in classrooms encourage broader engagement, healthier classroom environments, and may help students succeed in developing richer and more complex models of reality than they might do individually (Cohen & Benton, 1988). Thus, learners need to be engaged in collaborative tasks that promote authenticity. These types of authentic collaborative tasks may involve role-playing activities in which students assume the perspectives of historical figures, analyzing and utilizing primary-source documents to support an historical perspective, and using those sources as evidence to defend a position regarding a controversial historic event.

Finally, our PBHI model integrates additional aids, or *scaffolds*, to assist students and teachers engaged in PBHI (Brush & Saye, 2002; Saye & Brush, 2002). Scaffolds are tools, strategies, and guides which support students in attaining a higher level of understanding; one which would be impossible if students worked on their own (Hannafin, Land, & Oliver, 1999). In our curriculum development efforts, we have conceptualized two forms of support: hard and soft scaffolds

Figure 1. Overview of PBHI model.
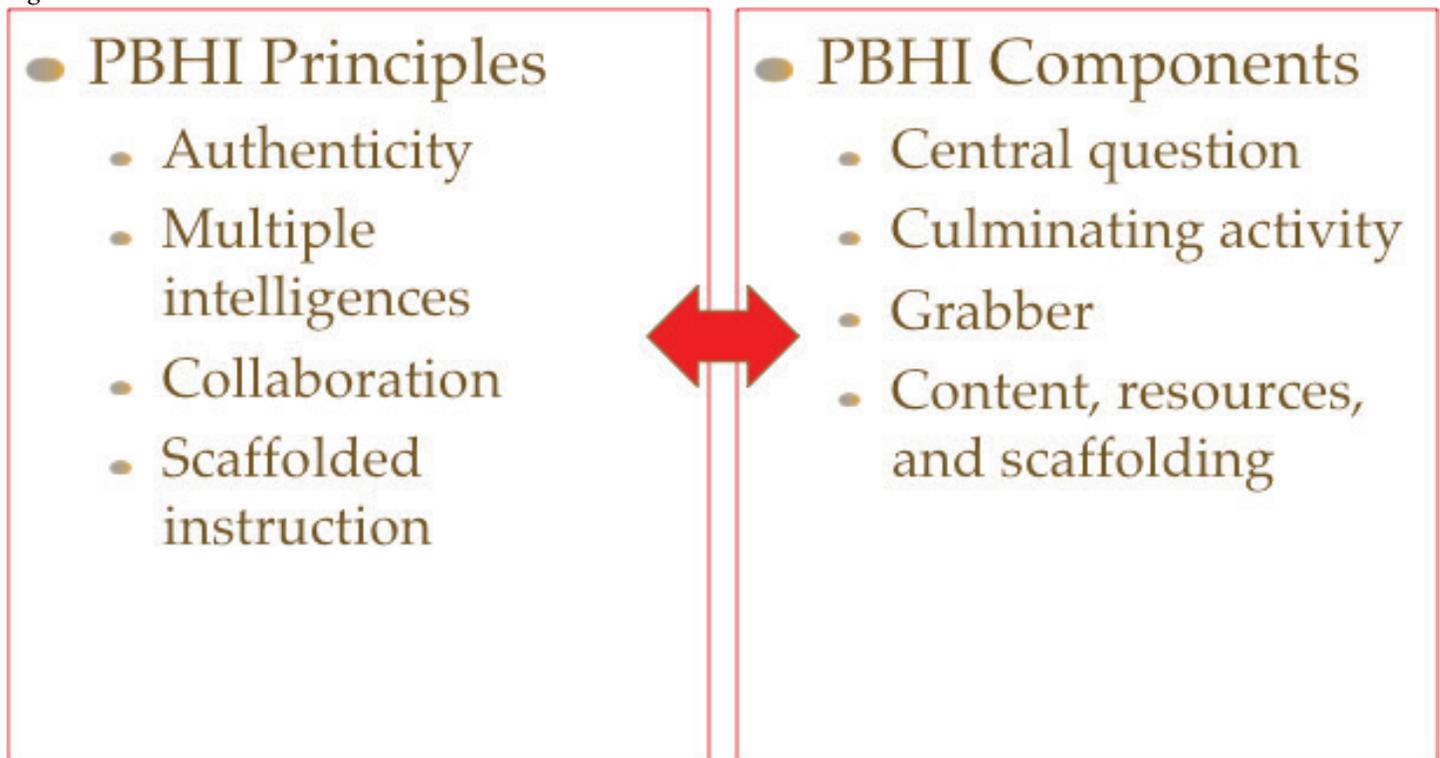
(Brush & Saye, 2002; Saye & Brush, 2002). Hard scaffolds are static supports that can be anticipated and planned in advance based upon typical student difficulties with a task. Soft scaffolds are dynamic, situation-specific aid provided by a teacher or peer to help with the learning process.

Integrating PBHI into Pre-Service Teacher Education

One major barrier to effective implementation of PBHI in secondary social studies classrooms is the lack of integration of PBHI teaching strategies into secondary social studies teacher education programs. This lack of integration exacerbates the issue of having teachers even prepared to implement PBHI curriculum into their future classrooms (Brush & Saye, 2009). This is not an issue exclusive to pre-service social studies programs. In fact, most teacher education programs still approach pre-service classrooms with conventional practices (Feiman-Nemser, 2008; Kiggins & Combourne, 2007), and few pre-service teachers have clear conceptions of designing and implementing PBL instruction (So & Kim, 2009). However, more teacher education programs are beginning to recognize the potential for PBL and the need for support in order to integrate PBL into their programs (Edwards & Hammer, 2006; Murray-Harvey & Slee, 2000).

The Auburn University social studies teacher education program emphasizes the development of civic competence as the central purpose for teaching social studies. Although the social studies include numerous social science disciplines, history courses dominate most states' 6–12th grade curricula (Dye & Huffman, 2003). In Alabama, history courses make up 71% of the 6–12 curriculum. Although our program addresses the other disciplines, we focus our teacher preparation on a civic-oriented approach to teaching history: problem-based historical inquiry.

Over the course of four consecutive semesters, students in the Auburn program work in methods classes and in lengthy field experiences in PBHI-based classrooms to explore, test, and reflect on PBHI principles. Our expectation is that this set of carefully sequenced professional experiences will develop in teacher candidates a nuanced understanding of the professional teaching knowledge upon which the program is based.

Our principles for planning and implementing PBHI instruction focus on engaging learners with rich historical content framed around inquiry into essential societal issues. To establish relevance, we build instruction around persisting ethical questions that apply to contemporary society, for instance, "When are citizens justified in resisting governmental authority?" In studying a particular topic in the curriculum, the American Civil War, for instance, that broad persisting question might made more specific: "Was the South justified in seceding from the Union?" Once a framing question is established, we encourage pre-service teachers to support disciplined inquiry and ethical reasoning by providing multiple ways of encountering content and actively supporting

Figure 2. PIHNet online PBHI unit scaffold.

student thinking. As pre-service teachers progress through the four-semester course sequence, they address essential questions about social studies and the preparation of democratic citizens. In each course, students engage in extended field experiences in PBHI-based classrooms and utilize an array of web-based planning guides, digital curriculum materials, tools to facilitate PBL curriculum design and implementation, and wise practice models available via our project website (http://pihnet.org) that reflect the program's core principles (Brush & Saye, 2009). For example, students use digital unit construction scaffolds to conceptualize and design their PBL units. These scaffolds incorporate key components of our PBHI model in order to facilitate students' inclusion of those components into the units they design in their courses (see Figure 2).

Assessing Pre-Service Teachers' Knowledge of PBHI

Assisting pre-service teachers with conceptualizing PBHI strategies and implementing those strategies in classrooms poses numerous challenges to teacher educators. Designing PBHI activities requires teachers to think differently about introductory unit activities, culminating student assessments, and classroom activities that engage learners and provide them with the foundational knowledge necessary to successfully complete the assessment activities (Saye & Brush, 2004). For pre-service teachers, there are potentially multiple aspects of the PBHI curricular design that are difficult for them to grasp. To this point, though, we have had little data to assist us with determining the knowledge level of pre-service teachers regarding PBHI, and no measurement devices for acquiring those data. In addition, we currently lack the tools to determine the effectiveness of curricular practices within our pre-service teacher education programs designed to provide future teachers with skills and experiences that will assist them in conceptualizing PBHI teaching practices, and potentially implement those practices in their future classrooms.

By developing an instrument that attempts to measure knowledge of PBHI curricular practices, we may be better able to customize the activities we implement in our teaching methods courses, while at the same time providing an assessment tool that other researchers may be able to use to determine the effectiveness of PBHI curricular interventions in a variety of history and social studies contexts. But developing an instrument to measure an individual's knowledge of problem-based inquiry is more difficult than developing more standard instruments such as attitudinal surveys or observation forms. For measuring this type of knowledge,

researchers have recommended assessments that provide content-specific scenarios and ask participants to complete a task based on the scenario. This form of assessment has been successfully implemented in fields such as science (Cooper, Shepardson, & Harber, 2002), business (Callanan & Perri, 2006), ethics (Snow & Bloom, 1996), and even computer security procedures (Barrett, Garrety, & Seberry, 2006). However, the use of scenario-based instruments to measure learners' knowledge of problem-based inquiry strategies (particularly in social studies) appears to be limited.

Purpose of Study

The purpose of this study was to utilize data obtained from implementation of a scenario-based assessment instrument to assess the degree to which pre-service teachers integrated PBHI principles into their pedagogical thinking. The instrument was designed to measure specific PBHI strategies emphasized in the Auburn University secondary social studies teacher education program. Pre-service teachers completed the survey instrument at the beginning of their teacher education program, and again at the end of their student teaching experience.

Specifically, this paper will present an overview of the scenario-based instrument, findings from implementation of the instrument with multiple cohorts of pre-service teachers, and a discussion of participant responses from their initial completion of the survey to their final completion of the survey prior to the end of their program. Finally, implications of these results for preparing pre-service teachers to integrate problem-based inquiry strategies in their teaching will be discussed.

Method

Participants and Setting

Participants included 120 students completing the secondary social studies teacher education program at Auburn University. Fifty-three percent of participants were female, and all but five participants were 25 years of age or younger. In terms of ethnicity, 92% of the participants classified themselves as "white (other than latino)," with 4% indicating that they were African-American. All participants stated that they used a computer every day.

Participants were enrolled in Auburn's two-year residential teacher education program, which (in addition to 45 hours of pre-requisite social studies content courses) included 11 hours of teaching methods/practicum courses, and 12 hours of student teaching. All participants completed the program between 2008 and 2012.

Design and Data Sources

The design of this study can generally be considered a cohort survey research design, in which the same participants complete a survey instrument on multiple occasions in order to determine differences in responses to various items over the course of an intervention (Fowler, 2002). Participants were asked to complete the survey instrument at the beginning of their teacher education program (their initial activity in the program), and to complete the same survey at the completion of their culminating student teaching experience. The data source for this study included participants' responses to the survey items on those two occasions.

Survey Instrument

The instrument itself had two sections. The first section (containing 11 items) asked participants to provide background information including age, gender, ethnicity, academic progress, and computer experience.

The second section of the survey included questions based on the scenario of teaching a 10th grade U.S. History class focusing on the Reconstruction period following the U.S. Civil War. Respondents were asked to make instructional decisions in three areas common in planning units of instruction: *Identifying Learning Objectives, Introducing the Unit,* and *Assessing Student Learning Outcomes*. The various options available on the survey were included based on both traditional classroom practices and classroom practices consistent with the PBHI curricular framework. We included several options in each survey section that are indicative of the assumptions of the PIH program model. For example:

- We included *learning objectives* that required the analysis and synthesis of foundational knowledge to support ethical decision-making.
- We included *introductory activities* that established relevance by connecting to students' experiences and established a purpose for learning the content through a central question that was the focus of instruction.
- We included *collaborative and individual assessments* that required students to publicly present and defend a position related to the issue posed by the central unit question.

In addition, open-ended questions included at the end of each section of the survey asked participants to provide rationales for their ranking and/or selection of items in the scenario.

Validity of Instrument

Content and concurrent validity for the instrument were established via a review of the instrument by a panel of three social studies education experts knowledgeable of the Auburn University teacher preparation program and its PBHI principles. These experts reviewed the survey to assess whether the survey items selected as best reflecting PBHI principles were in their judgment valid indicators of the program's goals and instructional philosophy. After independently reviewing the survey, all members of the panel concluded that the survey accurately assessed PBHI knowledge advocated by the program. Refer to Saye et al. (2009–2010) for more detail regarding reliability and validity of the survey instrument.

Procedure

Approximately one week prior to the first class meeting of their initial course in the teacher education program, participants were sent an e-mail by the instructor of their class requesting that they complete the survey. The email contained a link to the survey instrument. Participants were asked to complete the survey prior to their first class.

Approximately one week prior to the end of their student teaching experience, participants were sent an e-mail requesting that they complete the survey again. Once again, the e-mail contained a link to the online survey instrument. Participants were asked to complete the survey prior to their completion of student teaching.

Data Analysis and Results

Numerical data from the survey were analyzed using descriptive and inferential statistical procedures. Participants' initial responses to the survey were compared to their responses as they were completing their student teaching experiences via the nonparametric Wilcoxon rank-order test. The Wilcoxon test is a nonparametric analysis applicable to a repeated-measure design with an intervention, particularly when dealing with data in which participants are asked to rank-order alternatives (Green & Salkind, 2008). The Wilcoxon test provides a means for determining the extent to which participants alter their responses to ranked data between initial responses to items and final responses to items. Since there were multiple inferential tests conducted, Bonferroni correction was used to reduce the likelihood of type I error ($\alpha = .05/23 = .002$; $.01/23 = .0004$; $.001/23 = .00004$). In addition, participants' responses to open-ended questions were analyzed qualitatively for further explanation of their rankings and/or selection of survey items. The open-ended items were analyzed using constant comparative coding to establish a general overview of the reasons participants indicated for their rankings (Fram, 2013; Straus & Corbin, 1998). Using directed content analysis techniques (Hsieh & Shannon, 2005), open-ended responses in each section of the survey were independently analyzed by the two researchers in order to generate an initial set of codes

which were then used for further analysis. After the independent analyses of each section were completed, the researchers compared their results and noted areas of discrepancy in the coding of the data set. Each discrepancy was discussed and resolved in order to obtain agreement of 100%.

Comparison of Components of Scenario

The scenario-based component of the survey asked participants to rank various aspects of a unit focusing on the Reconstruction period following the U.S. Civil War. Participants were asked to provide views on four specific components of the lesson: the objectives for the lesson, the introductory activity for the lesson, methods for ensuring active student involvement in the lesson, and culminating assessment activities for the lesson.

Objectives

Participants were asked to rank six learning objectives in order of importance. These learning objectives included:

1. Students will explain the influence the Reconstruction period had on today's political structure.
2. Students will use primary documents to identify major controversies surrounding Reconstruction policies.
3. Students will describe the relationship between the Reconstruction period and the Civil War.
4. Students will construct an argument that reflects the perspective of a figure from the Reconstruction period.
5. Students will explain the reasons for the Federal initiatives implemented during Reconstruction.
6. Students will use historical evidence to defend a position on the desirability and effectiveness of Reconstruction policies.

A summary of responses is provided in Table 1. Figure 3 presents the results of the inferential statistical analysis.

These data suggest that participants modified their rankings of the possible learning objectives from the time they first completed the survey to when they completed the survey at the end of the program. When they initially completed the survey, over half of the participants selected Learning Objective 3 as the objective they considered to be most important to include in the Reconstruction Unit. Only 23% of participants ranked Learning Objective 6 as their first or second choice.

In contrast, over 62% of participants selected Learning Objective 6 as their first or second choice on the post-survey, with just over 23% selecting Learning Objective 3. The changes in rankings for both Learning Objective 3 (decrease in ranking) and Learning Objective 6 (increase in ranking) proved to be statistically significant changes. In addition, it is important to note that Objective 6 was the objective most

Table 1. Percentage of participants who ranked each learning objective as first or second.

Learning Objective	Pre-Survey %	Post-Survey %
LO1	41.7	42.5
LO2	24.4	35.0
LO3	56.7	23.3
LO4	19.2	25.8
LO5	35.0	10.8
LO6*	23.3	62.5

* Indicates objective best aligned with PBHI principles
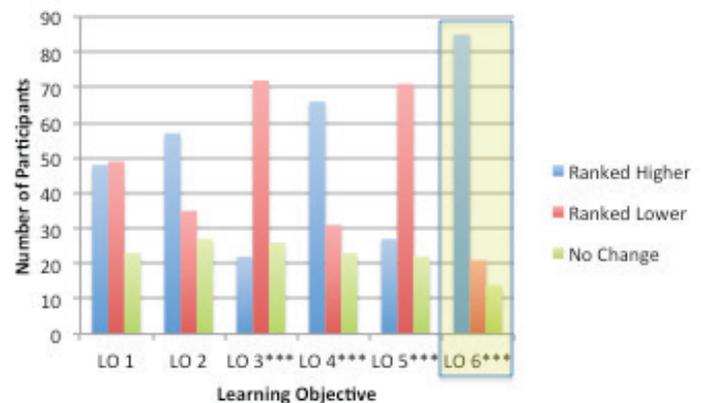
*** p < .001

Figure 3. Wilcoxon results for learning objectives.

closely aligned with PBHI curricular principles integrated into our teacher education program.

Examination of participants' open-ended rationales for the selection of their highest-ranked learning objectives also revealed some differences between the initial survey and the post-survey. On the initial survey, two general themes emerged from the rationale statements. First, participants felt that it was very important for students to understand how past events influenced present-day issues and political structures. Over 40% of participants specifically stated that this should be one of the most important goals of the unit. For example, one participant stated "I chose [learning objective] #1 as most important because I think it is very important to understand and learn how history can affect our lives many years after the fact." Another participant stated "looking at the Civil War and the influences that it has on today will help students see how the Civil war can still impact us today."

The second theme related to acquiring broad knowledge about the Reconstruction Period. Participants felt it was very important for students to understand "what the Reconstruction period was about and why it took place following the Civil War." Over 50% of participants made reference to the need for

students to gain this knowledge. Examples of participant statements included: "10th graders need to first get a solid foundation of information about the Reconstruction period before they can handle [objectives] 4, 5, and 6," "I believe that it is important for the students to know why certain events happened in history and why they came about," and "I think that is the most basic aspect of the Reconstruction period to cover: what Reconstruction was, and how it came about after the war."

On the post-survey, however, different themes emerged from participant responses. The most prevalent theme dealt with the importance of students being able to construct an argument and defend that argument with evidence. Over 60% of participants stated that this should be one of the most important goals of the unit. One participant stated, "I think this is important because it allows students to form their opinions about historical events based on evidence and helps them to develop reasoning skills." Another participant responded, "The first objective [objective 6] would be the central focus of the whole unit. I would want the kids to examine the pros and cons of these policies, assess their value, and defend/criticize from different perspectives."

A second theme focused on the importance of having students use primary sources in order to acquire multiple perspectives on an historical issue. Over 56% of participants stated that this was important. As one participant stated: "I feel that students only understand the controversy of the Reconstruction era by examining the actual documents using historical empathy." Another participant said, "I think it is important to analyze primary documents in order to teach students the importance of first hand accounts and to explain to students that the further the documents are removed from the time/event the less credible they will be."
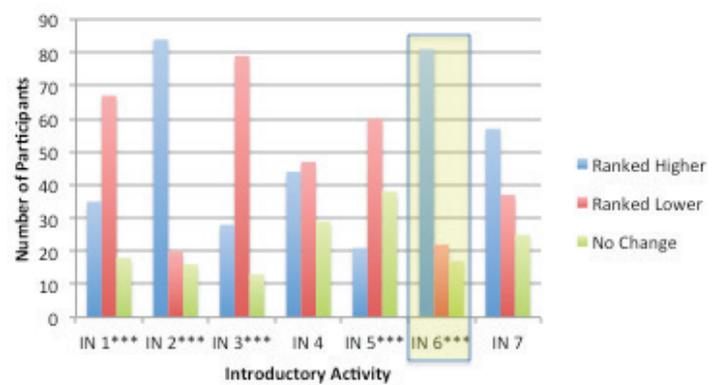
Introductory Strategy

Participants were asked to rank seven possible introductory strategies in order of how likely they would use them in their Reconstruction unit. These introductory strategies included:

1. Ask students what they know about the Reconstruction period.
2. Connect the historical topic to students' own interests and experiences.
3. Present a general overview of important events that will be covered in the Reconstruction unit.
4. Connect Reconstruction to events studied in the previous unit.
5. Have students complete a pre-test to determine their general knowledge of the Reconstruction period
6. Connect Reconstruction to broader historical themes or issues.
7. Explain to students how their understanding will be assessed at the end of the unit.

Table 2. Percentage of participants who ranked each introductory strategy as first or second.

Introductor Strategy	Pre-Survey %	Post-Survey %
IN1	48.3	31.7
IN2	30.8	68.3
IN3	41.7	10.0
IN4	25.8	22.5
IN5	33.3	12.6
IN6*	14.2	52.5
IN7	5.9	5.8

* Indicates objective best aligned with PBHI principles

*** $p < .001$

Figure 4. Wilcoxon results for introductory strategy.

Responses were aggregated to determine the percentage of participants who selected each introductory strategy as either their first or second choice. A summary of responses is provided in Table 2. Figure 4 presents the results of the inferential statistical analysis.

As with the learning objectives, participants' responses indicate that the introductory strategies they most preferred changed from the time they first completed the survey at the beginning of their program to when they completed the survey at the end of the program. In the initial survey, participants' preferences regarding the introductory activity seemed to be spread out across many of the possible choices, with 42% of participants selecting Introductory Strategy 3, 48% preferring Introductory Strategy 1, 31% preferring Introductory Strategy 2, 24% choosing Introductory Strategy 4, and 33% choosing Introductory Strategy 5. Only Introductory Strategy 6 and Introductory Strategy 7 were top choices for fewer than 25% of participants.

There were some significant differences in participants' responses on the post-survey. Nearly 70% of participants selected Introductory Strategy 2 as their first or second choice, and over 50% identified Introductory Strategy 6 as one of their top

preferences. Interestingly, only 10% of participants selected Introductory Strategy 3 as one of their top choices – the strategy that was preferred by over 40% of participants on the initial survey. The changes in rankings for Introductory Strategy 2 (increase in ranking), and Introductory Strategy 1, 3, and 5 (decrease in ranking) proved to be statistically significant changes. Introductory Activity 6, the introductory activity most closely aligned with our PBHI curricular principles, also demonstrated a statistically significant increase in ranking.

Examination of participants' rationales for the selection of their preferred introductory strategies once again revealed some differences between the initial survey and the post-survey. As with the overall rankings, the discussions of the reasoning for selecting the introductory strategy tended to be widespread and varied. However, one general theme was present. Over 52% of participants stated that they thought it was important to assess the current knowledge level of their students prior to teaching new content – either informally (by asking students to discuss what they already knew about Reconstruction) or formally (via a pre-test). They believed this would assist them in planning and refining their lessons. As one participant stated, "Of the choices given, I would probably give the students a pre-test in order to see how much each student knows and to see where I will need to focus my lectures." Similarly, a participant stated, "I think that students should be presented with a pre-test in order to determine what they know about the reconstruction and what needs to be taught in further depth." Another participant responded, "Asking students about their current knowledge of the Reconstruction would give me a good idea about where to start my introduction about this period."

One very strong theme emerged from responses on the post-survey: the importance of making the information relevant by connecting it to students' experiences. Nearly 70% of participants stressed the importance of finding methods of relating the topic of the unit to students' own experiences while introducing the unit. Their main reasoning for this strategy was that it would potentially increase student interest and engagement in the topic itself, and make the topic more meaningful to students. For example, one participant stated "it's a good idea to connect historical topics to students' own interests and experiences because it increases the likelihood that they'll get involved and become interested in the topic." Another participant responded, "I think that it is important to connect historical events to students interests in order to get students fully engaged in the lesson." Finally, one participant posited: "I feel that the only way to grab students' attention is to relate the past to what they're going through today. I think that too many teachers fail to make the subject interesting and therefore lose a lot of the students due to their teaching style." Interestingly, only one participant discussed the use of

Table 3. Percentage of participants who selected each assessment strategy.

Assessment Strategy	Pre-Survey %	Post-Survey %
AS1	62.5	30.0
AS2*	27.5	51.7
AS3	62.5	29.2
AS4	22.5	46.7
AS5*	61.7	75.8

* Indicates assessment strategy best aligned with PBHI principles
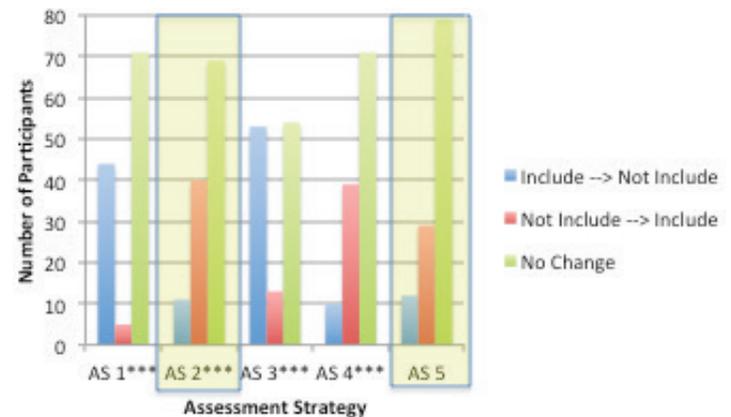
*** p < .001

Figure 5. Wilcoxon results for assessment strategies.

a pre-test to gauge students' pre-existing knowledge as one of their preferred introductory activities.

Assessment

In the final section of the survey, participants were asked to select the assessment strategy (or strategies) they would use in their unit. As opposed to ranking the various assessment strategies in order of preference, participants were allowed to select up to three of the assessment strategies provided to them that they felt they would use in their unit. The five possible assessment strategies provided included:

1. An objective test of student knowledge of Reconstruction events and issues,
2. An essay test in which students evaluate the desirability and effectiveness of Reconstruction policies,
3. An essay test in which students demonstrate understanding of Reconstruction polices and their effects,
4. A group project to construct museum displays that reveal the pivotal events of the Reconstruction period, and
5. A group project to prepare and conduct a mock Congressional hearing that debates Reconstruction policies and evaluates their effectiveness.

A summary of responses is provided in Table 3. Figure 5 presents the results of the inferential statistical analysis.

Results of the initial survey indicated that over 62% of participants would utilize Assessment Strategy 1 and/or Assessment Strategy 3 in their unit. In contrast, results of the post-survey indicated that over 75% of participants would include Assessment Strategy 5 in their unit, and that only 30% of participants would select Assessment Strategy 1 and/or Assessment Strategy 3. Participants' decisions to not include both Assessment Strategy 1 and Assessment Strategy 3 in their unit assessments (on the post-survey) proved to be statistically significant changes.

The assessment strategies included on the survey that most closely aligned with PBHI principles (Assessment Strategy 2 and 5) were both selected to be included in the overall unit assessment by a majority of participants on the post-survey. Participants' decisions to include Assessment Strategy 2 in their unit assessments proved to be a statistically significant change, and Assessment Strategy 5 was selected by more participants than any other choice on the post-survey.

In terms of the participants' written rationales for choosing the assessment strategies for their units, there were marked differences between responses made on the initial survey and responses made on the follow-up survey. On the initial survey, over 60% of participants stated that they would first use either an objective test or an essay test in which students demonstrate understanding of Reconstruction policies as their initial assessment (in fact, 30% of participants stated that this would be their only form of assessment). The specific reasoning for choosing these types of assessment tended to focus on ensuring mastery and retention of knowledge presented in the unit. Participant comments included: "I would first use an objective assessment for the Reconstruction era so that I can see if the students have learned the solid facts from the Reconstruction era", "I think it is important for students to be able to take an objective test because so many things are covered in a unit that this is a good way to measure what they have retained", and "To me giving an essay assessment is a good way to determine if the student has mastered the assigned objectives."

Participants' rationales for the assessment strategies they selected on the post-survey tended to focus on providing students with multiple opportunities to demonstrate their understanding. While they did not altogether reject the use of some form of objective assessment (31% specifically stated that they would include some form of objective test as one of their assessment strategies), their overall preference was for more open-ended group assessments such as a mock hearing or museum display. Participants repeatedly stated that providing opportunities to assess students with various learning styles and multiple intelligences was important in their overall assessment strategy. For example, one participant stated "This [group project] gives students with different learning styles a chance to express themselves and explain what they have learned from the unit." Another student stated, "The group project would be a great assessment method because it'd draw on students' various multiple intelligences [as they] take different roles within their group and present their arguments to class." A fellow participant concurred, stating "I like the idea of students working together on group projects because it pulls in multiple intelligences and strengths and allows different forms of assessment instead of constantly using written exams – objective or subjective."

Discussion

The purpose of this paper was twofold. First, we provided an overview of how we have integrated a specific model of problem-based learning – known as problem-based historical inquiry (PBHI) – into the teacher education program at Auburn University. In addition, we have presented one method for providing evaluative information regarding the effectiveness of this model in preparing pre-service teachers to implement PBL strategies in their future classrooms. We conducted a study of multiple cohorts of pre-service teachers completing Auburn's social studies program, and utilized a scenario-based survey instrument to assess their pedagogical understanding and endorsement of PBHI practices. Results suggest substantial changes in that pre-service teachers pedagogical thinking from their initial entry into their teacher education program to their completion of the program. In particular, there is some evidence that pre-service teachers came to understand and perceive the importance of major aspects of the PBHI curricular framework as it applied to an effective, principle-driven teaching practice: specifically authenticity, multiple intelligences, and collaboration.

In terms of authenticity, there is some evidence in the differences in responses from the initial survey to the post-survey that participants placed great value on incorporating authenticity into the Reconstruction unit they were developing via the survey. For example, when selecting learning objectives for their unit, a vast majority of participants selected learning objectives focusing on analysis and synthesis of evidence, constructing knowledge, and defending arguments in the post-survey. This compares to their responses in the initial survey, where a majority of participants selected learning objectives that focused more on description and explanation of knowledge related to the Reconstruction era. More interestingly, participants' rationales for their selection of learning objectives tended to focus on higher-order thinking (e.g., "constructing their own arguments using historical evidence", "allows students to think critically about the topic", "assess their value and defend/criticize from different perspectives") in the post-survey than the rationales

reported in the initial survey (e.g., "understanding what the Reconstruction period was about", "explain the details that were involved [in Reconstruction]", "explain and summarize what happened during Reconstruction").

Participants' choices in terms of introductory activities also provided some evidence that they were concerned about making the unit as authentic and relevant as possible. On the post-survey, nearly 70% of participants stated that they would develop an introductory activity that helped connect the topic to students' own interests, compared to just over 30% in the initial survey (fewer than the percentage of participants who chose to just give a general overview of the unit). Once again, the reasoning behind the choices provide insight into the selection of choices, with participants focusing on how to engage students and make the content meaningful in the post-survey (e.g., "Connecting to students interests makes the information more meaningful", "Relevance is the most important thing", "you are grabbing their attention and making the topic relevant to their lives"), as opposed to focusing more on attempting to assess student knowledge in order to better plan for the unit: the predominant rationales presented in the initial survey (e.g., "give the students a pretest in order to see how much each student knows", "Asking students about their current knowledge . . . would give me a good idea about where to start", "ask students what they knew already . . . so that I could decide how much detail I needed to go into").

The assessment activities participants selected provided further evidence that they both valued authenticity (e.g., "These assessments seem most authentic"), and how multiple intelligences could be incorporated into assessment. On the post-survey, over 70% of participants stated that they would utilize some form of group-based assessment activity (either a mock congressional hearing or a museum display), and numerous participants stated that they would use multiple forms of assessment in order to provide learners who may have different strengths and learning styles with opportunities to successfully demonstrate their knowledge of the information presented in the unit. Their justification for selecting their assessment strategies included "cover as many learning styles as possible", "it'd draw on students various multiple intelligences", "[a] group project will allow students that might not do well on a written test to adequately show what they have learned", and "it incorporates all of the multiple intelligences." In contrast, on the initial survey none of the participants explicitly stated that they would provide students with multiple opportunities to demonstrate their knowledge in different ways as a rationale for their choices of assessment strategies. In fact, although a large percentage of participants chose to include group projects such as the mock congressional hearing in their overall assessment strategies on the initial survey, many made this

choice simply because they enjoyed group projects when they were in school ("I chose the two group projects because I like group projects"), because they thought students would find the projects to be fun ("I chose to do the mock congressional hearing because I felt that it would be a fun experience"), or because they thought it would assist students with retaining information covered in the unit ("I went to the group project to try and keep the information interesting and maybe they won't forget it as easily").

Finally, participants' assessment choices on the survey provided some evidence that they not only believed that incorporating collaboration strategies into unit activities was important, but that they understood how collaboration could facilitate overall student learning. As stated above, over 70% of participants selected a group project as their preferred assessment strategy on the post-survey, and many of them indicated that incorporating collaboration would be beneficial to students in multiple ways (e.g., "[they could] take different roles within their group and present their arguments," "the group project would allow all students to participate and they learn best by participating," and "all students would be engaged and active"). While many of the participants also included a group project as an assessment strategy on the initial survey, none of them specifically described the pedagogical benefits having students work collaboratively might include, other than in a very general way (e.g., "[it] would allow the students to show their knowledge," "It helps people become more social," or "it is important for students to debate and work as a team").

Conclusion and Implications

Results of our evaluation with multiple cohorts of pre-service teachers provides some evidence to suggest that, when provided with opportunities to explore, critique, implement, and evaluate PBHI teaching strategies within their teacher education program, pre-service teachers are able to articulate the core curricular framework of PBHI, and are able to incorporate that framework into the design of instructional activities. Pre-service teachers' selection of various components of a unit on Reconstruction seemed to more closely align with the core principles of PBHI on the post-survey than on the initial survey. More importantly, pre-service teachers seemed to be better able to articulate their reasons for making various curricular choices on the post-survey. Their responses suggest the potential of teacher preparation programs unified around a set of core, research-based principles for promoting reflective professional teaching knowledge in their graduates.

This research also provides some promise for using scenario-based surveys as one method for determining how well pre-service teachers understand various curriculum

frameworks. While this assessment strategy is by no means fully authentic, we believe that it does provide a more authentic assessment of pre-service teachers' knowledge of PBHI and ability to apply PBHI in teaching situations than other alternatives such as general belief surveys or more objective assessments focusing on the specific components of the PBHI framework. Ideally, this assessment can be used to determine (in a more general sense) the effectiveness of a teacher education program's ability to facilitate pre-service teachers in understanding various curricular models. Coupled with more authentic assessments, such as evaluation of actual development and implementation of PBHI activities with students, this survey tool could provide valuable information to teacher educators and allow them to better model and guide pre-service teachers' mastery of PBHI teaching strategies.

References

Barrett, M., Garrety, K., & Seberry, J. (2006, June). *ICT professionals' perceptions of responsibility for breaches of computer security*. Proceedings of the Australian and New Zealand Academy of Management Conference, Yeppon, Queensland, Australia.

Barrows, H. S. (2002). Is it truly possible to have such a thing as dPBL? *Distance Education, 23*(1), 119–122. http://dx.doi.org/10.1080/01587910220124026

Brush, T., & Saye, J. W. (2009). Strategies for preparing pre-service social studies teachers to integrate technology effectively: Models and practices. *Contemporary Issues in Technology and Teacher Education*, 9(1).

Brush, T. & Saye, J. (2002). A summary of research exploring hard and soft scaffolding for teachers and students using multimedia-supported learning environments. *Journal of Interactive Online Learning, 1*(2): Article 3.

Callahan, C., Saye, J., & Brush, T. (2009-10). Educative curriculum materials to develop social studies teachers' professional teaching knowledge. *The International Journal of Social Education, 24*(2), 5–33.

Callanan, G. & Perri, D. (2006). Teaching conflict management using a scenario-based approach. The Journal of Education for Business, 81(3), 131–139. http://dx.doi.org/10.3200/JOEB.81.3.131-139

Cohen, E. G., & Benton, J. (1988). Making groupwork work. *American Educator* (Fall), 10–17, 45–56.

Cooper, B., Shepardson, D., & Harber, J. (2002). Assessments as teaching and research tools in an environmental problem-solving program for in-service teachers. *Journal of Geoscience Education, 50*(1), 64–71.

Doyle, W. (1983). Academic work. *Review of Educational Research, 52*(2), 159–199. http://dx.doi.org/10.3102/00346543053002159

Dye, P. & Huffman, L. (2003). *National survey of course offerings in social studies, Kindergarten–Grade 12, 2002–2003 survey*. Council of State Social Studies Specialists. http://www.cs4online.org/survey.html.

Edwards, S. & Hammer, M. (2006). Laura's story: Using problem based learning in early childhood and primary teacher education. Teaching and Teacher Educator, 22(4), 465–477. http://dx.doi.org/10.1016/j.tate.2005.11.010

Feiman-Nemser, S. (2008). From preparation to practice: Designing a continuum to strengthen and sustain teaching. *Teachers College Record, 103*(6), 1013–1055. http://dx.doi.org/10.1111/0161-4681.00141

Fram, S. (2013). The constant comparative analysis method outside of grounded theory. *The Qualitative Report, 18*, 1–25.

Fowler Jr., F. (2002). *Survey research methods* (3rd ed.). Thousand Oaks, CA: Sage.

Gardner, H. (1999). Intelligence reframed: Multiple intelligences for the 21st century. New York: Basic Books.

Green, S. B. & Salkind, N. J. (2008), Using SPSS for Windows and Macintosh: Analyzing and understanding data. Upper Saddle River, NJ: Pearson.

Hannafin, M., Land, S., & Oliver, K. (1999). Open learning environments: Foundations, methods, and models. In C. Reigeluth (Ed.), *Instructional design theories and models* (Vol. II). Mahway, NJ: Erlbaum.

Hmelo-Silver, C. (2004). Problem-based learning: What and how do students learn? *Educational Psychology Review, 16*(3), 235–266. http://dx.doi.org/10.1023/B:EDPR.0000034022.16470.f3

Hsieh, H. & Shannon, S. (2005). Three approaches to qualitative content analysis. *Qualitative Health Research, 15*, 1277–1288. http://dx.doi.org/10.1177/1049732305276687

Kiggins, J., & Cambourne, B. (2007). The knowledge building community program: A partnership for progress in teacher education. In T. Townsend & R. Bates. *Handbook of Teacher Education* (pp. 365–380). Netherlands: Springer.

Land, S. M. (2000). Cognitive requirements for learning with open-ended learning environments. *Educational Technology Research and Development, 48*(3), 61–78. http://dx.doi.org/10.1007/BF02319858

Means, B., Padilla, C., DeBarger, A., & Bakia, M. (2009). *Implementing data-informed decision making in schools: Teacher access, supports and use.* Report prepared for U.S. Department of Education, Office of Planning, Evaluation and Policy Development. Menlo Park, CA: SRI International.

Murray-Harvey, R. & Slee, P. (2000). Problem based learning in teacher education: Just the beginning! Paper presented at the *Australian Association for Research in Education*, Sydney, December 4–6.

National Council for the Social Studies. (2008). *About NCSS*. http://www.ncss.org/about/.

Newmann, F. M., Wehlage, G. G., & Lamborn, S. D. (1992). The significance and sources of student engagement. In F. Newmann (Ed.), *Student engagement and achievement in American secondary schools* (pp. 11–39). New York: Teachers College Press.

Onosko, J. (1991). Barriers to the promotion of higher order thinking in social studies. *Theory and Research in Social Education, 19*(4), 341–366. http://dx.doi.org/10.1080/00933104.1991.10505646

Patrick, S. (2008). ICT in educational policy in the North American region. In J. Voogt & G. Knezek (Eds.), *International handbook of information technology in primary and secondary education*. New York: Springer. http://dx.doi.org/10.1007/978-0-387-73315-9_70

Ravitz, J. (2009). Summarizing findings and looking ahead to a new generation of PBL research. *The Interdisciplinary Journal of Problem-based Learning, 3*(1), 4–11.

Saye, J. W., & Brush, T. A. (2004). Promoting civic competence through problem-based history learning experiments. In G. E. Hamot, J. J. Patrick & R. S. Leming (Eds.), *Civic Learning in Teacher Education: International Perspectives on Education for Democracy in the Preparation of Teachers* (Vol. 3, pp. 123–145). Bloomington, IN: ERIC Clearinghouse for Social Studies/Social Science Education.

Saye, J. & Brush, T. (2002). Scaffolding critical reasoning about history and social issues in multimedia-supported learning environments. *Educational Technology Research and Development, 50*(3), 77–96. http://dx.doi.org/10.1007/BF02505026

Saye, J., Kohlmeier, J., Brush, T., Howell, J., & Maddox, L. (2009-2010). Assessing the effects of a teacher education program on pre-service secondary social studies teachers' instructional decision-making. *The International Journal of Social Education, 24*(2), 35–76.

Saye, J. & the Social Studies Inquiry Research Collaborative (SSIRC). (2013). Authentic pedagogy: Its presence in social studies classrooms and relationship to student performance on state-mandated tests. *Theory and Research in Social Education, 41*(1), 89–132. http://dx.doi.org/10.1080/00933104.2013.756785

Shaver, J. P. (1996). The prospects of issue-centered education. In D. W. Saxe (Ed.), *Handbook on teaching social issues* (pp. 380–386). Washington, DC: National Council for the Social Studies.

Shaver, J. P., Davis, O. L., & Helburn, S. W. (1979). The status of social studies education: Impressions from three NSF studies. *Social Education, 4*(3), 150–153.

So, H. & Kim, B. (2009). Learning about problem based learning: Student teachers integrating technology, pedagogy and content knowledge. *Australasian Journal of Educational Technology*, 25(1), 101–116.

Snow, R. & Bloom, A. (1996). A survey-based pedagogical approach to ethics in the workplace. *The Journal of Applied Behavioral Science, 32*(1), 89–100. http://dx.doi.org/10.1177/0021886396321006

Strauss, A. & Corbin, J. (1998). Basics of qualitative research: Techniques and procedures for developing grounded theory (2nd ed.). Thousand Oaks, CA: Sage.

Strobel, J. & van Barneveld, A. (2009). When is PBL more effective? A meta-synthesis of meta-analyses comparing PBL to conventional classrooms. *Interdisciplinary Journal of Problem-based Learning*, 3(1). http://dx.doi.org/10.7771/1541-5015.1046

VanSickle, R. L. (1996). Questions of motivation for achievement in social studies. In B. G. Massialas and R. F. Allen, Eds., *Crucial issues in teaching social studies K–12* (pp. 81–105). New York: Wadsworth.

Walker, A., & Leary, H. (2009). A problem based learning meta analysis: Differences across problem types, implementation types, disciplines, and assessment levels. *The Interdisciplinary Journal of Problem-based Learning* 3(1), 12–43.

Wirkala, C. & Kuhn, D. (2011). Problem-based learning in K-12 education: Is it effective and how does it achieve its effects? *American Educational Research Journal, 48*(5), 1157–1186. http://dx.doi.org/10.3102/0002831211419491

Zukas, A. (2000). Active learning, world history, and the Internet: Creating knowledge in the classroom. *International Journal of Social Education, 15*(1), 62–79.

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