

Teacher Beliefs and Their Influence on Technology Use: A Case Study

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Abstract

In this article, the authors describe a case study approach used to examine the complexities and contradictions of ways teachers perceive and implement technology in a seventh-grade social studies class. The participants in this qualitative research study were a 13-year veteran social studies teacher and the student intern who worked with this teacher during a year-long professional development school experience in a culturally and economically diverse middle grades school. Using interviews and classroom observations, the authors portrayed the beliefs and practices of the two participants in relation to their views of technology and its uses in the classroom. The findings support and deepen current literature and suggest that, although teachers *believe* that technology can be used to help engage students in thinking critically to promote self-regulated learning and improve literacy skills, such beliefs do not always come to fruition in actual classroom practice.

Teacher Beliefs

As beliefs help guide individuals' interactions and interpretations of the world, the same can be said about the beliefs a teacher might have regarding teaching and learning and the instructional decisions that might result (Kagan, 1992; Pajares, 1992). Thornton (1989) contended that teachers act as gatekeepers controlling both the content and the instructional strategies that are utilized. He suggested that these curricular-instructional decisions are "ecological in character...part of an interactive system of beliefs and contextual factors" (p. 9), making it important to acknowledge this relationship, as such decisions may be executed subconsciously without regard to unchecked assumptions. Findings that associate teacher beliefs with teacher actions (Chan & Elliott, 2004) have suggested a similar relationship between beliefs and technology integration (Kim, Kim, Lee, Spector, & DeMeester, 2103; Ottenbreit-Leftwich, Glazewski, Newby, & Ertmer, 2010).

Evidence demonstrates that beliefs can and do influence the choices a teacher makes regarding the integration of technology for instructional purposes (Ertmer, 2005; Niederhauser & Stoddart, 2001). Research has shown that teachers who take a student-centered approach to teaching and learning have been associated with the classroom use of technology (Ertmer, 2005; Wozney, Venkatesh, & Abrami, 2006).

Student-centered approaches, which are often associated with constructivist principles (Bruner, 1993; Vygotsky, 1978), are designed to allow students more choice and control in the content to be learned, processes used to learn the content, and products created to demonstrate mastery (Richardson, 2003). While teachers use technology to access and manipulate data, gather resources, and enhance instruction, teachers who support student-centered instruction fully understand that in the hands of their students, technology offers the potential to problem solve in a real-world context (Lajoie, 2000) and to construct knowledge through global interaction.

Kim et al. (2013) sought to determine how teachers' pedagogical and epistemological beliefs related to their instructional use of technology. In a 4-year study, participants received technology equipment, professional development, as well as technical and pedagogical support, with the goal of improving technology integration practices. The results suggested a connection between teachers' beliefs about the nature of learning and effective teaching practices to their technology implementation practices. The study found that the more student-centered their pedagogical beliefs, the more ubiquitous the use of technology.

Kim et al. emphasized that the connection between student-centered beliefs and technology integration should be considered a correlation not causation. Judson (2006) suggested that analyzing the connection between beliefs and technology integration may help to explain the association. The basis for our case study was to develop a deeper understanding of the connections between teacher beliefs and their use of technology as an instructional tool.

Teacher beliefs do not occur in a vacuum. Rather, conditions and factors that lead to the creation of teacher beliefs are tied to personal and cultural experiences, cognitive insights, and "critical images and episodes" (Pajares, 1992, p. 310). One factor that can influence a teacher's beliefs regarding the use of technology is the perceived value for the instructional use of that technology—whether or not it would positively impact the teacher's instructional goals (Watson, 2006). In a study conducted by Wozney, Venkatesh, and Abrami (2006), expectancy-value theory was used to analyze teacher technology practices. Teachers who showed confidence in their ability to implement the identified technology, as well as valued the potential outcome for that technology, were identified as those "more likely to be at the high end of the 'technology user' spectrum" (p. 195).

As a teacher's assessed value for the tool's potential to meet instructional ends increases, so does the likelihood that the tool will be utilized (Hughes, 2005; Ottenbreit-Leftwich et al., 2010; Wozney et al., 2006; Zhao, Pugh, Sheldon, & Byers, 2002). Beliefs about the benefits of technology for teaching and learning may in fact be "the strongest predictor" of use in the classroom (Russell, Bebell, O'Dwyer, & O'Connor, 2003, p. 307).

A Discrepancy Between Beliefs and Practice

Despite evidence of a correlation between beliefs regarding the effectiveness of technology and its implementation, believing in technology does not guarantee its use in classrooms. Research suggests that an inconsistency exists between teachers' professed pedagogical beliefs and their actual instructional use of technology (Judson, 2006; Levin & Wadmany, 2005). Ertmer (2005) proposed that a series of contextual factors such as curricular, peer, parental, and administrative expectations may contribute to the appearance of an inconsistency. She noted that even when teachers report to hold constructivist principles other beliefs may become the deciding factor in determining their instructional choices.

This discrepancy in beliefs was affirmed in a study conducted by Chen (2008), who noted the influence of external factors, as well as the additional factor of possessing a limited or misconstrued understanding of constructivist practices. However, he asserted that these factors did not act as independent agents, but rather, it was the "interplay among these factors" (p. 69) that creates the divergence between what teachers believe about technology and what they implement in their classrooms.

In a study that attempted to reduce many of the previously mentioned contextual factors Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur, and Sendurur (2012) used a purposeful sampling of 12 teachers who had won awards for their technology use to revisit the disparity between teacher beliefs and technology integration practices. While their findings revealed that external barriers such as money, access, time, and state standards still existed, these participants felt they were able to overcome any negative influence the barriers may have had. However, the attitudes and beliefs of other teachers were perceived to be the greatest obstacle to student use of technology.

Internal factors of the participants' own attitudes and beliefs were perceived to be "a *facilitative* [emphasis in original] factor, providing the passion and drive needed to devote extra time and effort to enact their strong beliefs about good teaching and learning" (p. 433). The authors indicated that beliefs were not enough to ensure student-centered practices, unless what they described as the "barrier threshold" was overcome.

An additional explanation for the discrepancy between a teacher's identified beliefs and the execution of those beliefs may be due to a lack of knowledge or understanding of how student-centered environments can be established through the use of technology. Knowing how technology can facilitate student-centered learning may prove to be essential, as Guskey (1986) suggested that the successful use of instructional practices can work to change associated beliefs.

In a 3-year longitudinal case study, Levin and Wadmany (2005) studied the impact a technology-rich learning environment had on teachers' beliefs. Teachers received professional development in the form of trainings and weekly workshops on the effective implementation of technology for teaching and learning. By the end of the study, participants experienced a significant change in their practice, as well as their beliefs, demonstrating a "reciprocal rather than unidirectional link between teacher classroom practices, change in teachers' educational beliefs, and between teachers' knowledge restructuring processes" (p. 298). Despite the appearance that teacher beliefs are firmly entrenched, providing experiences that

not only challenge a teacher's underlying belief structure but demonstrate the benefits for teaching and learning may facilitate a change in these beliefs (Kagan, 1992; Kim et al., 2013).

Purpose

The current study evolved from an ongoing conversation related to the importance and effectiveness of technology in the classroom that took place between us over a number of years. Although we share an educational philosophy rooted in student empowerment and Deweyian tendencies (as described in Apple & Beane, 1995; Dewey, 1998), our views on technology tend to be conflicting and even oppositional.

First author Rena has a relatively optimistic perspective regarding the power of technology to transform student learning by opening up exciting, exploratory, and authentic opportunities. She is an avid user of technology, implementing it in much of her work with teacher candidates.

Second author Gary tends to see technology as closely tied to corporate-based reforms that discourage teacher innovation and predominantly provide students with reductive, standardized drill-and-practice and test-preparation experiences. Although he uses technology on an as-needed basis, he has concerns regarding the potential for electronic forms of curriculum to both deskill and replace teachers as curriculum planners. In short, Fullan (2013) provided an apt compromising statement regarding our respective theoretical perspectives concerning technology:

When we enlist technology in the service of exploratory learning for all, watch out! On the other hand, if we plod along with standards and assessment using technology only as a prop, we will get what we deserve: a higher level of tedium. (p. 78)

While the tensions between our two overarching perspectives are more complex than what we have described, long discussions related to that conflict caused us to work together to examine how a veteran social studies teacher and his student teacher in a local middle grades school perceived and implemented technology in their classroom. Initially, we were interested in finding their answers to the following research questions:

- How do social studies teachers and their students use technology to support the curriculum?
- What role does technology play in education?

As our conversations with the participants progressed, we came to understand the importance of teacher beliefs in relation to technology use. As a result of these conversations, our research expanded to include inquiries related to teaching philosophies along with pedagogical beliefs.

After initial observations of the participants revealed a disconnect between their professed beliefs regarding technology use and their implementation of those beliefs into practice, our research focus expanded again. The discrepancy between beliefs about technology and its classroom use led us into an additional line of inquiry related to discovering why this disconnect between stated beliefs

and actual practice existed. The [appendix](#) contains a detailed listing of our specific research questions.

Method

This study took place in a middle school in a city of approximately 80,000 people in central Illinois. Watson Junior High School (pseudonym) is one of the most racially, economically, and linguistically diverse schools in the region, providing an education for approximately 1,100 students in the sixth, seventh, and eighth grades. Demographic information from the Illinois State Department of Education indicated that at the time of this study 54% of Watson's students were White, 25.5% were Black, nearly 11% were Hispanic, and over 7% were mixed race. Approximately 56% of the students were eligible for free and reduced lunch, and 23 home languages other than English were spoken throughout the district.

Watson organized its teachers on teams, with two-person teams common at the sixth-grade level and five-person teams at the seventh- and eighth-grade levels. Within the last 4 years, the district has made an effort to provide SMART Board® interactive whiteboards in each classroom, and it is seen as a regional leader in using technology. For example, Watson has piloted one-to-one laptop programs for selected classrooms and has held annual extended technology workshops for teachers, administrators, and technology coordinators.

Procedures and Data Collection

This study used a qualitative approach that included small-group interviews and classroom observations. Interviews and observations were chosen primarily because we are former public school teachers who currently spend numerous hours working in public school settings and have what Mischler (1986) called “ordinary language competence” (p. 7).

Ordinary language competence is a “critical but often unrecognized precondition for effective research practice” that involves using “culturally shared assumptions about how to express and understand beliefs, intentions, experiences, and feelings” (p. 7). In other words, because we understand the language, intentions, and experiences related to schools, we also understand the language and instructional methods used by practicing teachers.

In order to construct an interview protocol, questions were borrowed from a national social studies survey (Passe & Fitchett, 2013). The interview questions (see [appendix](#)) included both Likert scale items during the interview and more open-ended queries about the philosophy of teaching, abilities, skills, and knowledge in relation to personally using technology, ways of using technology in the classroom, and technology issues related directly to social studies content. We used a semistructured approach to interviewing in order to ask relevant follow-up questions to protocol questions and to highlight the voices of the participants (Richardson, Dohrenwend, & Klein, 1965).

Initial data gathering involved meeting with the two participants face to face in November 2012 and asking them selected questions that related to instructional use of and attitudes toward technology use. We chose to interview the participants together, as interaction among participants can potentially “provide a deeper understanding of the issues and produce richer data as a result”

(Hennink, Hutter, & Bailey, 2011, p. 158) Open-ended questions were read to the teachers as part of the first small group interview and follow-up/clarifying questions were asked as needed.

This initial interview was audiorecorded and transcribed. The interview transcript was independently coded (Strauss, 1987) by each researcher. We met to share and discuss our initial, independent codes and collaboratively agreed upon the names and definitions of the codes or developed new names for codes when necessary. This collaboration resulted in two main themes that emerged from the data—Teacher Beliefs and Barriers to Implementing technology. Six subthemes contained within the theme of Teacher Beliefs included the following:

Philosophy – the purposes of education.

Student-centered learning – descriptions of classroom events/situations in which the students had significant ownership/power during lessons.

Technology – specific beliefs related to defining, understanding, and using technology.

Technology and content – beliefs about how particular forms of technology were related to specific content areas (disciplines of knowledge, i.e. math, science, reading).

Technology and practice – tied to notions of how technology is used during lessons, who uses it, how frequently is technology used, and its impact on students.

Ability – the self-perception of one’s competency in using various forms of technology.

Seven subthemes connected to the theme Barriers to Implementing Technology included the following:

Student technology knowledge – the abilities/skills related to technology usage that students bring to the classroom.

Time – amount of minutes/hours available for teachers to access technology; time was also related to the participant’s opportunity to learn about technology.

Resources – included availability/access to technology, money to purchase technology, human assistance, and professional development opportunities.

Standardized testing – the impact of having students take computer-based state and district mandated tests.

Attitudes/beliefs of other teachers – the degree of acceptance/comfort with using technology in the classroom among colleagues.

Beliefs vs. Practice – the disconnection between the expressed value of technology for improving education and the actual implementation of the technology—especially in terms of getting technology into the hands of the students.

Support – the degree that administration/district provided assistance to teachers who wished to do more with technology regarding their own teaching.

The classroom observation portion of the study involved one observation conducted by both of us and eight additional observations by a single researcher. The main purposes of these observations were to determine the types of technology being used by both the students and the teachers and to understand how the technology was being used. For the purposes of this study, the notion of *how* was closely tied to examining the degree to which technology was being used in a student-centered manner.

We were particularly interested in seeing how the teachers used technology as a learning tool to solve problems, to create knowledge, and to promote critical thinking (as described by Collins & Halverson, 2009; Inan & Lowther, 2010). In other words, we were interested in seeing if classroom technology usage was moving beyond drill-and-practice events and moving toward engaging students and making real world connections (as in Ertmer et. al, 2012).

Field notes were used to record each observation and, at times, we interacted with the students while they were using computers, asking clarifying questions related to functions performed by the students in an effort to gain an understanding of how they interpreted their work. The field notes from the observations were evaluated (using the previously developed codes) and used to develop questions for the final small group interview.

The focus of the final small group interview, which took place at the end of April 2013, was to understand how the participant teachers perceived technology use during the observed lessons and to compare this technology use with their previously stated teaching philosophies. Prior to the interview we developed a list of 13 questions that we had intended to ask, again using a semistructured approach (Richardson, Dohrenwend, & Klein, 1965). What actually took place during the interview was more of an unstructured interview (Patton, 2002) that led to multiple follow-up questions that provided us with insights into the practices of our participants that we did not anticipate.

As in the initial interview, the second interview was audiotaped and transcribed. We each read and coded the second transcript individually, and again met later in the process to share findings and analyze the responses in terms of the previously established codes. During this process, two of the subthemes were renamed to more accurately represent data found among the responses generated during the second interview. The subtheme Technology and Curriculum was changed to Technology and Content, as curriculum is too broad a topic. Technology and Instruction was changed to Technology and Practice, as practice included both how the teachers and students were using technology and not simply the design of the lesson.

Participants

The participants in this study were Mike, a 13-year veteran social studies teacher and his 22-year-old intern, Cheri, who was completing a yearlong professional development school experience as part of her senior year in college. The participants could be described as a convenience sample, as they were recruited because they were the only cooperating teacher and professional development school intern who were teaching social studies at Watson Junior High.

Mike had been a seventh-grade social studies teacher at Watson for 9 years and was working on his doctoral degree. In exploring his beliefs about teaching, Mike said,

...my belief is for the students to be as engaged as possible in their own learning, which in most cases involves the students doing the vast majority of the work themselves or with others. I try to be in a position where it is not me doing the talking, but the students who are doing their own learning through an activity that we're doing.

Mike indicated that his three most important reasons for teaching social studies were to help students develop skills in language arts and reading, to teach students life skills, and to help them become "informed on what being a good citizen is and what is required of them to be good citizens." In terms of prioritizing social studies goals for his students, Mike stated,

To be honest with you, mastering basic facts isn't very high on my list....It's more important that they [students] understand how they go about finding the answer to the topic or problem regardless of if its geography related or any subject related. So I think that geography information they get is secondary behind just the process of how to go about learning. The skill of being able to think, process, and maybe find the answer to what they're looking for is a more important skill than just geography facts and stuff, because it will help them longer than just in geography—other classes and in life.

To summarize Mike's responses to questions about educational philosophy, he values teaching that helps students acquire the skills and processes of learning more than he values teaching designed to aid students in the accumulation of facts. Furthermore, Mike believes that students should be active in the learning process and believes that they can learn both independently and from each other.

Cheri's previous teaching experiences involved mainly individual and small-group clinical experiences and teaching in a summer school program with students attending a large urban district. She appeared to share some of Mike's beliefs about the value of students learning from each other:

I favor group work a lot. There are benefits to individual work, but I feel that with group work there is more collaboration. Students can lean on each other rather than just raising their hand and asking the teacher for the answers. They can process the information better and look to their neighbor and say, "I don't understand this. Can you help me out so we can help each other?"

She indicated that the most important reason for teaching social studies is to have her students develop skills in language arts and reading, as reading is important in all subject areas. Her second reason was to prepare students for the next grade level by teaching them specific content area knowledge and skills in social studies, as she expressed concerns about preventing students from falling behind. Along these lines, Cheri believed that acquiring content knowledge in geography was important for students, as she wanted them to understand the world as a whole, and especially America's place within the world. Finally, much like Mike, Cheri saw learning geography as useful for preparing her students to become good citizens.

Results

Based on our thematic analysis, we present our findings as a summary of the participants' beliefs, our accounts of teaching observations when students were using technology, and a discussion of the barriers to implementing technology identified by the participants.

Mike's Beliefs

When asked to explain what comes to mind when hearing the word *technology*, Mike felt his perspective would be different than those of his students. Mike saw technology as more than electronic devices. He considered "any tool that can be used to help with learning," TV, clocks, phones, and so forth, to be technology. However, he reported that most of his middle grades students consider common devices embedded in their everyday lives, such as phones, to be just that, common and not viewed as technology.

When it came to educational uses of technology, Mike contended that the mere presence of technology did not naturally facilitate learning. He considered the teacher's role to be essential, even more critical than the technology itself. Teachers must make the technology fit into the expected curriculum. "They can't just use the technology to replace the learning that was taking place, or to replace the role of the teacher in the classroom. Technology is a tool to assist learning."

Mike considered high-end users of technology to be teachers who incorporated a wide variety of technologies, including those on the cutting edge, consistently in their lesson design. Although he indicated that his peers would rate him as a high-end user, Mike considered himself to be an average user. He acknowledged he possessed a vast technology knowledge base, but had yet to find the means to utilize such technologies instructionally: "There's a lot of stuff that I know how to do, and I'm comfortable with doing it; but I haven't found a way yet that I feel comfortable incorporating that into the learning."

Mike indicated that technology provided distinct benefits to him as a teacher. Access to newscasts in several forms, both current and archived, which covered a wide range of topics, along with social media platforms like Twitter, YouTube, and Facebook, enabled him to help students connect what was happening in their daily lives to what they were learning in the classroom: "So you're constantly in this process of thinking, 'How can I bring this from the outside to the inside?' and making sure the students enjoy the technology themselves and also seeing it can be beneficial for their lives."

Mike appreciated the freedom that came from teaching a nontested content area like geography. For instance, he said that there was less pressure to cover a specified amount of material than for those who teach reading or mathematics. He indicated that teaching social studies meant that the administration was also less prescriptive in determining what content should be taught and how technology should be used. In his school, reading and mathematics both had designated tests that students must complete electronically in order to determine a level of achievement. Teaching geography allowed him to select the technology he would use and to determine whether or not it would be used for assessment purposes.

While Mike reported that he was comfortable with the amount of technology he was using for teaching and learning, he was not satisfied with how he was using technology: “There is a disconnect I think, though, between the teachers using technology in their instruction and the students actually using the technology to help with their learning.” Mike indicated that the excitement of an interactive website is lost when only the teacher has the ability to manipulate the content on that site:

I can show it [interactive website] to kids on the SMART Board in five minutes and get the kids really excited about it. Then if I have to make the kids write down the 50 letter URL to take it home, their hopes have been dashed actually.

For Mike, increased student access to technology would promote excitement and engagement in learning, but unfortunately, student access was rarely available.

Observation of Mike’s Teaching Practices

We completed one formal teaching observation of Mike in which his students were actively using technology. The circumstances surrounding this lesson were unusual, as it took place on the last day of the third quarter, when 17 of the 28 students were bowling as a reward for their positive academic performance. Before the period began, Mike indicated that he needed to schedule the lab weeks in advance and that he chose the personal reward trip day, because it would give students who were missing assignments a chance potentially to catch up. Students who had completed their assignments were being rewarded by going bowling. He also said that he did not want to teach any new material when more than half of his students were on the reward trip.

Because so many students were absent from class, Mike created a webpage linked to his own teaching website that the absent students could access. The webpage consisted of a series of short online quizzes that would help his students review the major cities of Southwest Asia. The quizzes were structured in an order of increasing difficulty, with Level 1 being relatively easy and each subsequent level becoming more challenging. The quizzes were presented in a game format, and all but one student (who spent the time watching an online video) completed at least the first three levels during the period.

Mike’s Perceived Barriers to Using Instructional Technology

Mike acknowledged that technology can facilitate student learning and differentiation. For example, Mike had a student getting an A in his geography

class without exerting much effort toward this achievement. To enrich the curriculum, Mike assigned the student to select a book and create a supporting website. She chose Shackelton's *Incredible Voyage* (Lansing, 2007) and spent her class time in the media center working on an independent project, writing summaries, creating charts, and building her site. Mike said, "This is something I think a lot of kids would love to do."

However, according to Mike, the students themselves, in particular their varied technology skills, presented a roadblock that prevented Mike from using this strategy with his entire class. Their lack of keyboarding skills presented a substantial problem:

I had kids who actually worked for 40 minutes and had 12 words done. And they're sitting over there like, "Mr. S where's the [letter] A?" They were so bad, that it just became a waste of my lab time, because they wouldn't even get done at the end of the period, and I didn't have any more lab time.

Mike perceived that students' disparate technology ability levels could become a significant deterrent to using student-centered technology in the classroom. He went on to indicate how the physical layout of the school and relatively short class periods were also significant barriers in developing and implementing student-centered, technology-based activities:

You have to find something you can do in 40 minutes that will keep the kids engaged, because at the end of 40 minutes you have to be able to stop, and you won't be in the lab for another six weeks. It's not like you can continue with it six weeks from now.

With over 100 teachers and only two computer labs, finding openings for five sections of Mike's geography class was challenging. At 40 minutes per section, a computer lab would be used for the better part of an entire day. Compound that fact by the need to reserve the labs for over 1,100 students to take standardized tests, and lab availability was greatly reduced. When access could be secured, if students are unable to complete a task within a given lab period, the instructional value of the activity was lost, not to mention the motivation to replicate such activities. "I was up a creek without a paddle 'cause now I have 60 kids that aren't done with this word processing thing, and I have no computers for them to finish, so I didn't do it [again] this year," Mike said.

A viable solution to the problem of access may have been to acquire portable computers on a cart. One teacher in the building managed to secure 30 donated laptops from a local university. Because the computers were not a make or model utilized by the district, when repairs became necessary, the technology department refused to support them. Now this teacher has 20 laptops that are intended for classes of almost 30 students. The perceived lack of technology support caused Mike to say,

That would be so frustrating to go out and do the legwork and get a donation like that. I understand they have a lot to support in the district, but I mean if you want kids to be working with computers, it's frustrating.

Even if access to portable technology existed, the current infrastructure was not designed to maintain these devices within a classroom. Mike had only two electrical outlets in his classroom, and he indicated that the wireless Internet connection in his room was “sketchy at best.”

Mike also identified the lack of professional development as an additional barrier related to an increase in technology access:

Everything else that I know how to do has been self-taught, so professional development is a huge barrier. It’s even a bigger barrier for other teachers, because they’re not willing or able to go out on their own to teach themselves.

He pointed out the contradiction that the district was compelled to pull teachers out of class to provide specialized training on implementing the Common Core State Standards or to examine survey results, but release time for technology training and evaluation was never available. Mike contended that doing so could save the district money, as they have qualified faculty who could provide the training:

The people in the building have the knowledge to be able to do that [provide professional development for technology]. We don’t need to be sending them places to take classes, and that’s what we end up doing.

Even if professional development was readily available, Mike implied that using instructional technology may not be a shared goal among his colleagues. Watson Junior High is organized according to the middle school concept, with teams of teachers across disciplines working together to support a diverse cohort of students. Specific team planning time was designated for the purpose of discussing student work and their individual needs. For some teams, using technology for instructional purposes was a common goal. However, for Mike’s team, this was not the case.

Only two teachers on his five-person team took their students to the computer lab. He believed the remaining teachers were not comfortable with technology and would not risk using it with their students. He attributed this lack of initiative to “a fear factor” among teachers. Mike also rejected the idea of replicating some of the technology practices used by the other grade level teams:

There is going to be a pushback from a lot of teachers who don’t want that, because they would have to change what they are doing. Some of them are on my team. They would have to change the way they teach, and they don’t want to do that.

The possibility of changing teams is not a reality for Mike, as the administration was leery of creating a so-called super team and the need to deal with an onslaught of parental requests for their child to be assigned to a specific team.

Mike provided one additional story related to failed attempts to provide opportunities for his students to enhance their learning through the use of technology. In a collaborative effort with a language arts teacher, the students completed a project about Africa. Because they could get in the lab only 1 day a week, the project ran over several weeks, with long periods of time before students could return to the lab: “Kids would lose stuff; they forget what they’ve

done. It was so frustrating. The idea was there, but it was just so frustrating.” As such disheartening experiences accumulated, it became apparent that Mike reached his barrier threshold.

You get to the point where, unfortunately, I’ve gotten to, and it’s not even worth it because it gets so frustrating. The kids get so angry that I just resort to doing what you saw, which is 40 minutes of activities.

What we saw was 40 minutes where the students simply completed the task of finding a given location or geographic landmark on Google Maps.

When asked what types of activities Mike would like to do if he had all the pieces in place and he had everything he needed, Mike was at a loss for words. “That’s so far in the future, that I don’t know if I even imagined it, thought of it that much.” He soon realized that instead of showing his students only the exciting possibilities with Google Earth one-to-one technology would enable his students to experience this themselves. However, he could not explain why he had never attempted this with his students in the computer lab. “I’m not sure why, but I haven’t.”

Cheri’s Beliefs

Cheri was a 22-year-old African-American woman who was 3 months into her first semester as a professional development school intern in the middle grades program of a central Illinois university. Her endorsement areas were social studies and language arts. Therefore, she was in a unique position, because she would teach seventh graders in geography and teach the last 9 weeks with eighth graders in language arts. It was clear that literacy was one of her primary concerns, as she indicated that the most important goal for her students was to “...develop skills in language arts and reading. Reading is very important, not just in geography but other areas, like math.” She also believed that it was important for students “to be prepared for critical thinking skills and decision-making” and saw learning geography content as one way to develop those abilities.

While Cheri was a proponent of group work, based on observations of her teaching it was apparent that she had yet to develop classroom management skills necessary for consistently facilitating effective group work. As the semester progressed, she became more skilled at managing small groups, especially when leading writer’s workshop lessons with laptops. Throughout the year-long professional development school experience, Cheri was adept at using the available classroom technology to present content, and all of her observed lessons involved the use of the interactive whiteboard during at least some point in the lesson.

When it came to defining technology, Cheri described herself as “growing up in a generation of technology,” making her a part of the “net generation” (Brown, 2002) or a “digital native” (Prensky, 2001). She defined technology as

...anything that has do with like electronics, TV, iPads, iPods, you know, iTunes—everything is somehow connected to social media. I consider that technology, because you’re using a computer to connect to other people. So technology to me is such a broad term.

It was interesting to hear Cheri describe herself as a “low-end” user of technology, given her all-encompassing definition. However, her self-perception was validated when it came to describing the way she used technology in her teaching: “Yes, I’m a low-end user. I think the only technology I have encountered using is a SMART board.”

In terms of describing how she thought her students might view technology, she suggested that it is even more pervasive for them than it is for her:

I wish I could explain it down to specifics, but there are so many [devices] out there now. When I was growing up...Now there are so many. Look, I’ve got a phone right in front of me but they [my students] are constantly around it. So maybe I would say that their daily life, the daily items that they hold is how they see technology.

Interestingly, she did not view the ubiquity of technology in students’ lives as transferring into the belief that her students possessed a high level of technological competency, at least not when it came to classroom applications. While Cheri believed that the role of technology in the classroom could be “huge,” she expressed concern about making assumptions regarding students’ skill levels and the importance of gradually implementing technology:

I don’t think teachers should always use technology for every little thing, because sometimes students might not have the skills to do that. You should ease yourself into that instead of saying, “OK, now here’s a computer, so log onto it.” Most students don’t have the opportunity to even know how to type on a computer, so I think that some teachers need to remember that many students have it around them, but not all of them. We should not assume that. Let’s do it gradually and let’s see where that takes us.

In considering more appropriate ways to use technology, Cheri appeared to see technology as an artifact or phenomenon that was a significant part of her students’ generation that could be used as an engaging, relevant bridge between her students’ lives and the content knowledge and standards that she was expected to address:

Many of them (students) still have the mindset that history or geography is really boring. But then we will have the chance to show them it’s not boring because, “We’re going to use something from your generation,” which would be technology, to meet our demands, our needs for you trying to meet some of these decision-making skills and critical thinking skills.

Along these lines, Cheri indicated that technology was not being used enough in most classrooms and that there was a lack of variety when it came to the kinds of technology that her students could access. She stressed that classroom technology should be easy to learn for both students and teachers and added that its use must meet the needs of the users in order to be valid. Ultimately, Cheri concluded with the notion that technology was an effective tool when it made life easier and more interesting.

Observation of Cheri's Teaching Practices

True to her stated preference for group work and cooperative learning, in all but two of the lessons observed, Cheri had students working together for at least part of the hour. The cooperative learning strategies she selected included stations, jigsaw, think-pair share, a small group gallery walk, four corners, and writer's workshop—all challenging activities from a classroom management perspective for a novice teacher to attempt. The execution of her lessons was not always effective in the sense that she had difficulty managing disruptive and uncooperative students. However, her pedagogical choices provided consistent evidence that supported Cheri's contention that she viewed herself as a teacher who favored student-centered instructional strategies.

Cheri made a concerted effort to implement her stated goals of using geography to assist her students in becoming informed citizens and to acquire critical thinking skills. She presented content that went well beyond the standard fare for most geography classes, including controversial issues like mining for blood diamonds, the philosophical differences of W.E.B. DuBois and Booker T. Washington, the historical marginalization of women of color, and incidents of genocide. She frequently used Internet resources to present such content and attempted to engage students in serious discussions of how these powerful issues impacted their daily lives.

The two lessons that did not involve group work were a geography lesson that took place in the computer lab and a language arts/writer's workshop lesson, in which the students used laptops for a persuasive writing assignment. As Cheri indicated earlier, she believed that students saw technology as part of their lives, and therefore, she considered it to be an inherently relevant tool for learning. She also indicated that technology was being underutilized in the classroom, and in order for it to be effective it had to be easy and interesting to use.

In a geography lesson, Cheri involved her 19 seventh-grade students in an initial exploration of a European country for a travel brochure assignment that addressed the five themes of geography. The students had one week to select a country and create a brochure that would include information tied to culture, government, resources, landmarks, geographical features, climate, and a menu of optional items. During this particular lesson, the students were asked to work individually using the Google Maps (<https://www.google.com/maps>) and CIA World Factbook (<https://www.cia.gov/library/publications/the-world-factbook>) websites to find the required information about their respective countries. Cheri spent the first 5 to 10 minutes of the 50-minute period showing the class how to access information on the sites and then provided students with individual assistance as needed.

The students who were willing to follow Cheri's directions found a wide array of information for their brochures. Engaged students seemed especially excited about the Google Maps site, as it allowed for visual tours of their country. The screens could be manipulated 360 degrees and revealed visual information that helped students gain a detailed understanding of how daily life in their respective country compared with the daily lives of students. Comments like, "They have cars in Belgium?" illustrated student engagement while they explored aspects of their selected countries.

Unfortunately, more than half of the students refused to follow the written directions that Cheri provided for this assignment. One boy spent all but a few minutes looking at different pictures of sports figure LeBron James. The few minutes he was on task occurred when Cheri was working with him individually. Other students accessed fashion sites, watched YouTube videos, and looked at highlights from the previous days' sporting events. Because Cheri was answering legitimate questions posed by the engaged students, she was unable to monitor the computer use for the entire class.

The physical arrangement of the lab also appeared to be a detriment, as the room was arranged in two columns of five rows of tables, making it impossible to see all of the computer screens unless the teacher remained in the back of the room. When Cheri helped an individual student, other students appeared to switch screens and view websites that were unrelated to the assignment. While the lesson was consistent with Cheri's student-centered beliefs, less than half of the class chose to use the computer time appropriately.

In a lesson observed in the language arts classroom, Cheri utilized a writers' workshop strategy to provide her eighth-grade students with individual conferences and guided writing time. When compared with the students in the seventh-grade geography lesson, the eighth-grade students appeared to be much more engaged with the activity. As an introduction to the lesson, Cheri modeled ways of using a graphic organizer as a tool for narrative writing with an interactive whiteboard presentation. She was able to complete five individual conferences during the period and provided less formal, individual assistance to many other students. This individual assistance frequently involved helping students use Microsoft Word more effectively, by showing them the spell check and thesaurus features.

While one group of four boys was consistently off task, the remaining 22 students appeared to use the time to write their narratives. After the lesson, Cheri stated that this was only the second time her students were able to use laptops for writing since the fourth quarter began, which was 2 weeks before this lesson. She indicated that typing was difficult for many of her students, but felt that the students did well.

Barriers to Technology Integration for Cheri

Initially, Cheri identified funding and infrastructure as barriers to implementing technology in most schools:

I think money is the biggest barrier. Technology is not cheap, so finding money to put a SMART Board in every classroom can take a lot of out of district....As Mr. Styles [pseudonym] said, most buildings are not technology friendly. They might only have one port over there.

She also indicated that the "narrow-minded" attitude of some educators prevented them from "widening their horizons" by exploring technology as a viable educational tool. Cheri saw time as an additional obstacle, stating, "that might be a barrier for some people that might not have the time to do it [pursue technology]."

Cheri described a potential barrier involving the university-based teacher education programs and the professors who were supposed to prepare her to teach. The following extended conversation with Cheri illustrated these points:

Cheri: The University might not have those resources to get you going. Especially, like, preservice teachers, as we're the next generation. If the university doesn't have the resources for you, that might be just one large barrier again.

Researcher: You also run into professors who are way behind the curve. I don't think that helps any.

Cheri: So I guess it's like a generational barrier. Most of my professors aren't my age, and I found some professors who are very traditional. Projectors! I have seen some professors with [overhead] projectors and I've seen some with SMART Boards, but they're very limited, even with the SMART Boards. So there are some generational barriers that I've been experiencing as a preservice teacher.

At the time of this writing the teacher education building had four classrooms with interactive whiteboards. Based on our experience at this university, it seems accurate to suggest that most instructors use this interactive tool as a glorified overhead projector. Both the lack of access to different forms of classroom technology and modeling by their instructors makes it difficult for teacher candidates to experience hands-on learning for this particular form of technology.

Discussion

Shared Beliefs

The connection between teacher beliefs and teacher use of technology has been well-documented in the literature (Chan & Elliott, 2004; Ertmer, 2005; Kagan, 1992; Kim et al., 2013; Levin & Wadmany, 2005; Niederhauser & Stoddart, 2001). Cheri and Mike shared the belief that technology was a tool that could foster critical thinking, improve literacy skills, promote self-regulated learning, and prepare thoughtful citizens. Perhaps the benefit to using technology that came up most frequently in our conversations was the ability to increase student engagement. An example of this belief was found in Cheri's view of how the total immersion of technology in the lives of her students made using technology a relevant instructional strategy:

...with what's out there on the Internet and sources and the Library of Congress and YouTube and Twitter and Facebook, and all that stuff. You can find great examples of all of this in the kids' daily lives that would help them connect what we're learning about to their daily life in Watson.

Mike and Cheri also shared the belief that the selected use of technology as a teaching and learning tool should drive the frequency of use. However, both believed that the mere presence of technology did not ensure that learning occurred. As Mike explained, "They [educators] can't just use the technology to replace the learning that was taking place, or to replace the role of the teacher." Teachers should use technology as a tool to enhance or fortify their curriculum

planning and instructional repertoire. In addition, Cheri was cognizant of the necessity to incorporate technology gradually in response to the range of student technology skills:

The role of technology in education should be a good balance. I don't think teachers should always use technology for every little thing, 'cause sometimes students might not have the skills to do that; and you should ease yourself into that....Let's do it gradually and let's see where that takes us.

They also agreed that because geography is currently an untested discipline, teaching it afforded them the freedom to use technology as they chose. Without being held accountable to the incessant pressure of increasing student performance on a standardized test (see Hew & Brush, 2007; Walker & Shepard, 2011; Zhao, 2007), Mike found technology use to be "definitely less prescriptive, especially for us."

Ironically, while teaching an untested discipline did provide them relief from the pressures of standardized testing, it did not necessarily allow them opportunities to put technology into the hands of their students. Providing computer access for their students was difficult for Mike, Cheri, and other teachers in their school, because the computer labs were booked for over 80 of the 180 school days in order for students to take state and district-mandated standardized tests in math and reading.

Barriers to Implementing Classroom Technology

Despite the expressed shared belief of Mike and Cheri that technology could increase student engagement in learning, it did not override those factors the teachers perceived as interfering with their ability to put these beliefs into action. Researchers have suggested contextual constraints (Ertmer, 2005), misconceptions regarding constructivist instructional practices or other conflicting beliefs (Chen, 2008), as well as extrinsic and intrinsic barriers (Ertmer, Ottenbreit-Lertwich, and York, 2007) may be the culprits that prevented teachers like Mike and Cheri from implementing their beliefs.

Much has been written about the Net generation and its immersion in the world of technology (Oblinger, 2008; Prensky, 2001; Tapscott, 2009), often creating an assumption that this familiarity can transfer directly into technology skills and abilities for classroom use. In line with literature that questions this belief (Bennett, Maton, & Kervin, 2008; Selwyn, 2009), Mike and Cheri both mentioned how their students demonstrated a lack of technology competency:

We're doing map stuff on the computer and, you know, they say, "I don't know where some of these things are." "Pull a map up on Google. You're on the computer already," and they're like, "Wow! We can do that?" (Mike)

When using technology in language arts, there is a disconnect that I noticed during the workshop. Kids are raising their hands and saying, "Ms. Howell, how do you spell something?" and I'll say, "Well, you have the Internet on your computer." I mean, I will gladly give it to them [the

spelling of the word] but I feel like they only see the laptop for just a writing tool instead of a whole other resource. (Cheri)

This limited range of student technology skills presented a definite concern for both Mike and Cheri. While Cheri acknowledged the constant presence of technology in her students' lives, she was aware of the differences in students' ability to use technology within the classroom and in their personal lives. Both Mike and Cheri expressed the concern that students have an expectation that the automaticity of today's smart phones extends to all technologies:

Cheri: But you're not moving your hand though, you're just moving your thumb, and with some phones you can drag it. You don't even have to look at your finger; it does the words for you. It does it all on one screen.

Mike: Or you got the push to talk on the texting, talk to text; so they don't even have to type.

Cheri: You just say, "Hey! I need to find McDonald's," and Siri will pick it up.

This disparity did not present a deterrent to Cheri's use of technology as an instructional tool. Rather, she would use these gaps as teachable moments, such as showing how Microsoft Word has a built-in thesaurus. In addition, she expressed an optimistic view of the potential for technology in the classroom despite this variance of ability levels in personal versus academic use. She saw this familiarity with the tool not only as a means of connecting learning to their lives, but a means of making that learning more engaging. While Mike agreed with the potential technology has to excite and engage students in learning, he appeared to be more deterred by their inability to complete designed technology tasks. He believed the conveniences found in electronic mobile devices today, such as ordering the Siri virtual personal assistant on an Apple mobile device to call a friend, limited students' ability to use more mundane/affordable tools found in schools today.

External barriers, such as the lack of access to technology, support, and time, have been found to interfere with teachers' belief in the relevance and benefit of technology for teaching and learning and the execution of said belief (Chen, 2008; Ertmer, 1999; Hew & Brush, 2007). The availability of technology in the district had a direct bearing on the frequency Mike and Cheri would use it. The luxury of having technology available at will, would enable Mike's students to be the end users, not just Mike. Mike's role would be more of a guide with the students, as he said, "actually doing it on their own." Cheri envisioned students as producers, constructing their own websites using student-generated digital art created on various devices, including tablets. She imagined an interconnected classroom, where students could share their computer/device screens on an interactive white board or on another student's computer/device.

The Disconnect

In a study conducted by Kim et al. (2013), a positive correlation was found between teachers' pedagogical beliefs and their technology integration practices: "What teachers say they do was significantly correlated with both their beliefs about effective ways of teaching and their actual practices with regard to

technology integration” (p. 81). When asked about his pedagogical beliefs about teaching, Mike had this response:

I would say my belief is for students to be as engaged as possible in their own learning, which in most cases involves the students doing the vast majority of the work themselves or with others. I try to be in a position where it is not me doing the talking, but they who are either doing their own learning through whatever activity that we're doing.

His perspective shared similarities with those who claim to share constructivist beliefs, which stress student-centered, active learning. However, during an observed lesson that could have provided an opportunity for students to do “their own learning” with technology, Mike had the students finding locations on a map by completing online geography quizzes, and recording their scores—strictly a recall activity. With such sparse access to technology, this activity did not represent his expressed pedagogical beliefs.

The literature offers possible reasons for the inconsistency between teachers' espoused beliefs and their implementation of said beliefs in practice. The pressure to complete an expected curriculum or prepare for a standardized test has been suggested as an explanation (Lim & Chai, 2008). Chen (2008) described three factors he found to be related to this identified inconsistency: extrinsic factors that present obstacles such as access and support, misconceptions surrounding constructivist theory, and other beliefs that may conflict with existing pedagogical beliefs.

Though Wozney et al. (2008) did not identify the existence of a discord between beliefs and practice, their findings offered another possible consideration: “Teachers need to believe that they can successfully implement the innovation within their own context; if not, they may neither take the initial risk nor continue to persevere in implementing it” (p. 95). In addition, even if they value such change in their practice, they may not fully comprehend how this can be implemented into practice (Fullan, 2013).

Some suggest it is a matter of how much effort teachers are willing to exert in order to overcome obstacles (Fisler & Firestone, 2006; Mueller, 2009). What these authors have not addressed is how long such persistence prevails. Is there a limit to the number of obstacles a teacher is willing to overcome? For Mike, the lack of resources, access to technology, and technology support appeared to be significant roadblocks in his ability to implement student-centered uses of technology. Attempts to create such learning experiences met with disappointment and were not to be repeated.

Exemplary users have been able to overcome limited access and achieve effective integration (Ertmer & Ottenbreit-Leftwich, 2010). It is when the barriers are so great that teachers are unable to conquer them, that a “barrier threshold” is reached (Ertmer et al., 2012, p. 433)—the point where beliefs, despite their strength, cannot persist.

While Mike did not feel the pressure of having to teach content measured by a standardized test, he felt restricted by the limited technology access for his students, which was often tied to computer-based testing mandates in reading and mathematics and the absence of outside support. Witnessing the lack of

persistence in his colleagues to overcome the barriers they faced appeared to support his decision to maintain the status quo within his perceived barrier threshold. When asked what he would do if all his technology needs were met, Mike had not yet dared to consider that possibility.

Perhaps for Mike, his barrier threshold was so great that he could not let himself imagine a technology-rich, student-centered learning environment. It can be difficult to achieve a goal if there is no vision for such a goal.

Cheri appeared not yet to have met her barrier threshold. When asked what she thought she would need in order to use technology to benefit her students, she indicated she was committed to using technology in her future classroom:

I think there are standards that say make sure that they are using technology in your classroom. It's just that is what new teachers have to learn. So whatever district I go to, I am sure they might not have laptops or computers, but at least show me as a new teacher, or if I ask my veteran teachers, can you point me in the direction to get laptops for my students in the future....So whatever students I get in the future, I want them to expand those skills and use technology for their benefit and hopefully keep that going wherever I go.

Ultimately, the most significant barrier for Cheri may have been her difficulty with managing disruptive and noncompliant students during the student-centered lessons that she created. It is no secret that many teacher candidates struggle with classroom management and, especially, with redirecting distracted and reluctant learners. For example, at least half of the students in the geography lesson were unwilling to use the websites that Cheri provided them to explore for their assignment. While Cheri answered questions from engaged students, consistently teaching from the back of the room would have allowed her to see all of the computer screens and possibly redirect the students watching YouTube clips toward more appropriate tasks.

Also of note was Cheri's concern that the generational differences between her and her professors may have contributed to limited opportunities to learn effective strategies for using technology in the classroom. Whether or not it can be attributed to the age of an instructor, teacher preparation regarding technology instruction is essential. Teacher preparation programs that fail to develop technological competencies in their candidates may be responsible for creating both pragmatic and theoretical barriers (Wright & Wilson, 2006). What is most important to consider is that, while her ability to implement technology effectively was a challenge, her commitment to technology persevered. This commitment was exemplified as Cheri contemplated how to take a device embedded in the lives of her students like a smart phone, and transform it in such an engaging way that students would want to recreate that learning experience on their own.

Conclusions

Findings from this case study are supported by much of the literature reviewed for this article. Discrepancies between the teacher beliefs expressed by Mike and Cheri concerning how technology should be used as a learning tool and their actual use of technology in the classroom were similar to findings in the work of

Chen, (2008); Judson, (2006); Liu, (2011); and Ottenbreit-Leftwich et al., (2010). Despite the absence of pressures to prepare for standardized testing and curricular coverage expectations, other obstacles, such as the lack of access (Mueller, Wood, Willoughby, Ross, & Specht, 2008; Park & Ertmer, 2007-2008), lack of support (Walker & Shepard, 2011; Zhao et al., 2002), as well as the attitudes and beliefs of others (Ertmer et al., 2012), acted as barriers to implementing student-centered beliefs that aligned with technology for the participants.

One possible conclusion is that their beliefs were not enough motivation to overcome their perceived barrier threshold. Contrary to the findings of a study involving award-winning teachers (Ertmer et al., 2012), for Mike and Cheri the external barriers (e.g., access, support, and student technology ability) they faced had more influence than internal barriers (e.g., beliefs, attitudes, and knowledge) in determining the intent for technology use.

For Mike and Cheri, their beliefs regarding student-centered learning were not the driving force behind their instructional design decisions for technology integration. That being said, both used technology as a frequent resource for their presentations and created lessons that could be considered student centered. The inability to put technology in the hands of their students was not a matter of believing in the value of technology, how it can work to create an engaging and productive learning environment, or the knowledge to accomplish this feat.

In Mike's case it was the resulting frustration with previous integration experiences and the perceived potential for recurring results that acted as the gatekeeper to future endeavors. While Cheri was passionate about linking technology integration with student-centered instruction, her inability to consistently engage reluctant students prevented her lessons from being powerful learning experiences for all.

Although the results from this case study cannot be generalized beyond these two participants, many views expressed by Mike and Cheri were consistent with findings in previous research. Our research has led us to the conclusion that when it comes to understanding how teachers are using technology, there is a clear disconnect between their beliefs and their practice. Unfortunately, there are very real barriers that prevent teachers from implementing practices that they believe are in the best interests of their students. Barriers will continue to exist.

In addition, teacher educators must be cautious in assuming that teacher candidates, who are often labeled as digital natives, are willing and able to effectively use technology as an instructional tool (Kumar & Vigil, 2011, Lei, 2009). This discovery is especially germane for teacher education programs, as it suggests that simply addressing teacher technology standards in preservice teacher education may not be sufficient for preparing future educators to implement technology effectively in their classrooms. Preservice teachers may need to face clinical situations that cause them to consider and confront their beliefs regarding technology as an instructional tool. Further study is needed of those teachers who are able to overcome their barrier threshold and practice what they believe (Ertmer et al, 2012). Placing preservice teacher candidates with such teachers could be an important step in helping preservice teachers implement their ideals while overcoming their own barriers.

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**Appendix
Interview Protocol**

Teaching Philosophy – baseline/context questions

1. How would you describe your pedagogical beliefs about teaching?
2. Please indicate how you would rank the following reasons for teaching geography

1 = most important to 6 = least important

- a. To prepare good citizens _____
- b. Because it is required by state standards _____
- c. To teach students content knowledge _____
- d. To teach students life skills _____
- e. To prepare students for the next grade level _____
- f. To develop skills in language arts/reading _____

3. Please indicate your level of agreement with this statement: “My primary goal in teaching geography is to help students master basic facts, concepts, and content.”

1 = strongly agree; 2 = agree; 3 = disagree; 4 = strongly disagree

4. Please indicate your level of agreement with this statement: “My primary goal in teaching geography is to help develop students’ critical thinking and decision-making skills.”

1 = strongly agree; 2 = agree; 3 = disagree; 4 = strongly disagree

5. Technology Attitude/personal user context questions

6. What role do you feel technology should have in education?
7. How would you describe your use of technology for teaching and learning?

- a. High end user
- b. Average user
- c. Low end user
- d. Choose not to use it

8. How do you feel about the amount of technology you use for instructional purposes?

- a. I wish I could use it more frequently
- b. I am satisfied with the amount of technology I use for instructional purposes
- c. I have no desire to increase the frequency of use of technology for instructional purposes

9. How often did you use technology in the first quarter of this semester?

10. How do you perceive technology can be used to enhance teaching and learning?

11. How are you currently using technology to support the curriculum?

Examples:

a. How often do you?

Please use this scale: 1 = almost daily; 2 = twice a week; 3 = weekly; 4 = once/twice per month; 5 = never

- a. Use technology to support learner-centered strategies that address the needs of my students
- b. Apply technology to develop students' higher order skills and creativity
- c. Facilitate technology enhanced experiences that address the content standards

b. How often do you engage students in lessons that use:

Please use this scale: 1 = almost daily; 2 = twice a week; 3 = weekly; 4 = once/twice per month; 5 = never

- d. Interactive multi-media presentations
- e. Instructions strategies that utilize digital images/primary sources
- f. Digital media such as a digital camera, cell phone, iPod, or digital video
- g. Course development software, such as Elluminate, WebCT, or Blackboard

c. How often do you have students use the Internet?

Please use this scale: 1 = almost daily; 2 = twice a week; 3 = weekly; 4 = once/twice per month; 5 = never

- h. During geography instruction
- i. To find and examine primary source materials
- j. To complete a WebQuest or other inquiry activity
- k. To take a virtual field trip to an online museum
- l. To collect information for reports or projects
- m. Communicate with others (i.e. students, expert historians, etc.)
- n. Communicate with students in another country
- o. Develop Web 2.0 projects (e.g. podcasts, wikis, YouTube)

12. Are there areas you wish you could use technology, but barriers are preventing you from doing so?

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