

## Supporting In-Service Teachers' Professional Teaching Knowledge With Educatively Scaffolded Digital Curriculum

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### Abstract

This article advances a continuing line of inquiry into the potential of digital educative curriculum materials to support teachers' development of professional teaching knowledge. Instead of standalone levers of change, the educative curricula in this study were featured resources within a novel professional development approach. The qualitative, design-based research experiment asked, "Can sustained, collaborative professional development experiences with digital educative curriculum materials help in-service social studies teachers develop professional teaching knowledge?" Following a 13-month study, none of the six participants fully adopted the promoted wise practice pedagogy, problem-based historical inquiry. However, findings suggested that sustained, collaborative experiences with digital educative curricula helped teachers in this study begin to articulate and demonstrate tenets of problem-based historical inquiry (e.g., purposeful student-inquiry grounded in recurring societal concerns, structuring classroom events to promote historical thinking). The authors proposed three features to strengthen future teacher-support efforts: dynamic experiences modeling wise practices, digital curriculum designed for collaboration, and expert mentors to help facilitate learning.

Improving teachers' effectiveness motivates many contemporary education reforms. Initiatives supported with both public (e.g., Race to the Top) and private (e.g., Measures of Effective Teaching, <http://www.metproject.org>) funding have proposed that effective teaching is demonstrated by high student achievement on standardized exams (see Engel, Jacob, & Curran, 2014; Harris, Ingle, & Rutledge, 2014; Ronfeldt, Farmer, McQueen, & Grissom, 2015). Many scholars suggest otherwise. Some have posited that effective teaching is far more complex and should be more broadly defined to include holistic measures of teachers' content and pedagogical knowledge; habits of mind (Darling-Hammond, Holtzman, Gatlin, & Heilig, 2005; Hollins, 2011); ability to set, revise, and reach learning goals (Hiebert, Morris, Berk, & Jensen, 2007); reflective decision-making (Ryan, Cooper, & Bolick, 2015); and personal attributes such as enthusiasm (Darling-Hammond, 2010).

Others have suggested that helping teachers develop professional knowledge is a promising strategy for increasing their effectiveness (Goldenberg, Culp, Clements, Pasquale, & Anderson, 2014; Hiebert & Morris, 2012; Meirink, Meijer, Verloop, & Bergen, 2009). The emphasis on teachers' professional knowledge and effectiveness has focused greater attention on support programs for practitioners (see Ben-Peretz, 2011; Earp, Ott, & Pozzi, 2013).

Professional development (PD) typically fails to influence teachers' practice substantively, and its impact on student learning is often disappointing (Gersten et al., 2010; Goldenberg et al., 2014; Hiebert & Morris, 2012). Failure and disappointment may result, in part, from a program's design and implementation. Teachers' PD experiences tend to be of a short duration, poorly organized (Gersten, Dimino, Jayanthi, Kim, & Santoro, 2010), and centered around unproven ideas and strategies (Guskey & Yoon, 2009). PD providers also tend to deliver too few engaging activities to enrich teachers' knowledge (Borko, 2004). Moreover, PD tends to be ineffective even when founded upon widely recognized best practices: a strong content focus, inquiry based, and consistency with a school system's curriculum and policies (Desimone, 2009; Hiebert & Morris, 2012; Hill, Beisiegel, & Jacob, 2013; Penuel, Fishman, Yamaguchi, & Gallagher, 2007).

Many education researchers have encouraged investigations of innovative PD models to offer additional explanations for why teacher support is routinely ineffectual, and to suggest what constitutes substantive support for teachers (Earp et al., 2013; Goos, 2013; Heller, Daehler, Wong, Shinohara, & Miratrix, 2012; Hill, Beisiegel, & Jacob, 2013). This call motivated our design of a novel program of support for in-service social studies teachers. Throughout our study we asked, "Can sustained, collaborative professional development experiences with digital educative curriculum materials help in-service social studies teachers develop professional teaching knowledge?"

## Related Literature Informing PD Design

### Professional Teaching Knowledge

Although many theories exist to operationalize teachers' PD, we find professional teaching knowledge (PTK) particularly relevant. Hiebert, Gallimore, and Stigler (2002) suggested that a more professional knowledge for teachers would integrate *teachers'* practical understanding of orchestrating classroom events with *researchers'* wise practice suggestions derived from scientific studies. Classroom teachers' knowledge tends to be specific, situated in classrooms, and derived from private experience; teacher educators' knowledge is public, generalizable, and research based. Thus, PTK would integrate theory-based researcher knowledge with grounded-experience teacher knowledge to produce pragmatic, field-tested suggestions to guide

practice decisions (Hiebert et al., 2002; Saye, Kohlmeier, Brush, Mitchell, & Farmer, 2009).

Research suggests developing PTK will be difficult. Transferring workplace, practical knowledge (van Velzen, Volman, Brekelmans, & White, 2012) and combining experiential understandings with more generalizable theoretical knowledge (Rytivaara & Kershner, 2012) are challenging.

### **Our Model**

***Engaging and educative context.*** We developed our PD program to occur within an engaging and educative context. Scholars have suggested that an effective PD approach might feature providers who guide teachers through dynamic activities that model and explain powerful instruction (see Borko, 2004; Borko, Jacobs, Eiteljorg, & Pittman, 2008; Guskey & Yoon 2009). Such interactive, face-to-face learning opportunities may help teachers recognize and explore pedagogical suggestions (Collopy, 2003; Goldenberg et al., 2014) and provide a deliberative space for real-time support.

A pragmatic concern is precisely where and when to establish such a context. Our previous work exploring teachers' interactions with educative curricula (see Callahan, 2009; Callahan, Saye, & Brush, 2013a, 2013b, 2014) led us to believe that because of its busy pace and frequent interruptions, a typical school day and classroom may not provide an environment conducive to purposeful interaction with reform ideas and materials. We thought summer months, weekends, or faculty workdays might provide more suitable times for teachers to engage deeply in PD efforts.

Also, because the conceptual change associated with developing professional knowledge is difficult and incremental (Cornett, 1990; Rytivaara & Kershner, 2012) we designed our program to occur over an extended time—spanning beyond one academic year—to allow for sustained experiences (see Gersten et al., 2010; Heller et al., 2012; Rytivaara & Kershner, 2012).

***Improved materials.*** A promising strategy for improving instructional practices and student outcomes is for teachers and researchers to work together in creating, using, and revising curriculum resources (Hiebert & Morris, 2012; Morris & Hiebert, 2011). This strategy informed our design of experiences to support teachers' understanding of ways to promote historical thinking about visual information.

We narrowed our PD focus to visual information (e.g., historical photographs) because contemporary physical and digital environments are filled with images through which people tend to make sense of the world (Burns 2006; Callahan, 2013a, 2015; Callow 2006; Säljö, 2010). Social identities, public issues, relationships, and judgments are often mediated through sharing and responding to visual information (Callahan, 2013b, 2015; Fenn, Newman, Pezdek, & Garry, 2013; Samuels & Samuels, 2014; Werner, 2006). We presented teachers with comprehensive curricula and encouraged them to act upon the materials to expand their understanding of teaching and learning with visuals.

***Meaningful integration of technology.*** Our PD model leveraged affordances of Web 2.0 tools (see Wilson, Wright, Inman, & Matherson, 2011) and facilitated the exchange of ideas and powerful strategies (see Earp et al., 2013). Well-designed digital technologies can support teaching and learning (Manfra, 2014; Swan & Hofer, 2008) and help learners develop new meaning-making skills (Säljö, 2010). Some have further

asserted that digital technology is likely to serve as the foundation for future PD efforts for in-service and preservice teachers (Hicks, Lee, Berson, Bolick, & Diem, 2014).

Our technology integration centered around engaging teachers in prolonged collaborative experiences with digital *educative* curricula. Others define educative curriculum materials (ECMs) broadly as teaching resources intended for student *and teacher* learning (Collopy, 2003; Davis & Krajcik, 2005; Drake, Land, & Tyminski, 2014). We operationalize ECMs as

exemplar lessons that strongly illustrate fundamentals of wise practice pedagogy and that [are] educatively scaffold[ed] to help teachers develop their professional teaching knowledge. This...necessarily places a heavy emphasis on the scaffolds designed to support teacher learning. They must be nimble enough to overtly guide the teachers toward educative opportunities and facilitate participation with them, while simultaneously affording teachers the independence to discover information and create new understandings. (Callahan et al., 2013b)

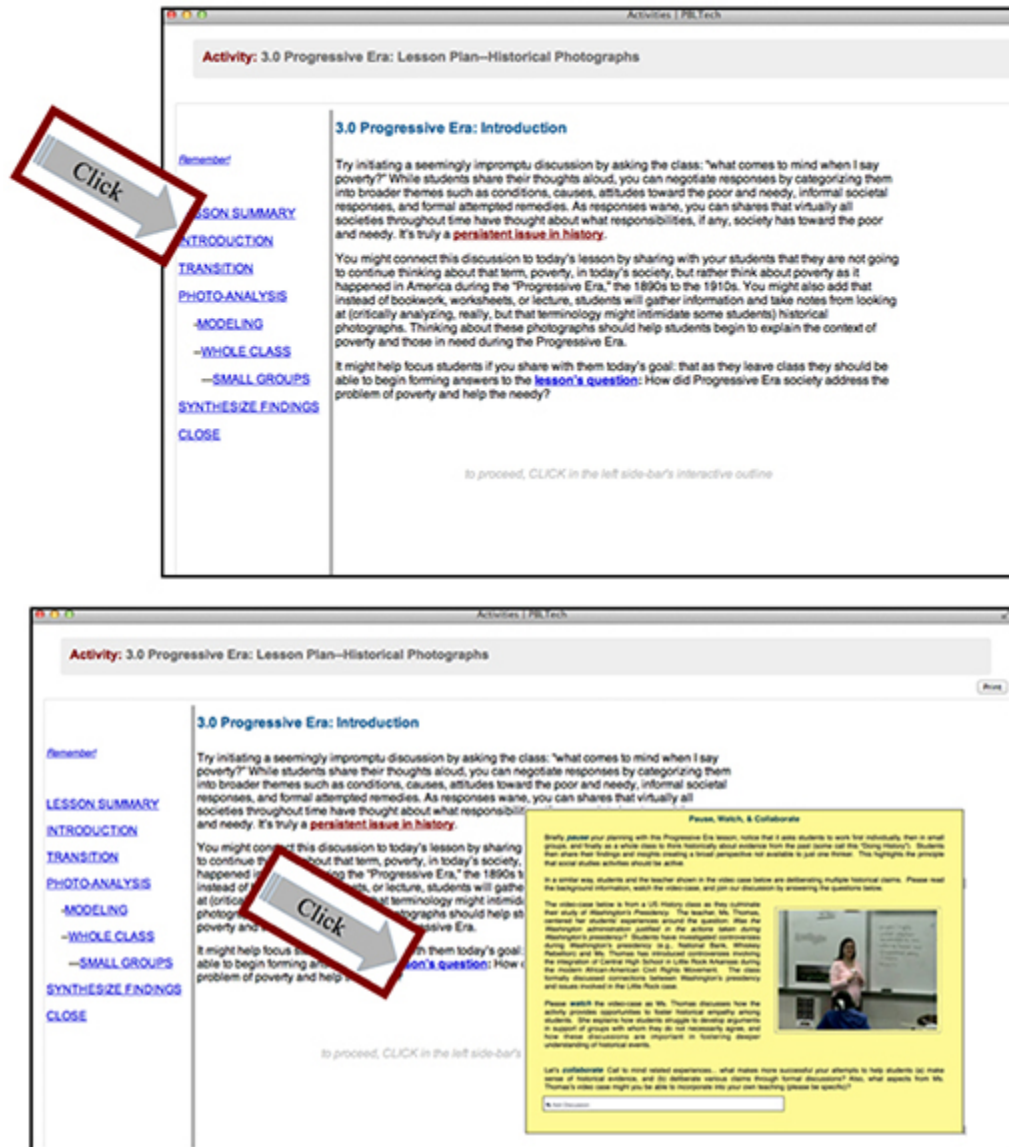
The digital ECMs in this study were refined through multiple field tests with in-service teachers (Callahan et al., 2013a, 2014) and continued data-driven hypotheses for their optimal design and use (Callahan et al., 2013b). Logistically, our ECMs provided interactive online lesson plans: exemplars of problem-based historical inquiry (PBHI). Within each lesson plan we strategically embedded hyperlinks to explain PBHI tenets. When teachers clicked a hyperlink, a new browser window opened and presented a potentially educative feature. Figure 1 illustrates an online lesson's interface design.

Each educative feature (i.e., hyperlinked webpage) contained (a) a paragraph explaining the theoretical basis underpinning the particular PBHI tenet, (b) a second paragraph describing, in practice, how the tenet was manifested both in the online lesson *and* in an upcoming videocase, (c) a 3- to 5-minute videocase illustrating the tenet in a real classroom, and (4) two critical-thinking questions to promote reflection and discussion.

***Sustained collaboration.*** Improved collaboration can help establish powerful learning environments for teachers—and their students—especially when an exchange of ideas concerning powerful practices occurs (Meirink et al., 2009). Although teacher collaboration (i.e., instructional teams, professional learning communities, etc.) is typically recognized as an important issue, exactly how it is conducted is often unclear (Earp et al., 2013; Ronfeldt et al., 2015).

We wanted to create an effective “architecture for participation” (O'Reilly, 2007, p. 17) to help organize and facilitate teachers' periodic collaboration throughout an academic year. For example, we asked participants to respond not only to the digital ECMs' critical-thinking questions but also to their colleagues' responses. Figure 2 illustrates an educative feature's interface design.

We allotted time in each PD session for teachers to plan collaboratively an activity that one teacher would implement while others observed for constructive critique. We hoped this lesson-study element (see Lewis, 2000; Lewis, Perry, & Murata, 2006) would help distribute the heavy cognitive load associated with inquiry-based reforms (Saye et al., 2009).



**Figure 1.** A sequence of screen shots that illustrate the digital ECMS' interface design.

**Pause, Watch, & Collaborate**


Briefly **pause** your planning with this Progressive Era lesson; notice that it asks students to work first individually, then in small groups, and finally as a whole class to think historically about evidence from the past (some call this "Doing History"). Students then share their findings and insights creating a broad perspective not available to just one thinker. This highlights the principle that social studies activities should be *active*.


In a similar way, students and the teacher shown in the video case below are deliberating multiple historical claims. Please read the background information, watch the video-case, and join our discussion by answering the questions below.

The video-case below is from a US History class as they culminate their study of *Washington's Presidency*. The teacher, Ms. Thomas, centered her students' experiences around the question: *Was the Washington administration justified in the actions taken during Washington's presidency?* Students have investigated controversies during Washington's presidency (e.g., National Bank, Whiskey Rebellion) and Ms. Thomas has introduced controversies involving the integration of Central High School in Little Rock Arkansas during the modern African-American Civil Rights Movement. The class formally discussed connections between Washington's presidency and issues involved in the Little Rock case.

Please **watch** the video-case as Ms. Thomas discusses how the activity provides opportunities to foster historical empathy among students. She explains how students struggle to develop arguments in support of groups with whom they do not necessarily agree, and how these discussions are important in fostering deeper understanding of historical events.

Let's **collaborate**: Call to mind related experiences... what makes more successful your attempts to help students (a) make sense of historical evidence, and (b) deliberate various claims through formal discussions? Also, what aspects from Ms. Thomas's video case might you be able to incorporate into your own teaching (please be specific)?

 Add Discussion



**Figure 2.** An educative feature's interface design.

## Conceptual Framework

We framed our study with a wise practice pedagogical approach to teaching history: problem-based historical inquiry. Proponents of PBHI posit that history instruction should be purposeful, active, connected, and structured to promote students' learning (Saye & Brush, 2004). To establish purpose, PBHI lessons are centered around recurring societal concerns, affording students opportunities to engage in real-world problem-solving as they work with resources in order to think deeply and begin to formulate solutions and act in authentically situated, real-world situations (National Council for the Social Studies, 2008; Oliver & Shaver, 1966).

Believing that active social studies classrooms can be powerful learning environments (Colman, Pulford, & Rose, 2008; Estes, Mintz, & Gunter, 2011; Levstik & Barton, 2010; National Council for the Social Studies, 2008), PBHI often asks students to deliberate and collaborate with peers to refine understandings of the past (Newmann, Wehlage, & Lamborn, 1992; Saye & Brush, 2004).

Recognizing that experts and novices tend to think and solve problems differently due to differences in degree of *connectedness* in their respective schemas (Goldstein, 2008; Estes et al., 2011), the PBHI model organizes instruction around substantive ideas that function as mental anchors to which students can attach newly learned information.

Teachers practicing PBHI structure their instruction to support "the learner's development and provid[e] support structures to get to that next stage or level"

(Vygotsky, 1978, p. 56). Our investigation examined the degree to which the participants' responses to our PD model suggested adoption of the four PBHI tenets.

### **Participants**

We found participants through a purposive, criterion sampling (Creswell, 2012) that matched our PD program goals. We contacted curriculum directors, principals, and department chairs in a southeastern U.S. state to find a secondary social studies department agreeable to a 13-month-long commitment to PD centered around planning and implementing lessons (a) designed collaboratively, (b) informed by digital educative curricula, and (c) featuring visual documents in a wise-practice, inquiry-based approach.

We initially planned to work with only one school's social studies department, because we could expect participants to work within a single school culture and to experience similar affordances and constraints. Also, the smaller number of teachers would allow for a more robust qualitative investigation into teachers' experiences. Three schools emerged for potential participation. We elected to work with Rural High School (a pseudonym) because its social studies teachers had gone the longest without social-studies-specific PD.

Shortly before our project began, the school system's superintendent asked if a rural intermediate school's social studies department could also participate. We welcomed them. This paper, however, focuses solely on our work with Rural High School's teachers and their experiences planning and implementing classroom activities informed by our PD program.

The six teachers described in Table 1 (all pseudonyms) comprised Rural High School's social studies department. At the time of the investigation, they were unaccustomed to sustained collaboration, met afterschool "once or twice a semester for department meetings" (Kate, Summer I), and had never experienced common planning or lunch times. Five members were natives of the state and had graduated from in-state universities. They completed teacher education programs that offered certification following four semesters of education coursework, including one content-specific methods course. They were also required to fulfill degree requirements in a specific content area and pass a state-mandated exam purporting to measure a candidate's knowledge and skills.

The sixth member of the social studies department was the curriculum coach, Kate. She was not a native of the state and had graduated from an out-of-state university with an education degree that included certification. She also earned a master's degree from that university; both degrees were in English/language arts.

Rural High School's student population, grades 9-12, was 714; 45% of students were African-American, 30% White, 15% Hispanic, 5% American Indian, and 5% self-reported as Other (Kate, personal communication, Summer I; Rural High School's state report card). Rural High School served a high percentage of underprivileged students: 75% qualified for free or reduced price lunch (the state's average was 54%).



**Table 1**  
PD Program Participants

<b>Name</b>	<b>Years Teaching</b>	<b>Schooling with Teaching Certification</b>	<b>Courses Taught</b>
Jerome	16	Political Science degree; US History Master's degree	Civics & Economics US history from 1877
Josephine	13	History degree	US history to 1877 World history from 1450
Kate	4	Education degree; English/Language Arts Master's degree	(Curriculum Coach for Rural High school)
Martha	10	Sociology degree	US history to 1877 World history from 1450
Norbert	3	Political Science degree	Civics & Economics US history from 1877 World history from 1450
Philip	17	History degree	US history to 1877 US history from 1877

### Research Design

This study is a part of an ongoing series of inquiries that taken together constitute a type of design-based research (see Brown, 1992; Collins, Joseph, & Bielaczyc, 2004; Design-Based Research Collective, 2003). The investigation reported in this paper, our third in this line of inquiry, builds on the implications from the previous two iterations of educative curricula in an effort to refine continuously the optimal design and use of digital ECMs for promoting PTK. Table 2 illustrates several significant design modifications we made for this iteration.

Design-based research in education typically explores an innovative approach or practice—an intervention—so that researchers may better understand a relationship between that intervention (i.e., its underpinning theoretical assumptions) and teaching and learning in authentic settings (Denzin, 2009; Peneul, Fishman, Chen, & Sabelli, 2011). Thus, design-based researchers often collect data over several iterations from multiple sources to provide rich data-triangulation (Design-Based Research Collective, 2003; Denzin, 2009). Subsequent analysis may then provide data-based speculations about the possible relationship between an intervention and teaching and learning (Collins et al., 2004).

Design-based research holds “the promise of effectively bridging the research-to-practice gap to produce meaningful change in practice when innovative practices are fine-tuned...by partnerships with teacher [and] researcher” (Jitendra, 2005, p. 213).



**Table 2**  
Significant Design-Based Research Modifications Made for This Iteration

<b>Research Design Features From Two Previous Iterations of Investigation Into ECMs</b>	<b>Design Challenges the Modifications Addressed</b>	<b>Modified Design Features Made for the Third Iteration of ECMs Investigation</b>
1. Each study examined three teachers, from three different school systems, for one semester.	1. Afford teachers the opportunity for sustained collaboration and share the cognitive load associated with inquiry-based reforms.	1. We studied six teachers from one school system for more than an academic year.
2. Teachers planned during the school day: planning period, lunch time, after school	2. Afford teachers a more deliberative space and concentrate time to work with reform ideas.	2. Teachers planned during professional development workdays.
3. Teachers implemented the lessons presented in the ECMs.	3. Afford teachers the opportunity to add their practitioner knowledge to the researcher knowledge (ECMs) and create activities for their classroom contexts.	3. Teachers used the ECMs to inform their planning and implementing of an original, collaboratively designed lesson.
4. The ECMs were stand-alone levers for teacher change.	4. Afford teachers more support to better understand and implement the reform ideas.	4. The ECMs were featured resources in a professional development program.

### Data Sources and Collection

Our first data point was a preintervention interview of participants and observations of their instructional planning. The second data point was a 13-month-long intervention that occurred in four phases. Each phase consisted of participants (a) as learners, experiencing an activity modeling PBHI; (b) in small groups, exploring digital ECMs; (c) collaboratively planning and implementing an activity informed by our PD program; and (d) together, debriefing each activity's implementation. The third data point was similar to the first: postintervention interviews and observations of participants' instructional planning. Table 3 illustrates this project's data points.

We employed think aloud protocols (Ericsson & Simon, 1998; Jaaskelainen, 2010) during the teachers' interactions with digital ECMs and throughout the collaborations to gain insight into participants' thoughts and rationale for their decisions. We also compiled transcripts and field notes and conducted member-checks throughout the study.

**Phase 1.** In July, Summer I, the first author (Callahan)—who provided all of the PD—began a 5-hour session by modeling PBHI. He projected a historical photograph (Figure 3) and distributed an original advanced organizer ([Appendix](#)). He then led participants through a Socratic exercise, asking a series of purposeful questions to encourage their thinking critically and historically about a document.

**Table 3**  
Data Points and Collection Schedule

Data Point	Collection	Source of Data
1. Preinterview and observation	June, Summer I	(a) Interview (b) Observation of planning (c) Develop activity with historical photo(s)
2. Four-phase intervention	July October March June	(d) PBHI learning experience (e) Exploration of ECMs — debriefing discussion (f) Collaboration to plan PBHI-informed activity (g) Observation of implementation
3. Postinterview and observation	June, Summer II	(j) Develop activity with historical photo(s) (k) Interview and observation of planning (l) Member-checks and field notes throughout



**Figure 3.** Historical photograph from the PBHI experience in Phase 1. Shorpy Higginbotham, a "greaser" on the tippie at Bessie Mine, of the Sloss-Sheffield Steel and Iron Co., Bessie Mine, Alabama. Photographed by Lewis W. Hine (1910). Library of Congress Prints and Photographs Division, Washington, DC.

The teachers analyzed the photograph's source, contextualized and corroborated its information, and thought deeply about its message (see Wineburg, 1991, 1999; Wineburg & Reisman, 2015). Callahan then engaged the teachers in a dynamic role-play (see Orlich et al., 2013, p. 257) of specific individuals and events depicted in the photograph. He asked participants to act out the photograph as a type of interactive tableau vivant. He then asked questions of participants to answer in character to help everyone engage in a thorough understanding of the era (e.g., "Why are you here covered in grease instead of at school?" and "What changes to society—specifically, this community—would you like to see and why?").

Callahan corrected ahistorical extrapolations and assumptions. Next, he posited a compelling question ("How well did Progressive Era society address the problem of poverty and help those in need?") and asked the teachers to use information gleaned from their photo-analysis to begin to formulate an answer.

He then led a debriefing discussion that emphasized how the previous activities (a) established purpose for studying social studies by reasoning about a persisting societal problem; (b) incorporated multiple ways of knowing, including political philosophy and moral reasoning; and (c) used analogical reasoning to refine thinking about a problem's possible solutions (see Saye & Brush, 2004). In the discussion, participants explored the notion that instruction can be authentically situated in real-world societal problems, and it can call for decision and civic action.

Following the discussion, Callahan introduced the idea of "educative" curricula. He suggested participants might further develop their craft in ways consistent with the PBHI experience by engaging digital ECMs and discussing them with colleagues. The participants' then explored a set of digital ECMs, and Callahan facilitated a discussion of its four educative features. Finally, the participants collaborated to develop an activity informed by their PD experiences. Callahan did not join the participants' collaboration. They understood one participant would teach students the collaboratively planned activity while the other participants and Callahan observed.

**Phases 2 and 3.** The second and third phases occurred during the academic year (fall and spring semesters, respectively). Participants, individually and on their own time, explored a second and third set of digital ECMs. A week later, substitutes taught the participants' morning classes while the participants met in their school's media center for another 5-hour, face-to-face PD session. Both sessions began with a PBHI learning experience identical to the one described for Phase 1. The only difference with this experience was the historical photograph explored. Again, Callahan led teachers through steps associated with thinking critically and historically and engaged them in a dynamic role play. The teachers then revisited their earlier work with digital ECMs and synthesized their discussions of PBHI tenets. Finally, the teachers collaboratively planned an activity.

**Phase 4.** The ensuing June, Summer II, the final phase occurred; it closely resembled the previous three. Participants experienced another PBHI activity (identical to the one described for Phase 1) centered around a fourth historical photograph; then they explored a fourth set of digital ECMs. The teachers again discussed their thoughts and experiences related to PBHI; however, instead of developing a fourth activity, participants collaboratively developed departmental goals for the next academic year.

## Data Analysis

We triangulated data sources to increase the credibility and validity of our findings (Creswell, 2012; Denzin, 2009) and reduce limitations found in analyzing a single source (as in Maxwell, 2013). Our analysis began with multiple readings of all data. We then organized data chronologically and created a profile for each PD phase. Next, we analyzed profiles—individually and across PD phases—and looked closely for phenomena (e.g., recurring events, analogies, or concepts mentioned) to use as codes to describe participants' experiences (as in Huberman, Miles, & Saldana, 2013). We privileged codes grounded in the convergence of multiple data sources.

We specifically compared data collected earlier in the study (e.g., preintervention interviews and Phase 1 implementation) to data collected later (e.g., Phase 2 and 3 implementation and postintervention interviews). Then, we reread all data through the lens of our conceptual framework (PBHI) and looked for evidence to suggest that participants' may have used the digital ECMs to develop PTK.

## Findings and Discussion

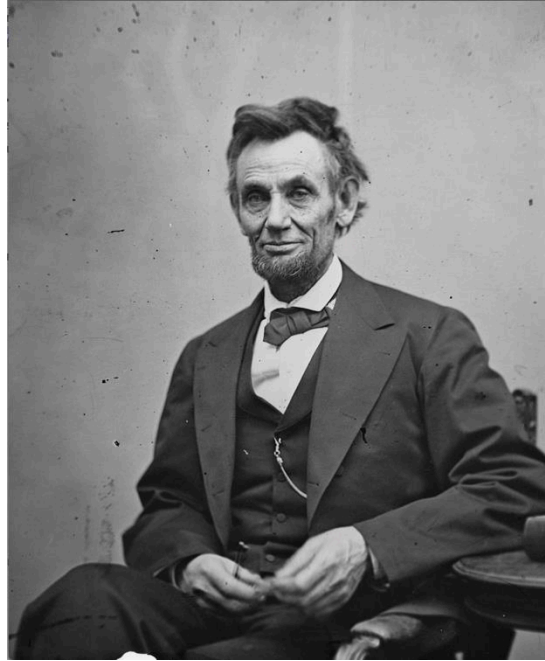
We investigated whether sustained, collaborative PD experiences with digital educative curriculum materials could promote secondary social studies teachers' PTK. Despite our inability to isolate key variables and analyze them individually, data suggested that sustained experiences with digital ECMs helped participants begin to develop PTK for PBHI.

Here, we should emphasize the difficulty many teachers experience when they encounter the type of fundamental change presented by inquiry-based practices (e.g., Windschitl, 2002). For teachers new to inquiry, complete fidelity to our PBHI model would represent a remarkable achievement. Adopting a more realistic view, any significant adherence to PBHI by study teachers should be considered a notable development.

## Collaborative Planning

**Phase 1 implementation.** In July, Summer I, the teachers together planned an activity informed by their PD experiences. Because she wanted a new introduction to her existing Civil War unit, Martha volunteered to teach her students the first collaboratively designed activity. Jerome, Josephine, and Philip were particularly interested in battlefield prints from a Mathew Brady collection they found online, but Martha said, "I want something that can compare the earlier and later aspects of the war...so that they [students] will think about where we're headed."

The participants found Alexander Garner's *Abraham Lincoln* (Figure 4) and formalized ideas into an activity.



**Figure 4.** *Historical photograph around which participants developed Phase 1 implementation. Abraham Lincoln photographed by Alexander Gardner (February 5, 1865). Prints and Photographs Division, Library of Congress, Washington, DC.*

Josephine took the lead in describing visual aspects she would want students to reflect upon:

Look at his hands....They're moving. Is he nervous? Is he impatient? It's 1865, so later in the war. February, actually, so close to the end. And his hair is...disheveled. I think this could give students a reason to think about what's going on and what could cause him to look and act like this.

The participants decided to use the photograph as a brief activity toward the beginning of a class period. The following dialog took place toward the end of the planning session:

Norbert: A lot of this is what we are expected to do already. I mean we should already be connecting content to real life and asking good questions, right? These [digital ECMS] should provide something more innovative.

Philip: Good point. Most of this is common knowledge.

Kate: Yeah, I agree we should be doing this [connecting content to students' lives], but I don't know that we are, really. I mean, these [digital ECMS] are at least providing us ways to think about making class more interesting for students, and it can help with differentiating, too.

[Josephine and Martha nodded assent]

- Jerome: Yeah, it does. This gives students more opportunity to express their ideas and different gifts and aptitudes. For example, having kids deconstruct images is really good for their being observant and objective...and it [the strategy] also allows them to share all of that...through the small groups.
- Norbert: I use mixed ability small groups a good bit and see how it [the strategy] could work well for letting students' talents work together.
- Kate: Well, sure, but it depends on how you want them [students] to express what they've learned....Is it through completing this [holding up the advanced organizer] or classroom discussion like she's describing [pointing to her laptop screen]. Both can work.

Four months later, during the fall semester, Kate, Josephine, and the first author (Callahan) observed Martha leading students through the activity. The photograph was projected at the front of the classroom as students entered. Immediately after the tardy bell rang, Martha led a whole-class conversation of its details. She repeated students' observations (e.g., askew bow tie, Lincoln's many wrinkles) and asked two questions to help organize their thinking: "What does this tell us about the era?" and "What was its purpose?"

Martha accepted superficial answers (e.g., "It was stressful" or "To tell he was important") and continued with her preexisting multimedia presentation concerning the Election of 1860, Fort Sumter, and the First Battle of Bull Run. When debriefing the lesson, Kate and Josephine shared their observations.

Kate said, "The activity was good, but it seemed kind of disjointed." Josephine said, "They we're really into it, but not everyone participated." Martha thought the activity was "good." She said, "When we talked about the election, they knew who won obviously....I got to ask them for opinions and some took the risk—you know, the low-level risk that it really was—to...share their thoughts."

As participants planned and implemented the first activity, they demonstrated minimal understanding of PBHI tenets. The teachers present for the implementation seemed to attribute value to engaging students in a thoughtful discussion to analyze a photograph critically (e.g., "What is its purpose?"). Josephine wanted students to use information they gathered from the photograph to hypothesize about its historical context (e.g., "What's going on and what could make him look and act like this?"). However, experiences with the ECMs did not seem to help teachers orchestrate classroom experiences to achieve these goals. Although Martha asked her students two potentially higher ordered thinking questions, she presented no rationale, or *purpose*, for exploring the historical photograph as evidence from the past.

The teachers seemed to interpret *active* to mean engaged. Martha's students simply shared their initial observations of the photograph; they did not socially construct a meaningful understanding of the past by negotiating truth claims, defending perspectives, and reasoning together to draw conclusions.

Norbert and Philip thought that connecting content information to students' lives was "common knowledge," and seemed dismissive of the digital ECMs. However, the materials described the PBHI tenet differently. *Connected* was described as organizing instruction around big ideas—key concepts or persisting societal concerns—that serve as mental-anchors onto which new information can become tethered, thus creating a larger

schema (i.e., mental map) of meaning. Kate seemed to interpret *connected* to mean only interlesson consistency, that all activities seem related. She seemed especially concerned that the lesson was “disjointed.”

The participants also seemed to interpret *structured* differently from the digital ECM’s intent. Martha and Josephine agreed with Kate and Jerome’s description of structured activities as opportunities for students “to express their ideas and different gifts and aptitudes.” The teachers did not seem to take up the ECM’s notion that supporting higher level student thinking would likely require (a) advanced planning to anticipate typical learner difficulties, and (b) spontaneous aid provided by the teacher during impromptu discussions during the lesson.

**Phase 2 implementation.** Following Phase 1 implementation, participants planned a second activity. Josephine said, “I liked the Lincoln one [activity] because it allowed lower level students...to enter the conversation.” Martha agreed: “It worked better for me and for them. They didn’t seem to worry about being right or getting the content. They weren’t remembering something.”

Philip thought they should develop another activity concerning the Civil War. On his laptop he revisited the Mathew Brady battlefield prints collection and asked, “Do we want to use some of these?” The participants followed Philip’s lead. As they began to plan, the teachers often revisited the digital ECM’s lesson they examined earlier. Kate was more vocal during this planning session; her initial comment was: “What about making this lesson more like in here?” She continued, “Let’s have students work together filling out these [holding up the advanced organizer provided by Callahan during the session] and then share all of their writings.”

Josephine liked the idea and suggested a “compare and contrast exercise with the pictures providing the information that we later talk about.” Jerome suggested a “before and after picture of Charleston or Richmond...or Atlanta.” Kate reminded everyone of the state’s course of study and a few of its essential themes for the social studies.

Eventually, they agreed to use several pictures of destroyed cities (Figure 5) and ask students to address the state’s essential theme of “exploring the impact of war on the lives of everyday citizens.” Kate reiterated, “Let’s make this lesson more like this” [pointing to laptop’s screen displaying the digital ECMs lesson]. Jerome spent several minutes revisiting the digital ECMs and read aloud a persistent societal concern presented in the materials. After a short pause, Jerome asked, “What about asking students to justify the war actions?” Josephine quickly added, “Or outcomes. I love it. Was the war—any war—worth it. You know, the hundreds of thousands dead and all the destruction? Death and destruction versus freedom. Cost versus cause.”





*a. Stone Wall Below Marye's Heights photographed by Andrew Russell (May 3, 1863). Prints and Photographs Division, Library of Congress, Washington, DC.*



*b. Ruins in Charleston, S.C., photographed by George Barnard. (April 1865). Library of Congress, Washington, DC.*



*c. Antietam, Maryland. Dead of Stonewall Jackson's Brigade by rail fence on the Hagerstown pike. Photographed by Alexander Gardner (September 1862). Library of Congress, Washington, DC.*

**Figure 5.** *Historical photographs around which participants developed Phase 2 implementation.*

During the spring semester, Kate, Martha, Jerome, and Callahan observed Josephine leading students through the activity. As students entered the classroom, Josephine handed each a two-sided handout: both sides were a blank copy of the PD advanced organizer (see [appendix](#)). She initiated a discussion of students' reactions to the word *war*. Josephine wrote her students' responses on the room's whiteboard and categorized them (e.g., combatants, conditions, causes, weapons, and specific examples).

Josephine then projected the image *Stone Wall Below Marye's Heights* (Figure 5a) and asked, "What do you see?" After several superficial observations (e.g., "guns and bodies on the ground," and "an old wall") Josephine said, "What I see are widows and orphans and shattered families....What about the impact of the war?"

The ensuing discussion, although brief, included students establishing a relationship between the cost of war and the reasons it was waged. A majority of students agreed that killing people and creating widows and orphans was a high cost to pay, but moreover, it was absolutely worth it to end slavery. No student voiced a differing opinion. Josephine then presented a question to order their study of the Civil War: "Was the cost of the war justified? Just something to think about today and this week."

She returned to the photograph and began to address its source:

We don't know Andrew Russell [the photographer] from Adam, but what might his bias be? Remember bias isn't the same as prejudice. Think of prejudice as preconceived dislike for someone. Think of bias as just how someone sees the world.

Josephine characterized her students' answers as "antiwar" and "trying to show how destructive and wasteful war is." She continued, "1863, what does that tell us? Later in the war right? Well, this is right before the Battle of Fredricksburg." For the next several minutes she described the battle: particular facts concerning the belligerents, their commanders, and the total casualties for both sides.

Next, Josephine placed students into small groups and distributed to half the image *Ruins in Charleston* (Figure 5b) and to the other half the image *Antietam* (Figure 5c). The groups completed one side of their advanced organizer as Josephine circulated around the room and visited with each group. Josephine then collected the class together as a whole and called on groups to share their findings. She added content information to students' observations (e.g., "That structure is actually the Circular Congregational Church and beside it is Secession Hall"). Students were assigned to complete the other side of their advanced organizer during a whole-class debriefing session.

After the activity, Kate said, "That was good. The organizer helped a lot...kept everybody together focused on the questions." Jerome added, "That went better than I could have done, I think. She [Josephine] did a really good job of keeping the discussion moving and getting through it all. That was a lot to do in one block." Martha said, "I wondered how it was going to go, but they seemed to understand...just fine. I think this is the type of lesson we should all be teaching because the kids were *thinking*, [emphasis added] and we all need that."

Josephine was thrilled with the activity. She said, "I just loved it. It was great to see the students working on this all together." When Callahan asked Josephine what she would like to have done differently, she replied,

I guess the big question should have been better. I think they think we answered it right away and are still trying to figure it out with the rest of the unit. Does that make sense? I mean, we kind of did answer it, but they need more to give an even better answer.

Participants demonstrated a growing understanding of PBHI tenets throughout implementation of Phase 2. The teachers present for the implementation again made comments that seemed to indicate they valued engaging students in a thoughtful discussion. However, the ECMs still failed to support teachers in developing a class discussion characterized by higher level questions and critical analysis of photographs.

Josephine presented an essential question for students to “think about today and this week.” She wanted to establish purpose for her students by requiring the use of the photographs’ information to formulate an answer. However, during the discussion prior to the activity, students seemed to think they soundly answered the question and did not need to revisit it nor use the photographic evidence Josephine presented. Further, she did not provide students with a rationale for developing the 21st-century skills associated with visual literacy.

Josephine actively engaged students in meaningful dialog and group work to perceive better the social reality of wartime costs on everyday citizens. Students were not limited by their individual perspectives, but rather worked together to develop and refine broader insights. Josephine also engaged students with some historical thinking. She referred to the source of one document (*Stone Wall Below Marye’s Heights*, Figure 5a) and attempted to model thinking about a creator’s potential point of view: “Think of bias as just how someone sees the world.” She contextualized the photograph by linking it in time to a battle students were to soon study (“1863... this is right before... Fredricksburg”). Still, her historical analysis of the photograph was shallow, and she did not ask students to think deeply about the photographs together as evidence from the past.

Despite students’ providing rather superficial answers to Josephine’s questions, Martha considered the lesson a success and the type of activity “we should all be teaching because the kids were *thinking*” [emphasis added]. This response suggests a misinterpretation of the expectations for active learning embodied in this PBHI tenet. While it is true that students seemed engaged in small, cooperative groups throughout the lesson, they only minimally constructed new knowledge or reasoned critically.

When Josephine introduced an essential theme, she attempted to establish a key concept that data could be connected to. However, because students seemed to think they had already answered the question, information gathered from the photographs served as illustrations of their preconceived answer as opposed to evidence from which an answer could be derived.

Josephine took Kate’s suggestion to make this lesson more like the PD sessions by employing the advanced organizer to help structure students’ thinking. Josephine seemed to consider the handout a pragmatic tool to help order the day’s events, keep students on task, and provide a mechanism for students to share their thoughts concerning their assigned photograph. However, there was no evidence that our PD design encouraged participants to conceptualize the advanced organizer as a scaffold to promote students’ critical thinking.

**Phase 3 implementation.** The participants' third activity (designed and taught during the spring semester) involved three photos: two from the Progressive Era and one from recent history (see Figure 6). Although the topic did not fall squarely within Josephine's course content, she again enthusiastically volunteered to teach the activity. Josephine later described the activity as a "1-day current event focal point."

As before, the teachers sat together in a semicircle: each with a laptop and a binder of PD materials. Josephine said, "I think it should be a lot like the last one [Phase 2 implementation]....The kids got into it and learned a lot." Kate suggested the activity include one of their state's essential themes. She asked, "Is there a way to make the lesson more conceptual to cover more ground?" The teachers looked through a list of essential themes, and Josephine said, "I think there are a lot of connections from that era [Progressive] to now...so, 'change over time' makes sense, or continuity really...as in, 'Has this really changed?'" Participants worked with laptops open and often revisited the digital ECMs. The teachers also used online search engines and visited the Library of Congress website (<http://loc.gov/pictures/>) looking for powerful historical photographs.

Photographs of child labor during America's Progressive Era reminded Martha of pictures she had recently seen of a factory in Bangladesh. The teachers discussed a tragedy that occurred less than a year earlier, when an eight-story building in Dhaka, Bangladesh, collapsed, killing hundreds of low-wage textile workers. In short order the participants decided to have students compare the working conditions and quality of life between the Progressive Era children-workers and the children (and women) who worked in Bangladesh factories a century later.

The following week, Martha, Kate, Jerome, and Callahan observed Josephine as she began the activity by asking students to analyze Lewis Hine's *Carrying-in* (Figure 6a). She presented the image, distributed to each student a copy of the advanced organizer, and assigned students to individually examine the photograph. For several minutes, Josephine randomly called on students to share aloud their observations.

She asked students about the photographer's bias; she said, "remember bias may not be the exact same as prejudice. Think of prejudice as preconceived dislike or intolerance for someone or something. Think of bias as just how someone sees the world. Bias is the lens someone wears."

Following several superficial answers, Josephine said, "Well, here, Lewis Hine is a social reformer. His life's work was to present evidence of society's problems so that we could fix them....What problem is this showing?" Many students shared thoughts related to child labor. Josephine continued to talk through the sections of the advanced organizer and led a short lecture that covered child labor in early-1900s America. She asked, "Does this type of thing still happen today?" and encouraged students to also think about other nations. After a few minutes where students shared thoughts about popular clothing brands and companies allegedly exploiting workers in developing nations, Josephine introduced the day's essential—she called it "the big"—question: "What should be done about child exploitation [labor]?"



a. "Carrying-in" boy in Alexandria Glass Factory, Alexandria, Va. Photographed by Lewis Hine (June 1911). Prints and Photographs Division, Library of Congress, Washington, DC.



b. A little spinner in the Mollahan Mills, Newberry, S.C. Photographed by Lewis Hine (December 3, 1908). Prints and Photographs Division, Library of Congress, Washington, DC.



c. Garment factory in Dhaka, Bangladesh. Unknown photographer for the Clean Clothes Campaign (March 2010). Reposted and found by the teachers on The Fableists blog at <http://thefableists.wordpress.com/2013/11/14/what-is-a-sweatshop/>

**Figure 6.** Historical photographs around which participants developed Phase 3 implementation.

Next, Josephine distributed another handout (each side was a blank copy of the advanced organizer), placed students into six groups and then gave each group one copy of Hine's *Mollahan Mills* (Figure 6b). She allotted 10 minutes for the groups to analyze the photograph, during which she moved about the room visiting each group several times to keep students focused and to correct inaccuracies (i.e., ahistoric assumptions). Next, in a whole-class setting, she called on several students from different groups to share their collected data.

Still in small groups, students then (a) analyzed a third photograph *Dhaka, Bangladesh* (Figure 6b), (b) completed the other side of the advanced organizer, and (c) generated conclusions regarding the day's big question. Josephine again moved about the room to help students think more deeply about the photo. She asked students various questions, such as, "How are the people in both pictures feeling?" and "If you were one of them, what would you want done on your behalf?"

To Josephine's attempts to promote empathy, students' responses were superficial. Many students mentioned the need for governments to protect workers through labor laws; others declared they would have refused to work in such conditions. Callahan observed no attempts to substantively compare lived experiences of people from the past and present, nor any explicit attempts to distinguish the two eras.

Finally, Josephine asked each student to "write a few sentences to answer the big question, 'What should be done about child exploitation?' Be sure to refer to evidence from your worksheets." Josephine was thrilled with her students' performance in the day's activities. Following the lesson she said, "It was awesome today! They were really thinking...and making connections from over a hundred years ago...recognizing a problem and coming up with reasons to do something about it." Kate said,

It was such a big pay-off.... They [the students] were thinking and talking about things that really matter and analyzing it. Don't know if any of them will do something about it [child labor/exploitation], but I think they know about it and could do something if they want to.

In the third activity, participants demonstrated more understanding of PBHI; however, teachers' actions and statements suggested their adoption of the tenets of the PBHI model was not yet well integrated. Influence from the digital ECMs was evident as Josephine presented her students an open-ended question that presented a societal concern (i.e., child exploitation) and called for real-world problem solving. As Josephine helped students engage in meaningful, authentic decision-making about a world problem, she felt, in her own words, "more energetic and enthusiastic... because it seemed to really matter." The lesson had a clear *purpose*; students were encouraged to address the concern and use information from the day as evidence to support their position. Still, Josephine presented no rationale for why she wanted to help students develop visual literacy, historical thinking skills, or engage an ill-structured question.

As with her earlier activity, Josephine's students were active; they worked in small, collaborative groups, explored two historical photographs, and completed advanced organizers. She also attempted to analyze a photograph's source when she said, "Lewis Hine is a social reformer. His life's work was to present evidence of society's problems so that we could fix them." Still, Josephine did not explain the value of questioning a document's source; likewise, students completed other critical and historical thinking



(i.e., contextualizing, corroborating, and thinking deeply) with virtually no discussion of their implicit value.

Participants continued to interpret the connectedness tenet to mean only interlesson consistency: that all activities and information logically fit together. However, in this lesson they overtly linked past events to those in the present and used child labor exploitation as the unifying theme. Students were given time to generate conclusions concerning the big question, and they were encouraged to use photographs from the past and present to formulate answers.

Josephine employed the advanced organizer and encouraged students to look for evidence of needed societal reform. She again moved about the room as students worked; however, this time Josephine asked a few higher order thinking questions of student groups and corrected their ahistorical assumptions. Previously, Josephine employed structure (i.e., scaffolding) for classroom management, not to support student thinking.

### **Interactive Experiences Modeling Wise Practice Pedagogy**

Data suggest that the PBHI learning experiences helped participants engage reform ideas and begin to develop their teaching knowledge. Four times Callahan led participants through an interactive, dynamic activity that modeled PBHI. When asked about the experiences, Jerome said, “They’re very helpful....Your modeling was so helpful for me to know really how to do this type of activity in my lessons.”

Martha commented on the repetition of the experiences: “We definitely needed those activities repeated. Some of us still do not fully understand how to *facilitate* [emphasis added] like you do. Some of us still ‘tell’ students about history instead of letting them figure it out.”

Philip and Josephine also had strong feelings about the PBHI experiences. Philip said, “I thought it was all a bit redundant. Once we got it, like the initial time, I think we could have used the rest of the times to create lessons.” Josephine disagreed. “They were my *favorite* [emphasis added] part. This training is *very* [emphasis added] useful and insightful. It’s the most beneficial training I have been to in maybe forever. *Thank you!*” [emphasis added]. Norbert explicitly referenced wanting to learn more because of the PBHI experiences: “You did a great job of modeling the process. I loved the ideas, wanted to do it, but had difficulty doing it. It was helpful to see it and practice with you. I’m not that good at it yet.”

Our observations of Martha and Josephine suggest that interactive experiences may have helped them recognize value in PBHI, but the PD model was less helpful for developing a deep understanding of its aspects. In their respective implementations both teachers used phrases nearly verbatim from the PD activity. Josephine repeated to students, “Bias may not be the exact same as prejudice. Think of prejudice as a preconceived dislike or intolerance for someone or something. Think of bias just as how someone sees the world. Bias is what lenses someone wears.”

Similarly, the two questions Martha presented to students (“What does this [photograph] tell us about the era?” and “What was its [the photograph’s] purpose”) were originally presented to her during the first PD session. Neither teacher seemed able to transform those statements into higher ordered thinking opportunities for students. Martha quickly moved on after having accepted students’ superficial answers, and Josephine did not help



students pursue bias as a means to better address a photograph's purpose for distribution.

### **Interphase Connections to PBHI**

Throughout the intervention, the teachers' activities tended to become more purposeful. Their first implementation consisted of a 10-minute, bell-ringer activity with no facet of inquiry. In the second and third implementations, participants developed class-length lessons that asked students to begin to answer an ill-structured question that called for civic action. As the teachers noted, student participation increased, too, as the activities required students to be more active in classroom events. At first, students answered only two questions regarding Lincoln's nervousness. Eventually, they began to think about child labor and its existence and continuity throughout the last century.

The teachers seemed to desire connectedness within their instruction; they wanted each aspect of the lesson to cohere to a common end. They also seemed to overlook additional components to the construct, however. The teachers made no indication that the connected tenet of PBHI also included, for example, that students should integrate new information in larger webs of meaning (schema) and apply newly developed skills and dispositions to authentic problems.

The teachers also supported students' thinking more diligently as the study progressed. At first, they did not use an advanced organizer and asked few questions. Later, they had students compare information from completed organizers and helped students begin to think about value claims.

Perhaps the greatest mismatch between the aspirations of the ECM models and teachers' enactment of the PD lessons was the pursuit of complex student thinking. Martha and Josephine were reluctant to challenge students to derive original conclusions from evidence. The digital ECMs lessons advocated students' deliberation of multiple truth claims and discussion of values underpinning historical decisions; both teachers omitted these features.

### **Limitations**

The study's limitations should temper any conclusions about the educative potential of our PD materials and model. Our findings are not generalizable; we cannot rule out all alternative explanations. Here, we report on practices of only one secondary school's complement of social studies teachers for one academic year. A wider sample of teachers over a longer window of support might have produced different results. The Hawthorne Effect may have been an additional limitation; simply by being observed, the teachers may have planned, discussed, and taught in ways different from their norm and told Callahan what they thought he wanted to hear (see Cook, 1962). Despite these limitations, our findings suggest a number of potential implications that might enhance the effectiveness of PD, especially when programs feature digital ECMs in similar contexts.

### **Implications**

This study contributes to the growing literature concerning theoretical and logistical groundwork for meaningful PD. Specifically, our work supports the idea that effective PD is situated within communities of practice that serve to distribute the cognitive load for understanding and implementing reform ideas (Garet, Proter, Desimone, Birman, &

Yoon, 2001). However, additional innovative teacher support programs over longer periods of time are needed to allow for more confident claims regarding which methods and materials can best support teachers. Our implications suggest areas of improvement in our future design and use of ECMs.

### **Interactive Experiences to Model Wise Practice**

This study's first implication is that interactive, dynamic learning experiences may be an effective way to present teachers with pedagogical reforms. Many teachers have served long apprenticeships in traditional classrooms as students (Lortie, 2002) and often distrust researchers' suggestions (Hiebert et al., 2002). We positioned interactive, dynamic experiences early in each face-to-face PD session and conducted them throughout the study to challenge participants' (very likely) traditional assumptions.

Several participants specifically commented that they thoroughly enjoyed the learning experiences and that PBHI was exemplar teaching to which they aspired. Martha and Josephine made such comments and were enthusiastic participants who articulated and demonstrated an emerging understanding of PBHI. Participants who experience wise practices might be more likely to meaningfully engage in PD in order to design and deliver similarly powerful instruction.

For several teachers, interactive experiences may have served as an effective first step to help motivate them to recognize value and utility in PBHI. Creators and presenters of teacher support programs should consider how interactive experiences that model tenets of a wise-practice pedagogy might increase teachers' engagement and their motivation to test reform ideas. The collaborative nature of these experiences might also help establish communication norms and trust between participants (Borko, 2004).

### **Collaborative Curriculum**

Another implication is that educative curricula may enhance PD efforts, especially when the materials facilitate meaningful collaboration among participants. The significant modifications we made to the structural features of this, the third, generation of our digital ECMs seemed to better promote a participatory teacher-curriculum relationship. Teachers explored digital ECMs collaboratively in a PD context and interacted with digital ECMs in preparation to plan and implement an original activity.

The teachers averaged 66 minutes exploring digital ECMs, and of that time they devoted an average of 26 minutes (39%) to discussing educative features. When teachers invest nearly half of an hour to collaboratively engage in a coconstruction of new understandings of reform ideas, they are more likely to begin developing more robust interpretations of their craft.

We also substantially modified the design of the digital ECMs, reducing the number of educative links embedded in the materials. This modification seemed to have helped teachers' concentrate their efforts to begin developing an understanding of PBHI. Each educative feature contained two questions that promoted participants' collaboration (i.e., discussion, reflection, and brainstorming). Curriculum designers who seek to establish a participatory relationship between teachers and their digital curricula might consider that fewer hyperlinks should increase teachers' engagement: fewer stimuli may allow for focused attention and minimize cognitive overload (see Callahan et al., 2014).

## **Expert Mentors**

A third implication is that despite an ability to encourage collaboration, educative curricula may require a skilled mentor as an active participant to facilitate learning. We only introduced the notion of educative curricula, provided digital ECMs, and encouraged teachers to work together to make sense of the reform ideas. Alone, our lesson study elements were not optimal experiences for teacher learning. Including a skilled mentor to plan classroom events with participants might have been more effective. As curriculum coach, Kate was a designated mentor for the department; however, she was not an expert in social studies pedagogy. Her contributions to the group consisted largely of reminding teachers of the state's course of study. Researchers have suggested that strategic mentoring and partnerships with pedagogy experts (i.e., teacher educators) can help teachers develop pedagogically (Goldenberg et al., 2014; Saye et al., 2009).

A related consideration is the need to provide teachers with increased modeling in formats both synchronous (i.e., real-time experiences) and asynchronous (i.e., video cases). This modeling could require explicit attention to expert teachers' skillful questioning, careful listening to student responses, and building a powerful discussion from those responses (see Sherin & van Es, 2009).

## **Conclusion**

In this study we attempted to identify any possible influence a novel PD program could have as secondary social studies teachers planned and implemented instruction. Our findings and implications may help the field continue to address the dearth of effective PD: "the most serious unresolved problem for policy and practice in American education" (Sykes, 1996, p. 465).

In order to make clear assessments as to teachers' development of PTK, we recruited teachers unfamiliar and unpracticed in PBHI. By the end of our 13-month long PD program, none of the six participants fully adopted PBHI. However, teachers' collaborative participation and created activities offered promising evidence that sustained collaborative experiences with digital ECMs can help teachers begin to recognize, value, and practice tenets of a wise-practice pedagogy.

To develop expertise in complex pedagogy, continuing collaboration and mentorship over multiple years with expert support gradually fading may be necessary. Teachers and teacher-educators might find mutual benefits from membership in this community as PTK is continuously negotiated and refined among its members.

Much is yet to be learned concerning effective ways to incorporate digital ECMs into effective PD environments. Our work may provide additional suggestions for investigations into the potential of interactive PD featuring digital ECMs.

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**Appendix**  
**The Advanced Organizer Distributed in Each PD Session**

<b>Visual Document Analysis Handout<sup>a</sup></b> <i>educated guesses are encouraged!</i>	
<b>Question</b>	
 <p><b>What is the image's date, title, and creator?</b></p>  <p><b>What type of person might have created this image, and for what purpose?</b></p>  <p><b>Was it random or posed, amateur or professional, private or published?</b></p>	
<b>Observe</b>	
 <p><b>Describe what you see in the image.</b>  <i>(be specific and attentive to detail)</i></p>  <p><b>Explain what is happening in the image.</b>  <i>(use your specific details as clues)</i></p>  <p><b>In about one sentence, state the image's overall message.</b></p>	
<b>Reflect</b>	
 <p><b>How does this image compare with other evidence?</b></p>  <p><b>Why might other evidence (messages &amp; data) agree/disagree with this image?</b></p>  <p><b>What else do you need or want to know about this image?</b></p>	

<sup>a</sup> Adapted from a synthesis of the Library of Congress's Primary Source Analysis Tool (<http://loc.gov/teachers/primary-source-analysis-tool/>) and "Historical problem solving: A study of cognitive processes used in the evaluation of documentary and pictorial evidence" by S. Wineburg, 1991, *Journal of Educational Psychology*, 83, pp. 73-87. Copyright 1991 by the American Psychological Association.