

Using Wikis with Teacher Candidates: Promoting Collaborative Practice and Contextual Analysis

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Abstract

This article examines a collaborative study that two teacher educators conducted across two sites. Participants included teacher candidates implementing a digital language experience approach project with elementary learners. The teacher candidates collaborated across sites, building joint wikis to examine their processes and products. The wikis were designed to support candidates' critical thinking while promoting collaboration. Results indicate that the use of wikis effectively promoted collaboration, critical thinking, understanding of learners' development and diversity, and understanding of literacy-based pedagogical strategies. However, results also show that teacher candidates need support in considering contexts of instructional practice (including community, school, and classroom factors) and need guidance in giving and receiving peer feedback. (Keywords: collaboration, contextual factors, diversity, literacy, teacher education, technology, wiki)

Assisting teacher candidates in the development of content and pedagogical knowledge must be counterbalanced with scaffolding more elusive dispositions, such as critical thinking and collaboration. Although these dispositions are more difficult to communicate and cultivate, they are critical to success in teaching and learning and create opportunities for teacher candidates to best apply theories and strategies on behalf of their students.

Teacher educators strive to assist teacher candidates to think critically about the contexts of teaching. To design effective instructional experiences, candidates must develop their understanding of learner characteristics including the developmental needs of students; students' diverse approaches to learning; and students' existing skills, abilities, and prior knowledge. In addition, candidates must think critically about the community, school, and classroom factors that may impact their instruction including culture, geography, and language.

Research Description

This study took place across two sites in fall 2009 with teacher candidates in the urban Northeast and the rural South. The researchers were two teacher educators who collaborated across sites with the goal of promoting their candidates' exposures to more diverse teaching contexts: The northern candidates would have a chance to respond to the experiences of their southern colleagues, and the southern candidates would have a chance to respond to the experiences of their northern colleagues. In addition, the teacher educators also felt that candidates distant from and unfamiliar with one another might be more forthcoming in commenting on each others' ideas and work.

The two groups of teacher candidates developed digital language experience approach (DLEA) stories with K–4 elementary learners. Teacher candidates worked with small groups of elementary students to develop digital stories based on an initial, shared experience (Labbo, Eakle, & Montero, 2002). Digital stories combine still images with oral narration and music in a multimedia format (Groth, Dunlap, & Kidd, 2007). The ideas are entirely student driven. The candidates' role is to provide the initial experience and to guide and support the students' writing process. Candidates also may design follow-up literacy mini-lessons and activities. This DLEA project is detailed in a related study published separately (Wake & Modla, 2010).

In this study, candidates collaborated across sites to build joint wikis examining their DLEA processes and products. They used the wikis to discuss their learners' needs, the contexts of their teaching practices, and the pedagogical strategies necessary to support elementary school students' literacy development. In addition, candidates evaluated the wikis for their role in supporting their critical thinking in these areas. As such, the research questions for this study are:

- Does structured collaboration via wiki exchanges promote candidates' abilities to think critically about the contexts of their teaching practices, to include learners' development; learners' diverse approaches to learning; and learners' existing skills, abilities, and prior knowledge?
- Does structured collaboration via wiki exchanges promote candidates' abilities to think critically about the contexts of their teaching practices, to include community, school, and classroom factors, such as culture, geography, and language?
- Does structured collaboration via wiki exchanges promote candidates' abilities to think critically about the pedagogical strategies necessary to support elementary students' literacy development?
- Does the use of wiki exchanges promote positive collaboration among candidates?

Wikis

Student collaboration in this study could have occurred in a number of media and formats, ranging from discussion boards to blogs to email exchanges. However, for several reasons, and based on a review of the literature, the researchers viewed the wiki exchanges as ideal for allowing interactivity and sustained communication (Wang, Woo, & Zhao, 2009) as candidates shared information related to their work and discussed their experiences. Wikis allow students to extend their knowledge and claim ownership of the learning process in their design and implementation of literacy instruction (Matthew, Felvegi, & Callaway, 2009; Solvie, 2008). Wikis provide versatile spaces open for collaborating (Vratulis & Dobson, 2008). In a wiki, multiple candidates and instructors can exchange information and interact with new knowledge while supported by peer and expert perspectives (Ren, Baker, & Zhang, 2009). Wikis also provide space for uploading ideas and knowledge, plus space for warehousing learner products (lesson plans, digital stories, reflections) (Matthew, Felvegi, & Callaway, 2009; Parker & Chao, 2007).

Wikis in Teacher Education

Wikis in teacher education have been effective in promoting collaborative learning (Ertmer, Newby, Liu, Tomory, Yu, & Lee 2011; Vratulis & Dobson, 2008). Moreover, they have been found to increase critical thinking about content (Ertmer et al., 2011; Wheeler & Wheeler, 2009). Teacher candidates have evaluated wikis as valuable for promoting deeper processing of pedagogical content (Matthew, Felvegi, & Callaway, 2009). However, little research has been conducted on the use of wikis to promote analysis of instructional context.

The structure of a wiki makes it particularly conducive to constructivist learning and provides teacher candidates with new relationships to their learning (Parker & Chao, 2007). Wikis allow learners to “build, tinker with, explore, share, and collaborate with others online” (Bonk, 2008, para 2) and allow students to “generate, share, and reshape knowledge (Ertmer et al., 2011, p. 214). In this study, the constructive and collaborative nature of the wiki was seen as a means to disrupt the transmission model prevalent in teacher education (Musanti & Pence, 2010; Parker & Chao, 2007). Rather than their instructors lecturing about critical thinking, the influence of classroom contexts, the needs of learners, and pedagogical strategies, teacher candidates might reach these levels of analysis and evaluation on their own terms with a minimum of instructor guidance.

Wikis and Collaboration

Collaboration is a desirable disposition to cultivate in teachers (Malm, 2009; Mullin, 2003; Singh & Stoloff, 2008), allowing opportunities to reflect, share, and revisit beliefs on teaching and learning (Musanti & Pence, 2010). Teacher candidates form unique communities of practice that allow them

to analyze experiences and construct their views of teaching and learning (Osana & Seymour, 2004; Ostorga, 2006). The wiki provides a space for teacher candidates to express and examine their work with students within a community of learning.

Essential to that community and to the construction of knowledge in a social constructivist experience is peer feedback. Peer feedback involves giving and receiving constructive critique to pose multiple viewpoints, ask questions, and provide recommendations. Giving and receiving feedback may not be an intuitive or welcome process in the teacher candidate community (Ochoa & Robinson, 2008). Additionally, the process may actually hinder the learning process by reinforcing stereotypes or affirming original beliefs and practices (Musanti & Pence, 2010; Parks, 2009).

With these limitations in mind, teacher candidates must be guided in giving and receiving feedback in ways that deepen and enrich their exploration of content. The use of the wiki in this study was seen as one way to teach these skills moving candidates from a “pseudo-community,” where candidates share shallow and insubstantial opinions, to a true learning community, where they truthfully and critically engage with one another and the content (Parks, 2009). Additionally, talk around concrete artifacts, such as lesson plans or learner products shared in the wiki, as this study required, may increase the quality and quantity of substantive feedback (Meirinka, Imantsb, Meijerc, & Verloopa, 2010).

Wikis and Contextual Understanding

Wikis have been used to promote candidates’ collaboration and evaluation of pedagogical content (Matthew, Felvegi, & Callaway, 2009). Wikis also have been useful in supporting teacher candidates’ analysis of the contexts of classroom practice, particularly in their analysis of classroom and culture (Matthew, Felvegi, & Callaway, 2009; Parker & Chao, 2007). Wikis used to promote context analysis capitalize on the situated experiences of the wiki authors to include developing an appreciation for the contributions and diverse experiences of others (Matthew, Felvegi, & Callaway, 2009; Parker & Chao, 2007). As authors discuss situated practice enacted in the classroom, the wiki provides an opportunity for communities of practice to evolve.

Studies exploring candidates’ analysis of context include a study wherein candidates taught English language arts to elementary students in various classroom settings (Matthew, Felvegi, & Callaway, 2009). Candidates used the wiki to share resources, extend classroom discussion, explore questions, and deepen reflections. In particular, candidates’ talk often focused on struggling readers and the context of the learners’ experiences as candidates searched for ways to support these students. Similarly, a study involving teams of secondary teachers from five schools involved teachers in using wikis to explore their teaching contexts with a goal of improving instructional practice (Meirinka et al., 2010). The authors found that collaboration alone

was insufficient and must be supported by the provision of concrete artifacts (e.g., lesson plans, student samples). Finally, Ertmer et al. (2011) involved their candidates in a project where they collaborated with candidates in another country to explore classroom uses of various Web 2.0 tools. These candidates felt the experience gave them a deeper understanding of people from different cultural backgrounds. Candidates also noted an appreciation of new viewpoints and differing opinions and voices.

Wiki Limitations

Although wikis may be powerful learning tools for many learners, they are not without liabilities. Students may not be comfortable contributing to wikis despite their familiarity with Wikipedia and comparable tools (Ertmer et al., 2011), and students may find working in a wiki to be cumbersome (Matthew, Felvegi, & Callaway, 2009). When non-experts author or edit pages as part of their learning experiences, there are questions of accuracy and veracity, and learners may make unintentional edits or accidental deletions (Matthew, Felvegi, & Callaway, 2009). Several variables, including age, computer proficiency, and attitude toward technology, may also affect student engagement and success in using wikis (Ren, Baker, & Zhang, 2009). Additionally, students may find it difficult to negotiate content and roles without causing conflict or compromising content or student input (Vratulis & Dobson, 2008; Wheeler & Wheeler, 2009). Finally, access to content, particularly when working with a minor population, may be a concern. Fortunately, wiki pages can be password protected (Parker & Chao, 2007).

Critical Thinking

Critical thinking is implicitly connected to knowledge construction; it is a personal process that involves accommodating new experiences and information into existing cognitive structures (Huang, 2006; Wang, Woo, & Zhao, 2009). Critical thinking is aligned with constructive and collaborative approaches based in authentic learning situations. In the context of this study, critical thinking includes the abilities to make comparisons, draw inferences, synthesize and evaluate information drawn from experience, reflect (Schellens, Keer, De Wever, & Valcke, 2009), and consider diverse perspectives (Wang, Woo, & Zhao, 2009). These critical thinking skills are valued in this study, as candidates were asked to synthesize and evaluate the teaching and learning process and to compare experiences between sites. To do so, candidates must consider diverse perspectives represented in these other locations and teacher education programs; they must reflect on all of this to draw inferences about their own experiences and those their peers shared in the wiki posts.

Teacher educators have employed many approaches to scaffold teacher candidates' critical thinking. Written reflection has been used to promoting critical thinking (Ostorga, 2006; Yost, 2006). Group collaboration and whole-class discussion have been used in conjunction with reflections

(Wang, Woo, & Zhao, 2009). Argumentation and scientific reasoning have been found to promote critical thinking (Osana & Seymour, 2004), as have peer critiques of lesson implementation (Parks, 2009; Wilkins, Shin, and Ainsworth, 2009). Cooperative project-based learning (Ochoa & Robinson, 2005) and inquiry learning (Huang, 2006; Wentworth, 2007) were also found to be effective.

Two prevalent approaches surface from the literature to promote teacher candidates' critical thinking skills and their construction of knowledge: cognitive construction and social construction. Cognitive constructivists focus on the individual making sense of new information based on prior knowledge; this is supported by approaches such as individually written reflections. Social constructivists believe knowledge is collaboratively constructed by learners working together in heterogeneous groups to advance the learning of all group members through discussion, negotiation, and sharing. This approach employs argumentation (Osana & Seymour, 2004), peer critiques (Parks, 2009; Wilkins, Shin, & Ainsworth, 2009), collaborative inquiry (Huang, 2006; Wang, Woo, & Zhao, 2009; Wentworth, 2007) and problem-based approaches (Ochoa & Robinson, 2005). This study draws from inquiry or problem-based approaches.

The problem or inquiry process involves critical thinking steps, including identifying and defining the problem (Schellens, Keer, De Wever, & Valcke, 2009) or goal (Ochoa & Robinson, 2005); drawing from multiple sources of information (Matthew, Felvegi, & Callaway, 2009; Schellens, Keer, De Wever, & Valcke, 2009); analyzing the context (Ochoa & Robinson, 2005; Ostorga, 2006); synthesizing facts with prior knowledge and formulating and evaluating possible solutions or actions (Schellens, Keer, De Wever, & Valcke, 2009); and demonstrating understanding in a variety of ways (Huang, 2006).

Critical Thinking and Collaboration

Problem-based and inquiry approaches develop critical thinking skills by moving away from passive, lecture-based instruction and instead emphasize learner inquiry into authentic problems or situations (Ochoa & Robinson, 2005) within a social context. Learners participate in collaborative learning experiences that provide them with a sense of voice and ownership (Huang, 2006; Ochoa & Robinson, 2005).

Collaboration is essential to knowledge construction in a community of practice (Musanti & Pence, 2010; Wang, Woo, & Zhao, 2009). It enables learners to approach highly complex, authentic problems from a variety of knowledge bases and perspectives (Wang, Woo, & Zhao, 2009). Collaborative endeavors involve joint work, mutual engagement, and a shared repertoire of knowledge supported by peer dialogue and feedback (Musanti & Pence, 2010; Parks, 2009) ranging from informal, casual exchanges to more formal, structured experiences where learners assist and share in joint problem solving and solution planning (Meirinka et al., 2010). The use of

the wiki in this study provided structured experience as its foundation for teacher candidates' work with their students.

Critical Thinking and Contextual Analysis

Teacher candidates struggle in examining the contexts of classroom practice (Frank & Uy, 2004). Often they do not possess enough of their new discourse to fluently understand their observations and experiences. As a result, they may miss critical incidents or may too critically evaluate these incidents based on misinterpreted or insubstantial evidence.

Compounding the research is the description of today's typical teacher candidates. They tend to be young, suburban, middle class, and European-American (Santoro, 2009). The research has depicted teacher candidates as unreceptive to ideas related to the impact of sociocultural influences, even when their teacher education programs provide this content. They tend to lack awareness about their own ethnic positioning (Santoro, 2009). The negative and stereotypical outlooks of teacher candidates toward issues of cultural and linguistic diversity indicate that teacher candidates need explicit and scaffolded experiences that allow them to analyze these factors critically.

Novice teachers must develop an understanding of teaching and learning contexts, to include learner characteristics; instructional practices; and community, school, and classroom factors (Renaissance Partnership, 2002). Placing teacher candidates in authentic situations, such as those used in this study, may increase teacher candidates' abilities to analyze contexts of teaching and learning critically and carefully (Ochoa & Robinson, 2005; Ostorga, 2006).

Theoretical Framework

This study was based on the theory of constructivism, which contends that learners actively build their understanding of the world based on integrating new information with existing knowledge. Specifically, this study employs the social constructivist paradigm in asking students to design, implement, and reflect on lessons while sharing their process in a social context through the wiki exchanges. Constructive learning experiences provide students with opportunities to participate in authentic activities within a community of learners. The role of the teacher in this context is to facilitate student learning. Wikis provide an ideal platform for this type of instructional approach (Matthew, Felvigi, & Callaway, 2009; Parker & Chao, 2007) as learners analyze their experiences within a community of practice.

Method

This study uses a phenomenological approach employing a comparative grounded theory methodology (Glaser & Strauss, 1967; Strauss & Corbin, 1994). Grounded theory, sometimes called comparative grounded theory, is a phenomenological qualitative method that emphasizes the generation of

theory from data in the process of conducting research. Researchers employing phenomenological approaches attempt to derive meaning from events and interactions of participants in particular social situations. This study derived meaning from the candidates' interactions on the wiki and evaluations of the wiki.

Pure phenomenological research focuses on describing rather than explaining an event or situation and begins in "silence," free from hypothesis or preconception. Researchers working in phenomenological research make interpretations and form a conceptual schema based on their observations of the data (Bogdan & Biklen, 2003). However, some phenomenological researchers refute the possibility of starting without preconception, as in this study. Instead, these researchers emphasize how data findings fit the interpretation structure that frame the study while making clear the role of the researcher (Moustakas, 1994).

Participants

Participants for this study were enrolled in their programs' required literacy course. The researchers asked candidates to take part in the study as part of their coursework. Any candidate who did not wish to be involved in the study would have their posts in the wiki excluded from analysis. None of the candidates enrolled in the courses excluded themselves from the study. As a result, all students enrolled in their programs' required literacy course took part in the study.

Across both sites, a total of 16 candidates participated in the study; 6 of the candidates were enrolled at the southern university, and 10 were enrolled at the northern university. The groups were similar in makeup (other than geographical differences). They were traditional undergraduate candidates of approximately 20 years of age in their junior year of study. All candidates were education majors seeking early childhood/elementary licensure. Thirteen of the 16 were European-American, and 15 of the 16 were female. They fit the profile described in the research, as they were all young, suburban, and middle class (Santoro, 2009).

University #1. Six teacher candidates participated in the study at the rural, southern university, all of whom were female. Three of the participants were European-American and from the region; the other three were Asian-American. At this point in their programs of study, all candidates had completed coursework including one educational psychology course covering the basic learning theories, a special needs course covering diversity and special needs issues, a foundations of education course covering the history of education in America, and an instructional methods course designed to prepare candidates to take the state-mandated licensure exam. During the study, all participants were enrolled in their first literacy course.

University #2. Ten teacher candidates (nine females and one male) participated in the study at the urban, northeastern university. Nine of the candidates were first-semester juniors and one was a second-semester junior. Their education courses included an educational psychology course covering the basic learning theories, a special needs course covering diversity and special needs issues, a methods course covering developmental theories, and a foundations of education course covering the history of education in America. During this study, the first-semester juniors were enrolled in their first literacy course required in their programs of study. The second-semester junior was out of rotation with her cohort due to delayed entry in the program. As a result, she had already completed another literacy course in her program of study prior to this course and may have had more prior knowledge than her peers in literacy pedagogy.

Research Design

The grounded theory approach requires the researcher to collect data through a variety of methods. The researcher then analyzes the data through four stages: coding, creating of concepts (groups of similar codes), creating of categories or themes (groups of similar concepts), and developing theory generation or explanation (Glaser & Strauss, 1967; Strauss & Corbin, 1994). The patterns noted in the data lead to identification of general concepts about the observed phenomenon. These concepts contribute to identification of broader theoretical positions that can be replicated and/or tested through comparison with other groups. According to Glaser and Straus (1967), theory generation does not require a large number of cases; rather, the researcher's task is to develop a theory from the data that are collected on the relevant behavior. Thus the small population size in this study is conducive to this methodology.

Measures

Measures for this study included the teacher candidates' wiki postings and final evaluations of the degree to which the wiki promoted their understanding of their experiences. The researchers examined the data from the two universities as a whole and disaggregated it for data unique to the two locations (rural South and urban Northeast).

Wiki postings. The data included wiki postings detailing the participants' experiences using the digital language experience approach with their K–4 student populations and thus included posts regarding both processes and products generated by the candidates' instructional practices. Candidates worked with local elementary students as part of the courses' required field experience. Candidates at both sites spent 30 hours across the semester in the same classroom setting. Candidates worked with K–1 students at the southern site; candidates at the northern site worked with K–4 students.

During the required hours, candidates were in charge of planning and implementing lessons in coordination with the course instructor and the classroom teacher. In total, candidates each designed and taught five lessons to students in five areas (phonemic awareness, phonics, spelling, shared reading, shared writing/DLEA). In most cases, lessons took two 30- to 40-minute time blocks. However, for this project, candidates worked with their students across four days with each session lasting 30–40 minutes apiece. For the courses' remaining required practicum hours, candidates conducted literacy assessments with identified students, observed the classroom teachers, and worked one on one with students needing additional literacy work under the guidance of the classroom teacher.

The researchers analyzed the wiki exchanges as nominal data after the study's conclusion using grounded comparative analysis describing reoccurring codes, concepts, and thematic categories. The researchers coded the wiki posts for discrete idea units (a clause including any verb and the elements that cluster with it [Gee, 2005]). Each idea unit received a numerical assignment. The researchers grouped coded idea units into concepts and, subsequently, into categories or themes. Posts not yielding substantive data (e.g., "good job" or "I didn't think of that") were not counted, as they did not contribute to the dialogue and were viewed as cheerleading comments typical of a pseudo-community (Parks, 2009).

The initial thematic coding of the wiki postings involved assigning numeric codes to each idea unit (Gee, 2005). For example, the first code to emerge from an idea unit was related to student responses to an opening lesson activity. The first coded phrase was "they really liked the mystery bag" (referring to the prop used in the opening lesson). This idea unit received a numeric code of 1. Any subsequent idea unit that mentioned positive student response to the opening activity presented by the candidate also received a code of 1. Other idea units that mentioned positive student response to other aspects of instructional practice received separate codes. For example, the mention of positive student response to the brainstorming map creation received a code of 2. The researchers then grouped idea units until the final categories from the study were established. In this example, comments coded as 1 and 2 were placed in the theme of "student engagement."

Initial themes that were recurrent or dominant were established during the first and second combings of the transcripts. The researchers examined all statements that did not fit the initially defined themes in a third combing of the scripts; they either incorporated them into an existing category or created a new category for their placements. The researchers examined scripts a fourth and fifth time to eliminate errors in the coding and to combine or collapse existing categories into broader or more clearly defined categories.

Throughout the process, the two researchers worked independently as each one coded and categorized the participants' postings. Then the two researchers conferred to compare and contrast their findings and to create

the codes, concepts, and categories with the goal of total agreement for each posting and each coding.

Another rater checked the scripts and codes to establish inter-rater reliability after the researchers had defined their final 12 thematic categories. The objective rater was a faculty colleague specializing in early childhood literacy teacher education. The researchers gave her a list of the 12 thematic categories as well as the original comments on randomly mixed slips of paper. They asked the objective rater to place the slips into the categories and/or to create new categories for the slips, including a “miscellaneous” or “unknown” category. Then the researchers used joint probability of agreement to examine the objective rater’s decisions. The researchers re-examined any coded comments that were not placed as expected until they reached consensus about placement into category.

Wiki evaluation. The participants also completed an evaluation designed to measure their perceptions of the wiki’s impact on their abilities to think critically about the contexts of teaching (learner characteristics, community/school/classroom factors), their abilities to think critically about their pedagogical practices, and their abilities to collaborate (see Appendix, p. 265). This survey included 14 Likert-scaled statements that participants rated on a 4-point scale from strongly agree (3) to strongly disagree (0). The statements represent categories as follows: statements pertaining to instructional pedagogy (statements 1, 6–11), statements pertaining to the classroom context (statements 13–14), and statements pertaining to collaboration (statements 2–5). As a limitation of the study, statements related to learners’ diverse needs were not included in this measure. The evaluation also included four open-ended questions. The researchers coded responses to these questions using the same procedures they employed for analyzing the wiki postings.

Procedures

The researchers randomly assigned candidates to wiki groups across sites and asked them to share their experiences with each other through structured wiki exchanges. The candidates provided feedback and offered observations to each other as the digital storytelling project progressed based on instructor-provided prompts and the candidates’ own emergent ideas. Prompts ranged from directions to write short, introductory autobiographies to instructions to develop and post rough drafts of lessons for peer review to suggestions for discussing the ongoing project across sites. Candidates’ posts included comments made about their students, critiques of lesson plans, ideas for assessment, and sharing of students’ products. At the end of the project, the candidates reflected on their experiences by completing the wiki evaluation.

The instructors at each site introduced the study to the teacher candidates in the fall 2009 semester. The teacher candidates spent one week discussing the study guidelines, reviewing project examples, and receiving technology guidance in the digital storytelling software. The course instructors

also introduced the teacher candidates to the wiki site that the instructors had developed and assigned their teams. Each of the six teams included one teacher candidate from the rural, Southern site and one or two teacher candidate(s) from the urban, Northeastern site. At the end of the first week, the candidates introduced themselves to their wiki group members by writing short autobiographies.

The teacher candidates began working with their students the following week. Each teacher candidate worked with two to four students on writing shared digital stories. Throughout the process, the teacher candidates developed and posted their work for peer review, including lesson plans, reflections on their work with their students, and the students' drafts and digital stories. A required piece of each lesson plan was an analysis of the student population for the intended lesson. In addition to asking the teacher candidates to describe the developmental levels of their students, the instructors also asked them to detail the demographics of their students and to describe their communities, schools, and classroom contexts. The teams read each others' work and provided feedback.

On average, the teacher candidates spent 4 days in the classrooms teaching the lessons and developing their students' writing in 30- to 40-minute lesson blocks. Instructors asked teacher candidates to use the wiki to peer-review candidates' and learners' products, share insights, make recommendations, ask questions, post comments, and voice frustrations. The requirements for providing feedback were loosely structured, and the instructors asked the teacher candidates to provide a minimum of eight posts to each peer in their group. Additionally, the teacher educators prompted and monitored the candidates' posts throughout the process by asking candidates to focus on specific elements as appropriate to the process, including the lesson plan, the opening experience shared with the learners, the lesson reflection, and the students' products.

At the conclusion of the experience, the teacher candidates completed an evaluation asking them to assess the use of the wiki in assisting them in developing critical thinking about their own instructional practice and their classroom contexts. The evaluation also asked candidates to evaluate the use of the wiki in promoting collaboration as a desired teacher disposition.

Results

Wiki Postings

The researchers coded the participants' wiki exchanges and analyzed them for patterns leading to broader generalizations. The researchers noted a total of 96 substantive comments in the initial coding to yield 21 initial categories, which were later collapsed into 12 thematic categories (see Table 1). The researchers calculated a simple percentage to represent the number of comments made in each category in relation to the number of overall comments.

Table 1. Wiki Discussion Themes Reflective of Overall Population

Theme	Rate of Occurrence
Engagement of K–6 population	19.8%
Writing process	18.8%
Mini-lesson	8.3%
Surprise at established abilities of K–6 students	7.3%
Need to modify/adjust	7.3%
Success of lessons	6.3%
Concerns about classroom management	6.3%
Students as authors	5.2%
Developmental needs of students	4.2%
Future planning	4.2%
Technology use and issues	3.1%
Other	9.3%
Total	100.1

The most dominant themes overall included candidates' pleasure at the high engagement of the K–4 students (19.8% of all comments) and the teacher candidates' positive responses to use of the writing process approach (18.8%). These prevalent themes were followed by candidates' discussion of possible content they could embed as mini-lessons in the projects (grammar, mechanics) (8.3%); a marked surprise at the literacy abilities of the K–4 students (7.3%); the realization that not all lessons run smoothly, causing teachers to modify and adjust their instruction in the moment (7.3%); surprise at the success of the lessons (6.3%); concerns about classroom management (6.3%); and comments about viewing and promoting students as authors (5.2%). The categories receiving the least comments included reference to students' developmental needs (4.2%), speculation about future planning using ideas gained from these projects including using technology to promote literacy (4.2%), and an initial level of trepidation about using the required technology (3.1%).

The data were also disaggregated to assess any differences between sites (see Table 2, p. 256) to examine candidates' responses to population or location differences. For example, the southern participants worked with a mix of white and Hispanic students in a rural setting, whereas the northern participants worked predominantly with African-American students in an urban setting. The teacher educators were particularly interested in examining any cultural-specific references or biases reflected in the postings.

In terms of comments unique to each site, the northern candidates exclusively referenced (a) the concept of mini-lessons and mini-lesson content (vocabulary, grammar, mechanics) (22.1% of all their comments), (b) the developmental needs of their students (11.2%), and (c) a level of trepidation about the technology aspect of the study (8.3%). The southern candidates (a) referenced concepts related to the writing process (33.4% of

Table 2. Wiki Discussion Themes Reflective of Each Site

Theme	Rate of Occurrence	
	Northern	Southern
Shared across Both Candidate Populations		
Engagement of K–6 population	25.1%	19.5%
Success of lessons	11.2%	3.9%
Concerns about classroom management	11.2%	3.9%
Future planning	5.6%	3.9%
Unique to Northern, Urban Candidates		
Mini-lesson	22.1%	0%
Developmental needs of students	11.2%	0%
Technology use and issues	8.3%	0%
Unique to Southern, Rural Candidates		
Writing process	2.7%	33.4%
Need to modify/adjust	0%	13.7%
Surprise at established abilities of K–6 students	2.7%	11.8%
Students as authors	0%	9.8%
Total	100.1%	99.9%

all their comments), (b) were more likely to speak openly about issues and their efforts to modify and adjust their instruction (13.7%), (c) referenced their surprise at the abilities of the K–4 students (11.8%), and (d) spoke more directly about the K–4 students as “writers” or “authors” (9.8%).

Wiki Evaluation

The researchers analyzed the responses to the Likert-based evaluation questions for simple mean response across the group to determine candidates’ perceptions of the wiki’s impact on their critical thinking skills (see Table 3). There were no significant differences between the population groups on any question as determined by a simple t-test, so this study does not present disaggregated data.

Candidates reported favorable responses to the statements pertaining to use of the wiki in promoting critical thinking about instructional practice (statements 1, 6–11). Specifically, participants felt that the wiki supported their abilities to think critically about content (statements 1, 7), supported their understanding of content (statements 6, 8), supported their organization and planning process (statement 9), enabled them to seek out resources to support their work (statement 10), and encouraged them to understand different aspects of the project (statement 11).

Their responses to the statements examining the collaborative nature of this project were also strong (statements 2–5). Participants’ responses indicated that they felt they had benefited and grown from the collaborative nature of the wiki project.

Table 3. Wiki Evaluation Likert-Scaled Responses

Statement Posed	<i>N</i>	<i>M</i>	<i>SD</i>
1. The experience of using a wiki helped me to think critically about the subject matter of this assignment.	16	2.63	.72
2. Using a wiki made it easy to collaborate with other students.	16	2.25	.58
3. I received adequate feedback on the quality of my work from my group.	16	2.19	.66
4. The feedback I received from my group on my work was logical.	16	2.06	.68
5. The feedback I received from my group helped me to improve my work.	16	2.0	.73
6. The experience of using a wiki helped me to find information about and understand literacy theories discussed (LEA, shared writing, etc.).	16	2.56	.51
7. The experience of using a wiki helped me to analyze and evaluate content related to the literacy theories discussed (LEA, shared writing, etc.).	16	2.31	.70
8. The experience of communicating my understanding of literacy theory helped me better understand the project.	16	2.44	.63
9. The experience of organizing lesson content in relation to literacy theory helped me better understand the project.	16	2.63	.62
10. The experience of presenting my work through using visual, multimedia, and hypertext helped me better understand the project.	16	2.44	.73
11. The experience of using a wiki with students in other locations helped me understand different aspects or ways of thinking about the project.	16	2.38	.62
12. The experience of using a wiki with students in other locations helped me think about how culture and geography can impact theory and/or product and/or process.	16	0.94	.85
13. The experience of using a wiki with students in other locations helped me think about how culture and geography can impact use of language.	16	1.13	1.03
14. The experience of using a wiki with students in other locations helped me think about the complex relationship among society, schools, and culture.	16	0.88	1.03

Note: Strongly agree (3), agree (2), disagree (1), strongly disagree (0)

Candidates reported the least favorable responses to questions regarding contextual analysis of the instructional practice (statements 12–14). Their responses to the statements pertaining to the use of the wiki in promoting critical thinking about classroom contexts were very weak. They did not feel the wiki supported them in thinking about how culture, geography, or language affected their students' experiences.

The researchers coded the responses to the open-ended wiki evaluation questions and analyzed them for patterns using the same procedures used for the wiki postings (see Table 4, p. 258). Although candidates were prompted to provide three responses to each prompt, they often supplied less than three responses. Again, there were no significant differences between the population groups on any question, so this study does not present disaggregated data.

In responding to the open-ended questions, candidates commented on aspects of the wiki that supported their instructional practice, including the ability to compare work and ideas with other candidates, the ability to give and receive feedback, and the process-based aspect of the assignment. They also made suggestions regarding perceived weaknesses of the wiki, including the extra work that the wiki required and the nature of feedback received from some peers.

Table 4. Wiki Final Evaluation Responses

Prompt Question	Prevalent Responses by Theme
In contrast to a research paper, please state up to three things in the wiki that worked for you.	Ability to compare ideas/work to that of other candidates Level of feedback and interpersonal contact Ability to improve and work through progressive process
Please state up to three things in the wiki study that you would change.	Difficult to have homework plus wiki requirements Not everyone gave constructive feedback
Please state up to three ways this study used group work in a positive, constructive manner.	Groups gave good feedback as well as comments and compliments Exchange of creative ideas
Please state up to three ways that this study was not supported by group work.	Felt other students were too critical and could have been more constructive Group did not always provide helpful, effective feedback Not all students received feedback

Discussion

In this study, the researchers designed the wiki to support teacher candidates' critical thinking about learner characteristics; community, classroom, and school factors; and pedagogical content necessary to support elementary school students' literacy development. Additionally, the researchers designed the wikis to promote collaboration as a disposition among the teacher candidates.

The data from the wiki posts showed that the teacher candidates felt the wiki supported their critical thinking about their learners' developmental needs; diverse approaches to learning; and learners' existing skills, abilities, and prior knowledge. Candidates indicated that they were pleased to discover the responsiveness and engagement levels among their K–4 students. They also reported their surprise in finding the advanced levels already in place among their students' literacy skills, abilities, and motivation. Finally, they also made comments directly related to their students' developmental needs.

The candidates' responses indicating surprise and pleasure about their learners' abilities and engagement may indicate a short-sightedness of the abilities and characteristics of this age group due to the candidates' lack of experiences. It is noteworthy that this study was the first authentic classroom experience the southern candidates had access to in their program of study, whereas the northern candidates had previous and more extensive interactions with students in classroom settings. This dynamic was borne out in the data, with the southern candidates making markedly more positive comments indicating how impressed they were with their students' abilities, prior knowledge, and skill base, whereas the northern candidates made more comments explicitly related to developmental matters.

Candidates' comments supporting technology integration and constructive learning approaches also point to candidates' abilities to consider and support students' diverse approaches to learning. Prior to this experience, candidates had not seen or taught lessons that engaged students in more

than direct instruction or worksheet completion activities. The teacher candidates' future-planning comments overwhelmingly spoke to scaffolding students into more constructivist learning avenues both with and without technology integration.

The data from the posts were less encouraging in examining the teacher candidates' ability to think critically about the contexts of their teaching in regard to community, classroom, and school factors. The absence of data from the posts in this vein is most striking, particularly as these factors were required elements in the lesson planning process. The wiki posts did not yield any substantive data indicating that the teacher candidates were considering their students' cultures, geographies, and languages as influential in the teaching and learning process. The wiki evaluation the teacher candidates completed also verified this finding when they indicated that this project had the smallest impact on their abilities to think about how their students' cultures, locations, and languages affected their school experiences.

Originally, the researchers had thought the wiki exchanges could promote their candidates' exposures to more diverse teaching contexts. However, candidates were not explicitly required to discuss race, ethnicity, culture, geography, or language in the assignment beyond including demographic information in their initial lesson planning. Not surprisingly, they did not spontaneously discuss these contexts in the wiki. Indeed, candidates spoke of their students in the posts without identifying race, ethnicity, culture, geography, or language. This finding elicited mixed emotion from the researchers. On the one hand, it was encouraging to see that candidates were not openly applying negative or inhibiting biases or stereotypes to their students. Nonetheless, the impact of students' linguistic and cultural identities could have been a rich topic of discussion if the assignment had appropriately scaffolded students' thinking in exploring these topics. The research base affirms that candidates need explicit guidance to discuss these issues (Frank & Uy, 2004; Santoro, 2009), and thus, this was a limitation of the assignment.

The data gathered from the wiki posts and the wiki evaluation also showed that the wiki supported teacher candidates in their critical thinking about pedagogical strategies necessary to support elementary school students' literacy development. The comments recorded in the wiki posts indicated the candidates' pleasure at the success of the lessons and provided evidence of future planning, to include continued authentic writing using the writing-process approach with students and positioning students as authors. Candidate comments regarding pedagogy also focused on embedding literacy-specific mini-lessons and using technology to support student literacy development. Likewise, the wiki evaluation results supported this finding. Candidates' growth in pedagogical knowledge was supported in an independent content-based survey administered separately and not reported here (Wake & Modla, 2010).

Candidates also indicated that the collaborative nature of the wiki was a positive aspect of the study and that the wiki did push them to consider their pedagogical practice more critically. Their responses to the Likert-scale wiki evaluation examining the collaborative nature of this project were positive, and participants' open-ended responses indicated that they felt they had benefited and grown from the collaborative nature of the wiki project. However, their estimation of the quality and level of feedback they received from their peers indicated mixed experiences differing on a candidate-by-candidate basis.

In the wiki evaluation open-ended responses, candidates cited two positive prevalent themes in evaluating the collaborative nature of the project: the ability to see what other candidates were designing and experiencing so they could compare their work, and the ability to post ideas through a process rather than focusing solely on an end product. These two themes indicate that the candidates appreciated reading the ideas and plans of other teacher candidates, they valued the process-centered nature of the assignment, and they valued the opportunities to exchange creative ideas for their lesson designs in a collaborative setting that allowed them to make changes and improve on their products.

Although candidates responded positively to the collaborative nature of the wiki and many of them found their peers' comments helpful, this finding was double-edged, as several candidates expressed their discomfort in giving and receiving feedback from other students (as opposed to the instructor) and felt that their peers were either too critical or unhelpful. Clearly some candidates felt pleased and supported with the level and quality of feedback they received, whereas other teacher candidates were less satisfied. This outcome may reflect a bias that positions the instructors as content masters and the only ones qualified to provide feedback (Wilkins, Shin, & Ainsworth, 2009). However, it also supports the research indicating that giving and receiving feedback may not be an intuitive or welcome process in the teacher candidate community (Ochoa & Robinson, 2008).

The candidates also indicated their dislike of the extra workload required by the collaborative nature of the study. It is interesting that they saw the workload as "extra" or as additional to the "real work" of the classroom. One point of the study was to promote collaboration as a positive teacher disposition. Although the teacher candidates evaluated the wikis as positively promoting collaboration, they may have needed more support in seeing the collaborative process as having inherent value (Meirinka et al., 2010; Musanti & Pence, 2010; Ochoa & Robinson, 2008).

Although the study allowed the researchers to address their initial questions, a few unexpected findings also manifested during the data analysis. The candidates' enthusiasm for the technology aspect of this project was a particularly positive finding. The candidates embraced this study, its processes, and the technology in spontaneous future planning. The research

base indicates that teacher candidates may fear work with technology or fail to see how to effectively integrate technology with instruction (Groth, Dunlap, & Kidd, 2007; Labbo, Eakle, & Montero, 2002). However, in this study, candidates were able to see the potential of writing supported with technology and to consider future planning options with technology.

A second unexpected finding emerged from the data unique to each site, which gave the researchers more insight into their own practices as teacher educators and the influences of the two different programs of study. The focus of the northern candidates on the concept of mini-lessons clearly reflected an emphasis promoted by that teacher educator. In contrast, the southern candidates' focus on writing process and viewing students as authors spoke to that teacher educator's primary instructional focus. Additionally, the northern candidates' focus on the developmental needs of students reflects that program's early, intensive emphasis on developmental theory. Conversely, the focus of the southern candidates on the need to modify and adjust is a programmatic constant in their curriculum and is reflected in their posts.

Limitations and Implications for Further Study

Limitations of this study are evident in examining the data. The candidates' inabilities or unwillingness to examine contextual factors such as race, ethnicity, geography, culture, and language indicate a need for more explicit scaffolding in this area. Similarly, candidates' discomfort in giving and receiving peer feedback and their perspective that collaboration required additional work indicated that the instructors should have spent more time with these candidates discussing the merit of constructive critique. Collaboration in the profession is a critical component of professional development, and teacher education programs could expand on this aspect in future studies. Finally, the inabilities of the instructors to recognize their own differential approaches to the project should be considered a limitation. Ironically, although the study was intended to be identical across sites, the preferences of the instructors were clearly evident in the final data analysis.

Conclusion

In this study, teacher candidates in two distinct locations used wikis to collaborate in their work supporting elementary school students' literacy development. The researchers designed the wikis to promote critical thinking and collaboration. Although these dispositions are more difficult to communicate and cultivate, they also create opportunities for teacher candidates to best apply theories and strategies on behalf of their students. The instructors asked the candidates to think critically about the contexts of teaching, to include learner characteristics; community, classroom, and school factors, as well as their pedagogical practices. Data in this study emerged from examining the wiki posts as well as candidates' evaluations of wikis for promoting critical thinking and collaboration.

Results show that peer collaboration on wiki exchanges supported collaboration and critical thinking about student characteristics and instructional pedagogy. The wiki posts indicated that the wiki supported candidates in considering the developmental needs of students; students' diverse approaches to learning; and students' existing skills, abilities, and prior knowledge. The wiki also supported candidates in considering their pedagogical practices in relation to their students' levels of literacy development. Candidates' willingness to embrace both technology (after some initial trepidation) and constructivist approaches to teaching literacy also were positive. The wiki did not support candidates' critical thinking in regard to the impact of community, classroom, and school factors, such as culture, geography, race, ethnicity, or language. Candidates clearly needed more explicit guidance in exploring these topics.

Finally, the wiki structure also promoted collaboration and allowed candidates' grassroots analyses of their experiences. Candidates appreciated the chances to engage in a process approach to learning that allowed them to see, comment on, and receive feedback on their work throughout the project. However, candidates' comments also indicate the teacher candidates' sensitivity to giving and receiving peer feedback. The candidates also saw the work of collaboration to be "extra" work and not part of the overall process. Again, candidates clearly need explicit support in giving and receiving constructive feedback as part of the collaborative process, and they need guidance in seeing collaboration as a part of their work and as a positive and desired disposition for their field.

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Appendix

WikiLiteracy Evaluation

Statement	Strongly Agree	Agree	Disagree	Strongly Disagree
1. The experience of using a wiki helped me to think critically about the subject matter of this assignment.	3	2	1	0
2. Using a wiki made it easy to collaborate with other students.	3	2	1	0
3. I received adequate feedback on the quality of my work from my group.	3	2	1	0
4. The feedback I received from my group on my work was logical.	3	2	1	0
5. The feedback I received from my group helped me to improve my work.	3	2	1	0
6. The experience of using a wiki helped me to find information about and understand literacy theories discussed (LEA, shared writing, etc.).	3	2	1	0
7. The experience of using a wiki helped me to analyze and evaluate content related to the literacy theories discussed (LEA, shared writing, etc.).	3	2	1	0
8. The experience of communicating my understanding of literacy theory helped me better understand the project.	3	2	1	0
9. The experience of organizing lesson content in relation to literacy theory helped me better understand the project.	3	2	1	0
10. The experience of presenting my work through using visual, multimedia, and hypertext helped me better understand the project.	3	2	1	0
11. The experience of using a wiki with students in other locations helped me understand different aspects or ways of thinking about the project.	3	2	1	0
12. The experience of using a wiki with students in other locations helped me think about how culture and geography can impact theory and/or product and/or process.	3	2	1	0
13. The experience of using a wiki with students in other locations helped me think about how culture and geography can impact use of language.	3	2	1	0
14. The experience of using a wiki with students in other locations helped me think about the complex relationship among society, schools, and culture.	3	2	1	0

In contrast to a research paper, please state up to three things in the wiki that worked for you.

Please state up to three things in the wiki project that you would change.

Please state up to three ways this project used group work in a positive, constructive manner.

Please state up to three ways that this project was not supported by group work.

