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Constructivism as a Theoretical Foundation for the Use of Technology in Social Studies

Peter E. Doolittle
Virginia Polytechnic Institute and State University

David Hicks
Virginia Polytechnic Institute and State University

Abstract

The National Council for the Social Studies has explicitly advocated technology integration into the social studies classroom to transform the teaching and learning of key social studies content and skills. While the call for technology integration into the social studies classroom is clear, the application of technology within the realm of social studies has traditionally been theoretically underdeveloped. One theoretical foundation that has promise for framing the discussion of technology and social studies integration is constructivism. Within this paper the current relationship between social studies education and technology is explored, the nature of constructivist philosophy, theory, and pedagogy is delineated, and principles for the integration of technology in social studies that supports an explicit constructivist foundation are posited.

> "Integrated social studies teaching and learning include effective use of technology that can add important dimensions to student learning."
> (NCSS, 1994, p. 165)

Upon entering the third millennium, it is hard to ignore the pervasiveness of information technology within education, on both a national and international scale. Technology integration, specifically Internet technology, into the K-12 social studies classroom, to transform the teaching and learning of key social studies content and skills, has been explicitly advocated by the National Council for the Social Studies (NCSS, 1994), as well as by many social studies educators (Berson, Lee, & Stuckart, 2001; Braun & Risinger, 1999; Hope, 1996; Martorella, 1997). The use of technology within the social studies, as the opening quotation

reveals, forms a key ingredient for NCSS's "vision of powerful social studies teaching and learning" (1994, p. 162). A key assumption of this proposed use of technology is that when used effectively within the K-12 social studies classroom, technology can improve social studies teaching and student performance.

While the call for technology integration into the social studies classroom is clear, the application of technology within the realm of social studies has traditionally been theoretically underdeveloped. Recently, however, White (1999), Hooper and Hokanson (2000), and Lorsbach and Basolo (1999) have advocated the use of a constructivist theoretical perspective to undergird the use of technology in the social studies classroom. Unfortunately, the majority of discussions relating technology integration, social studies, and constructivism manifest an incomplete view of constructivism and therefore an incomplete view of technology integration. Thus, there is a real need to clearly explicate and examine the extent to which constructivism can be used as a foundation for the application of technology in the social studies in order to achieve the goals of social studies education.

A review and exploration of the current relationship between social studies education and technology is provided as a framework from which to understand the nexus of constructivism, technology, and social studies education. Following this framing, the constructivist landscape of radical, social, and cognitive constructivism is surveyed from philosophical, theoretical, and pedagogical perspectives. These perspectives are aligned to provide a coherent rationale, with specific examples, for the positing of constructivism as a foundation for the use of technology in social studies. Finally, the article concludes with a few caveats for adopting a constructivist perspective in social studies education.

Social Studies Education and Technology

The origin, nature, and purpose of the social studies have been strongly debated throughout the twentieth century (e.g., Barr, Barth, & Shermis, 1978; Hertzburg, 1981; Ross, 1997). In spite of competing curricular traditions within the social studies, in the closing of his presidential address at the 1999 NCSS Annual Conference, Richard Theisen captured the essence of the social studies: "We have a mission, the education of children and young adults for citizenship" (see Theisen, 2000, p. 6). Specifically, citizens must have the knowledge, skills, and dispositions necessary for informed and active decision making on public and private matters of social concern (Engle, 1960; NCSS, 1994; Ross, 1997).

Many social studies educators have argued that preparing students for the responsibility of the office of citizen is in fact the

perfect place to let students learn to explore critically their world through the use of interactive technologies (see Braun & Risinger, 1999; Cogan, Grossman, & Lei, 2000). That is, having access to up-to-date knowledge resources, archives, and experts via information technology can only benefit a teaching field that (a) has begun to recognize the important implications for teaching and learning social studies from a constructivist perspective (Alleman & Brophy, 1998; NCSS, 1994; Scheurman, 1998; Scheurman & Newmann, 1998), and (b) stresses the importance of allowing students to develop the intellectual skills necessary to critically unpack primary sources and to work with data sets, while investigating and inquiring into past and present issues (White, 1997).

Currently, the literature focusing on the integration of technology and the social studies favors the use of the Internet with its virtually unlimited range of sources, and its capacity to connect individuals and groups over time and space (Berson, Cruz, Duplass, & Johnston, 2001; Braun & Risinger, 1999; Scott & O'Sullivan, 2000). Such recognition of the potential of the Internet by social studies educators is mirrored by the priority given to national educational initiatives to provide Internet access to schools (see Hicks, Tlou, Lee, Parry, & Doolittle, 2002).

The development of this networked infrastructure over the last decade explains the absolute increase in Internet use and the recognition of the value of the Internet within the social studies classroom (Becker, Ravitz, & Wong, 1999).[1] Berson, Cruz, et al's. (2001) belief that "mastery of the Internet and its resources can greatly enhance the quality of learning experiences in social studies classrooms" (p. v) is strongly supported by Becker's (1999) research, which suggests that "along with word processing, the Internet may be the most valuable of the many computer technologies available to teachers and students" (p. 32).

Diem (1999) suggests that the challenge for the social studies teacher is to find "how to use the new tools and techniques in ways that will increase content understanding and hone the skills needed to effectively use technology" (p.2). Such a challenge, Fontana (1997) argues, must be undertaken quickly by social studies educators, if the discipline of social studies is to maintain its vitality, direction, and integrity. The danger of not acting, she warns, may well be that

> others who know nothing of the discipline will shape these important networking tools without the needs of the social studies in mind. Waiting is also dangerous because current curriculum trends that place great emphasis on reading, writing, and mathematics in the elementary schools, and upon math, science, and technology have led to reduced time, attention,

> and resources for teaching the social studies. If social studies educators fail to be at the forefront of technology, they risk having parents and policy makers conclude that the social studies are not relevant in the information age. (Fontana, 1997, p. 6).

This sense of urgency and concern that comes with failing to utilize technology is easily understood when one begins to explore the actual use and impact of interactive technologies in the social studies, and on the nature of teaching social studies. Cuban's (2001) research reveals that across all disciplines including the social studies, computer technology has not been seamlessly integrated into the classroom, and where it is used, little evidence exists to suggest that it has transformed the teaching and learning process. In fact, Cuban notes that the relatively small numbers of teachers who do use computers proficiently appear to primarily use technology to "maintain existing classroom practices" (p. 171). Specifically within the social studies curriculum, technology has been likened to a sleeping giant (Martorella, 1998). That is, many social studies educators contend that interactive technologies hold a great deal of potential for the teaching and learning of social studies, yet little actual technology research, development, and implementation have taken place among social studies educators (Ehman & Glenn, 1991).

Research reviews by Ehman and Glenn (1991) and Berson (1996), related to the use and impact of interactive technologies in social studies, suggest the sleeping giant has been having quite a long nap. Within their reviews they note, as do Friewald (1997) and White (1999), that social studies teachers generally hold positive perceptions toward using interactive technologies in their classrooms. Teachers perceive the use of computers as having "a significant impact on student enthusiasm, as providing additional learning opportunities for gifted students, and as a means for helping handicapped or learning disabled students" (Ehman & Glenn, 1991, p. 513). Relatively few social studies teachers, and in particular experienced and secondary level teachers, however, understand or use computers to engage students within their classrooms (Berson, 1996; Ehman & Glenn, 1991; Van Fossen, 1999). This becomes apparent when one considers that social studies teaching has been observed by generations of students and researchers as clinging to a specific patterned genre of teaching (Baxter, Ferrell, & Wiltz, 1964; Goodlad, 1984; Shaver, Davis, & Helburn, 1980; Wiley & Race, 1977). In this pedagogical genre, the teacher talks and students listen, students are directed to read and answer questions in textbooks, and students memorize facts and details that for the most part are "removed from their intrinsically human character" (Goodlad, 1984, p. 212). Recent research suggests that such a reliance on textbooks within the traditional

social studies classroom can be seen as a choice made by teachers rather than a decision forced on them from above (Schug, Western, & Enochs, 1997). Such a choice, based upon such concerns as time and the clear link between book content and curriculum, indicates that teachers are making active decisions about the tools they regard as effective in the teaching of social studies. That traditional social studies teaching is "yoked to the textbook, captive to talk and chalk" (Hope, 1996, p. 150) does not bode well for those who challenge social studies educators to integrate technology.

Further, it appears that for many social studies educators, the decision to integrate technology into their classrooms can only begin if they can gain a greater understanding of why and how current and emerging technological tools can be effectively used in the teaching and learning of social studies. Technology integration into the social studies, however, must not be undertaken simply to help teachers cover content more efficiently. If integrating technology means nothing more than enhancing the traditional delivery system of social studies content, where laptops replace notebooks for taking notes, where PowerPoint slides replace handwritten overheads, where e-textbooks replace hard copy textbooks, then we will be no closer to a vision of transformative, powerful social studies teaching and learning. As Harrington (1993) suggests, "Critical reflection is necessary to determine if our incorporation of technology enhances our intentions" (p. 5).

Such a process of critical reflection must begin with the development of philosophical and theoretical foundations that provide evidence of why and how the integration of technologies should or should not be used to achieve the goals of powerful social studies teaching and learning. It is indeed worrisome and somewhat surprising that such efforts have not already been more fully undertaken within the field of social studies education (Crocco, 2001). Until this occurs, irrespective of increased levels of classroom connectivity and teacher computer expertise, social studies educators will remain either unwilling or reluctant to integrate interactive technologies, such as the Internet, into their classrooms.

Philosophical Constructivism and Social Studies Education

The import of establishing a clear philosophical and theoretical foundation for the implementation of Internet technology in the social studies lies in the need for effective, robust, and flexible pedagogy. A philosophical and theoretical foundation provides answers to the questions of *why* and *how* specific pedagogy, including the application of technology, should be employed. One possible avenue for informing the use of technology in social studies is constructivism. It should be noted that "constructivism" is not a unitary concept, but rather, is a

multidimensional concept that has been variously applied to the realms of philosophy, theory, and pedagogy. Thus, constructivism is discussed at length within the following sections to provide a solid foundation from which to create, implement, and evaluate technology-based social studies pedagogy.

Constructivism represents a break from the traditional, positivistic assumptions of the social studies. Traditionally, the search for knowledge within the social studies consisted of the search for "truth"; that is, the acquisition of knowledge that mirrors or corresponds to a singular "reality." Constructivism, however, employs a more flexible, culturally relativistic, and contemplative perspective, where knowledge is constructed based on personal and social experience. This relativistic perspective encompasses the belief that knowledge claims of truth, falsity, or viability are always dependent upon, or relative to, personal, cultural, or historical perspectives. According to Fosnot (1996):

> Learning from [a constructivist] perspective is viewed as a self-regulatory process of struggling with the conflict between existing personal models of the world and discrepant new insights, constructing new representations and models of reality as a human meaning-making venture with culturally developed tools and symbols, and further negotiating such meaning through cooperative social activity, discourse, and debate (p. ix).

Therefore, constructivism involves the active creation and modification of thoughts, ideas, and understandings as the result of experiences that occur within socio-cultural contexts. Central issues in this creation of understanding include (a) what counts as valid knowledge (epistemology), and (b) what counts as existence and/or reality (ontology). In addressing these issues of epistemology and ontology, constructivism is currently built upon four primary philosophical tenets (see Garrison, 1998; Gergen, 1995; von Glasersfeld, 1998):

> Tenet 1: Knowledge is not passively accumulated, but rather, is the result of active cognizing by the individual.
> Tenet 2: Cognition is an adaptive process that functions to make an individual's cognition and behavior more viable given a particular environment or goal.
> Tenet 3: Cognition organizes and makes sense of one's experience, and is not

a process to render an accurate representation of an external reality.
Tenet 4: Knowing has its roots in both biological/ neurological construction and in social, cultural, and language-based interactions.

Thus, constructivism emphasizes the active role played by the individual learner in the construction of knowledge, the primacy of social and individual experience in the process of learning, and the realization that the knowledge attained by the learner may vary in its accuracy as a representation of an external reality. The adoption of these assumptions changes the nature of the social studies from one of a search for *truth*, to one of a search for *perspective*. These four epistemological tenets, while illuminating, allow for great variability in what is typically called "constructivism" (see Moshman, 1982; Phillips, 1995; Prawat, 1996). Steffe and Gale (1995) and Moshman (1982) describe this variability as having three main divisions: radical constructivism, social constructivism, and cognitive constructivism. Each of these divisions addresses the nature of knowledge and knowing differently (see Table 1) and adopts a different subset of the four previously mentioned philosophical tenets, resulting in disparate world views. The three main types of constructivism, their influences on world view issues, and their effect on social studies thought and action are addressed in relation to the practice of social studies and the inclusion of technology.

Radical Constructivism

Radical constructivism represents the most extreme form of constructivism, emphasizing the *internal* nature of knowledge and embracing the first three philosophical tenets. The foundation of radical constructivism is that while a reality external to the individual may exist, the true nature of this reality is unknowable. Knowledge then becomes the subjective construction of the individual, resulting from the cumulative experiences of the individual (Piaget 1973, 1977; von Glasersfeld, 1995). This subjective construction reflects the radical constructivist's supposition that knowledge is not passively transmitted from the environment to the individual, but rather that knowledge is the result of active cognizing by the individual for the purpose of satisfying some goal. In addition, the ultimate goal of knowing is not ontological "truth" - that is, the construction of internal mental structures that mirror or correspond to a world that exists outside of the individual - but rather, the construction of internally coherent mental structures that are adaptive and that lead to efficient and effective thinking and behaving (von Glasersfeld, 1984, 1998).

This positing of individual subjective knowing leads to a de-emphasis on social processing in favor of individual cognizing. Indeed, for radical constructivists, other humans are simply additional environmental entities with which one has personal experiences and must adapt. That is not to say that social interaction is useless; indeed, social interaction may provide the impetus for an individual to rethink his or her ideas. It is, however, this rethinking that is responsible for the construction of knowledge, not the social interaction (von Glasersfeld, 1995). Ultimately, the world view for radical constructivism is that truth is a measure of the internal coherency of one's personal mental structures, and therefore, "the art of teaching has little to do with the traffic of knowledge; its fundamental purpose must be to foster the art of learning [and development]" (von Glasersfeld, 1995, p. 192; see also Pepper, 1942).

Consider a lesson based on radical constructivist assumptions. A teacher is interested in having her students understand the nature of life in small American towns during World War II. The teacher employs a K-W-L inquiry strategy where the students are first asked what they *K*now about small American towns during World War II. The teacher records these ideas and concepts on the blackboard. The teacher then asks the students to write down what they *W*ant to know about life in small American towns during World War II. The teacher records these ideas and concepts on the blackboard also. The teacher then provides her students with various relevant primary sources such as ration coupons, war posters, soldiers' letters, flags, pictures, books, and advertisements, as well as secondary sources such as texts, Internet resources, and maps. The students use these sources to challenge and verify their thoughts in the pursuit of their stated goal of understanding. This, for a radical constructivist, is where knowledge construction occurs. Finally, the teacher asks the students to demonstrate what they have *L*earned in the form of a class presentation, research report, or portfolio. From a radical constructivist perspective, the teacher is not concerned with whether or not the students learn a set of textbook-defined facts and concepts relative to life in small American towns during World War II, or the "reality" of these small towns; rather, the teacher is concerned with whether or not the students' understandings are coherent and valid given the artifacts and sources with which they have engaged. Students are not free to construct any knowledge they wish (i.e., solipsistic, "anything goes" knowledge). Instead, their constructions are constrained, influenced, and made valid by the materials with which they interact. Thus, the goal is an individual, viable model of understanding, not the acquisition of a predefined set of supposed reality-based concepts.

Social Constructivism

Social constructivism represents a moderate form of constructivism, emphasizing the *social* nature of knowledge and embracing all four of the previously mentioned philosophical tenets. Social constructivism, like radical constructivism, shares the world view that an individual cannot come to know ontological reality in any meaningful way. Unlike radical constructivism, however, social constructivism emphasizes social interaction as the source of knowledge, rather than individual cognizing (Garrison, 1998; Gergen, 1995; Prawat & Floden, 1994). Indeed, for social constructivists "the process of personal meaning-making takes a backseat to socially agreed upon ways of carving up reality...the community is the prime source of meaning for objects and events in the world" (Prawat, 1996, p. 220).

This reliance on a social or activity source of knowledge brings language, culture, and context to the forefront (Dewey, 1896; Gergen, 1995; Vygotsky, 1986). Ultimately, for social constructivism, truth is adaptive and socially determined meaning that "is not to be found inside the head of an individual person; it is born between people collectively searching for truth, in the process of their dialogic interaction" (Bakhtin, 1984, p. 110).

With the previously mentioned lesson regarding life in small American towns during World War II, a social constructivist perspective would emphasize the need for social interaction, exploration, and negotiation. Thus, the social constructivist teacher might use a cooperative inquiry approach to teaching. The teacher divides her class into groups of 3 to 5 students and poses a question, "What was life like in small American towns during World War II?" The teacher then has each group discuss what they think life was like in small American towns during World War II. One of the group members records the students' thoughts. Each group is then given the same packet of primary and secondary sources detailed in the previous example and is challenged to examine the sources, discuss what they see, and come to a group consensus about what life was like in small American towns during World War II. This, for a social constructivist, is where knowledge construction occurs. Finally, the teacher asks the students to demonstrate what they have learned in the form of a group presentation with a follow-up discussion. From a social constructivist perspective, like the radical constructivist perspective, the teacher is not concerned with whether or not the students learn a set of textbook-defined facts and concepts relative to life in small American towns during World War II. The teacher is concerned that the students socially interact and come to a consensus regarding life in small American towns during World War II. Ultimately, the circle of socialization is enlarged when the students are asked to compare their consensus to social studies experts' consensus on what life was like in small American towns during World War II as a form of validation and further learning.

Cognitive Constructivism

Cognitive constructivism represents a conservative form of constructivism, emphasizing the *external* nature of knowledge and embracing only the first two of the previously mentioned philosophical tenets. Cognitive constructivism, unlike radical and social constructivism, embraces the notion that one can come to know reality, or truth, as it exists external to the individual (see Mayer, 1996; Prawat, 1996). Therefore, knowledge is objective, and knowledge acquisition is the (re)construction of external reality into internal mental structures. According to Moshman (1982):

> The construction of knowledge is thus fundamentally a *re*construction of structures...*pre*formed in the external reality...Though the abstraction of knowledge from that environment is assumed to involve an active organism, empirical guidance of this constructive activity remains the principal factor in directing the course of learning... Structures of knowledge are adequate or "true" to the extent that they accurately copy the external structures that they ideally represent (p. 373).

Therefore, the cognitive constructivist world view dictates that the search for knowledge is the search for how the world really works, and the value of knowledge is determined by its correspondence with the real world (Pepper, 1942; Prawat & Floden, 1994).

To return to the "life in small American towns during World War II" scenario once more, the cognitive constructivist perspective would be interested in "getting it right." That is, the cognitive constructivist teacher would want her students to understand the way life really was in small American towns during World War II. This teacher may use a guided discovery process that begins with asking, "What was life like in small American towns during World War II?" A brief classroom discussion is followed by handing out primary and secondary source packets to each student. The teacher then asks questions that the students answer by sifting through and analyzing the source packets. Each question is discussed in a large group, with the teacher verifying student responses and validating correct (i.e., truthful) answers. This, for a cognitive constructivist, is where knowledge construction occurs. A question-discover-validate sequence continues throughout the lesson. Finally, the teacher asks the students to demonstrate what they have learned in the form of an objective assessment such as multiple-choice or matching tests. From a cognitive constructivist perspective, the goal of the lesson is for the students to build mental structures that mirror or correspond to the reality of life in small American towns during World

War II. Student conceptions are validated as "correct" or "incorrect" based primarily on agreement with the textbook and/or the teacher – the sources of truth. Whether this acquisition of reality-based knowledge is accomplished individually or in groups is of little concern.

As is evident from the preceding discussions of radical, social, and cognitive constructivism, the concept of "constructivism" is diverse, with varied interpretations. This diversity necessitates that the asserting of constructivist claims be made with caution and significant forethought. The first order of business, after engaging in this "significant forethought," is to narrow the field of constructivist perspectives.

There is an essential philosophical difference, ontologically and epistemologically, between cognitive constructivism and both radical and social constructivism. Specifically, cognitive constructivism is built upon objectivism and metaphysical realism; that is, reality is an independent identity, separate from and regardless of the thoughts and beliefs of the observer. The type of social studies that is built upon the knowledge of specific facts, dates, people, and places embraces this perspective. Radical and social constructivism, however, are built upon subjectivism and relativism; that is, knowledge is not a mirror image of reality, but is relative to the observer. Social studies that is built upon the knowledge of inquiry and the challenge of perspective-taking embraces this perspective. This difference between cognitive constructivism and radical and social constructivism hinges on the acceptance and/or rejection of the third epistemological tenet of constructivism – that cognition organizes and makes sense of one's experience, and is not a process for rendering an accurate representation of reality.

This fundamental difference between cognitive constructivism and radical and social constructivism raises the issue of whether or not cognitive constructivism ought to be included in discussions of constructivism. The idea of banishing cognitive constructivism from the constructivist camp due to this fundamental difference has been proposed by Ernest, von Glasersfeld, and Anderson, Reder, and Simon. Ernest (1995) states that while cognitive constructivism accepts the first two principles of constructivism, it rejects the third principle "with its far-reaching epistemological consequences" (p. 468). Ernest argues "that [information processing] falls short of being even a form of trivial constructivism" (p. 468). Von Glasersfeld (1984) also clearly defines constructivism in a way that excludes the viability of cognitive constructivism:

> It is necessary to keep in mind the most fundamental trait of constructivist epistemology, that is, that the world which is constructed is an experiential world that consists of experiences and makes no claim whatsoever

about "truth" in the sense of correspondence with an ontological reality (von Glasersfeld, 1984, p. 29).

While Ernest and von Glasersfeld are social and radical constructivists, respectively, Anderson, Reder, and Simon are leaders in information processing theory and have been termed cognitive constructivists in a limited sense (see Anderson, Reder, & Simon, 1998). Anderson et al. do not call for the separation or alienation of cognitive constructivism from "constructivism," but rather call into question the very viability of constructivism, specifically social and radical constructivism. "Much of what is claimed by [social and radical constructivism] is not 'theoretically sound'" (Anderson, Reder, & Simon, 1996, p. 5); "constructivism contains little that is new and ignores a lot that is already known" (Anderson, Reder, & Simon, 1995, p. 17). Anderson et al. (1998) ultimately conclude, "The time has come to abandon philosophies of education and turn to a science of education" (p. 254).

The consensus of Ernest, von Glasersfeld, and Anderson, Reder, and Simon provides a robust rationale for a division between radical and social constructivism and cognitive constructivism. Hereafter, "constructivism" will be used to refer to social and radical constructivism only, while references to cognitive constructivism will be made explicit.

Theoretical Constructivism and Social Studies Education

Even given the exclusion of cognitive constructivism from the discussion, the transition from philosophical tenets to theoretical principles is hazardous and must be taken seriously. According to Doolittle (2001), "It is time within social studies education to take a long look backwards at the beliefs, assumptions, and theory that underlie the domain, so that the look forward to practice and pedagogy is clear, informed, and valid" (p. 502). With this in mind, we link the following six theoretical principles directly to the preceding four philosophical tenets of constructivism (see Figure 1). Moreover, these principles are not canonical, but rather purposefully overlapping and intersecting.

Principle 1: The construction of knowledge and the making of meaning are individually and socially active processes. Active, in this case, refers to both mental and social activity occurring within specific contexts. A central tenet of all types of constructivism, as indicated in the first philosophical tenet, is the notion that knowledge acquisition and meaning making cannot simply be transferred or transmitted from one individual or group of individuals to another, but rather, that knowledge acquisition and meaning making are individually and socially constructed. Thus, individuals create their knowledge

and meaning of the world through such active *individual* processes as abstraction, reflection, and the creation of knowledge structures (von Glasersfeld, 1995), and the active *social* processes of social negotiation, shared discourse, and the creation of social structures (Packer & Boicoechea, 2000).

Principle 2: The construction of knowledge involves social mediation within cultural contexts. The individual, the social, and the contextual are all inextricably linked, not in a dualist ontology of subject and object, mind and body, but rather in a mutually transformative and emergent dialectic (see Berger & Luckmann, 1967; Cobb & Yackel, 1996). The individual, engaged in socially mediated activity, is transformed or constructed through this socially mediated activity, just as the social institution is transformed or constructed by the participation of the individual. Indeed, "any social context – a classroom, for example – is itself the product of human language and social practice, not fixed but dynamic, changing over time, in what we call history" (Packer & Boicoechea, 2000, p. 232). While this principle emerges primarily from the fourth philosophical tenet – that knowledge construction involves social, cultural, and language-based interactions – it is also supported by the first three philosophical tenets. Specifically, social mediation is an active individual and social process resulting in knowledge that is individually, socially, and culturally adaptive (Vygotsky, 1978).

Principle 3: The construction of knowledge is fostered by authentic and real-world environments. Authentic, real-world environments are those individual and social environments that comprise naturally occurring, spontaneous experiences, including activities, contexts, problems, and goals. These experiences are imbued with the richness of culture, the complexity of communication, and the ubiquity of problem solving. This principle is based primarily on the second and third philosophical tenets. Specifically, while cognition is not designed to render an accurate representation of an external reality (i.e., authentic and real-world environments), cognition *is* designed to render a viable representation of one's experiences within this external reality, where viability is measured by one's effectiveness in achieving specific individual and social goals and desires. Thus, it becomes increasingly clear that the quality or fidelity of the environment within which one acts and adapts during the knowledge construction process will affect one's ability to cognate and act in the same or similar environments later (see Rogoff, 1998; Saxe, 1988; Wenger, 1998).

Principle 4: The construction of knowledge takes place within the framework of the learner's prior knowledge and experience. An essential key to all learning is what the student brings to the learning situation – prior knowledge. According to Ausubel (1968), "The most important single factor influencing learning is what the learner already knows" (p. vi). What the learner already knows, prior knowledge,

extends far beyond knowledge attained through formal education to include cultural knowledge, personal knowledge, metacognitive knowledge, and tacit knowledge. Connecting this prior knowledge to new knowledge provides a basis for establishing personal and social meaning. Therefore, the construction of learning environments must be made relative to the prior knowledge of the student, who will engage these environments. This focus on the role of prior knowledge is founded primarily upon the first and third philosophical tenets. Specifically, cognition is an active process of organizing one's prior knowledge to make sense of one's experience, where this organizational process is not designed to construct a mirror image of ontological reality, but to construct personal meaning based on experience.

Principle 5: The construction of knowledge is integrated more deeply by engaging in multiple perspectives and representations of content, skills, and social realms. Not only do different students learn differently, the same student learns differently in different situations (Ackerman, Kyllonen, & Roberts, 1999). Therefore, knowledge and skills should be presented in multiple formats and in diverse situations to maximize both the learning among individuals and the learning within each individual. In addition, the teacher should challenge students to unpack multiple perspectives. The constructivist supposition of relativistic knowledge leads naturally to the conclusion that there will be several viable perspectives, relative to the observation of a particular event, based on differences in culture, community, and individual experience. This principle is broad and reflects all four philosophical tenets, yet is not a direct result of any single tenet. That is, an emphasis on engaging in multiple perspectives creates a complex set of interrelated experiences to which an individual or group must actively construct intersections in order to make meaning from a potentially disordered set of circumstances.

Principle 6: The construction of knowledge is fostered by students becoming self-regulated, self-mediated, and self-aware. An essential goal of education is the development of autonomous individuals capable of directing their own lives effectively. Students must be encouraged to become self-regulatory, self-mediated, and self-aware by learning to set their own goals, regulate their own thought processes and understandings, and monitor their own progress. Self-regulation, self-mediation, and self-awareness help a student to become fully equipped to construct knowledge effectively – and thus, become a life long learner. As Kluwe (1982) states:

> It is important that human beings understand themselves as agents of their own thinking. Our thinking is not just happening, like a reflex; it is caused by the thinking person...It can be monitored

> and regulated deliberately, i.e., it is under the control of the thinking person (1982, p. 222).

Kluwe reflects the philosophical underpinnings of this principle - that is, the active nature of the knowledge construction process, the first philosophical tenet. Specifically, this deliberate regulation of knowledge construction is fostered by making students actively aware of their understanding. This awareness is based both on the feedback received from the environment (e.g., others, artifacts) and self-reflection on one's understanding and experience.

Corollary: Teachers should serve primarily as guides and facilitators of knowledge construction, not dispensers of knowledge. Traditionally, teachers have been thought of as conveyors of knowledge – the teacher teaches and the student learns. Constructivism requires that teachers become facilitators of knowledge, not conduits. In this view, students learn best when they are socially interacting within an authentic situation that is relevant to their prior knowledge and goals, and that fosters autonomous and self-directed functioning. A growing body of literature, however, reveals how deeply rooted misconceptions can serve as stumbling blocks to future learning and development (Bransford, Brown, & Cocking, 1999). What is clear is that in taking on the role of facilitator, teachers must develop a pedagogically reflective ability to identify and utilize strategies to effectively address and unpack student misconceptions - inaccurate social studies knowledge, understanding, and dispositions - that they bring with them, cling to, and elaborate on in the social studies classroom. The teacher's challenge, as articulated by von Glasersfeld (1995), is as follows:

> To arrive at a viable model of the student's thinking, it is important to consider that whatever a student does or says in the context of solving a problem is what, at this moment, makes sense to the student. It may seem to make no sense to the teacher, but unless the teacher can elicit an explanation or generate a hypothesis as to how the student has arrived at the answer, the chances of modifying the student's conceptual structures are minimal (p. 15).

Given the aforementioned constructivist philosophy and theory, then, what are the implications for constructivist pedagogy and the pedagogical implementation of technology in social studies education?

Pedagogical Constructivism, Technology, and Social Studies

Education

Just as the transition from philosophical constructivism to theoretical constructivism must be made with care and caution, so must the transition from theoretical constructivism to pedagogical constructivism. Indeed, according to James (1958),

> I say moreover that you make a great, a very great mistake, if you think that psychology, being the science of the mind's laws, is something from which you can deduce definite programmes and schemes and methods of instruction for immediate schoolroom use. Psychology is a science, and teaching is an art; and sciences never generate arts directly out of themselves. An intermediary inventive mind must make the application, by using its originality (p. 23).

Hence, pedagogy of any type is at least once removed from any theoretical underpinnings. Nonetheless, several authors have proposed models of constructivist pedagogy (see Brooks & Brooks, 1993; Duffy & Cunningham, 1996; Hendry, 1996; Jonassen, Peck, & Wilson, 1999). In order to create sound pedagogy upon which to build meaningful social studies instruction, the constructivist pedagogy proposed here is linked directly with the preceding philosophical tenets and theoretical principles (see Figure 1). In addition, the proposed pedagogy is contextualized within the use of technology in the social studies.

The proposition that technology has a role to play in the fulfillment of social studies pedagogy is undeniable. The question remains how best to implement this technology. Naisbitt (1982) argues that new technologies move through three key stages as they are integrated into various domains. Initially the new technology follows the "path of least resistance" into an existing domain. At the second stage, current users begin to replace what are now seen as obsolete technologies with the new technologies; however, the new technologies are generally used to accomplish the same task more efficiently. In the third stage, users begin to explore the potential of the new technologies. They discover new functions and uses through asking questions that go beyond examining what can now be done more efficiently to what can now be accomplished that could not be accomplished previously.

Peck and Dorricott (1994) contend that within the field of education, the shift to stage three begins with teachers asking, "How can these new tools contribute to a more powerful educational experience?" (p. 12). Unfortunately, computers in many classrooms "spend more time off than on," and when on are merely used for "creating puzzles, delivering instruction, assessing student progress, and producing

reports" (Peck & Dorricott, 1994, p. 12). Means and Olson (1994) contend that efforts to introduce technology into schools were founded upon the "wrong model of teaching with technology, [whereby] product developers believed in their content knowledge, pedagogical techniques, and in the power of technology to transmit knowledge to students," instead of providing the types of technologies that support "students and teachers in obtaining, organizing, manipulating, and displaying information" (pp. 15-16). A key implication is that if interactive technologies are truly going to impact teaching and learning, there needs to be a shift in social studies education that requires technology to be used as a resource stimulus for inquiry, perspective taking, and meaning making, and not as a conduit for the transmission of knowledge.

Such a transformation from technology-as-teacher to technology-as-partner is essential to achieving the goals of social studies education (Jonasson, Peck, & Wilson, 1999). It must be noted, however, that the key to achieving these goals is not technology itself, but rather how technology is used as a developmental tool to encourage citizenship. Implementing technology as a developmental tool within a constructivist framework in the social studies classroom should include the following pedagogical strategies. Each strategy is accompanied by web site references that serve as potential exemplars. However, the web sites incorporated in these explanations (a) do not comprise an exhaustive list of all the quality social studies web sites on the Internet, and (b) may not serve as an exemplar beyond the stated strategy.

Strategy 1: Teachers and students should be prepared to implement technology as a tool for inquiry. Implementing a constructivist approach to social studies requires a new set of intellectual tools. While a significant number of students and teachers are readily acquainted with computers, most do not have the training necessary to use technology as a tool for inquiry. Saye and Brush (1999) provide an excellent account of a technology-rich learning environment that suffered from students and teachers who were unprepared to engage technology as a tool for inquiry in a U.S. history classroom. At the beginning of the unit, both students and teacher struggled with how best to implement the technology. According to Saye and Brush, student comments such as, "This doesn't make sense! How are we supposed to tie this together?" and "I'm lost; how do we use this information we collected?" (p. 488) were common. Likewise, the teacher commented, "I am going to have to find ways to hold them more accountable. I'm not sure how much to let them guide themselves" (p. 488). Student construction of knowledge, and the teacher's facilitation of this construction, necessitates that both be prepared for the journey of inquiry. This pedagogical emphasis on inquiry is rooted in the first, third, and fourth theoretical principles, specifically, that the

creation of knowledge and meaning require an active exploration and interpretation of both the environment and one's prior knowledge.

The use of the Internet as an inquiry tool, however, becomes problematic if teachers and students are ill prepared to evaluate and validate online resources (November, 1998; Shively & Van Fossen, 1999). Valid concerns have been raised with regard to students' readiness and ability to conduct meaningful and self regulated in-depth research when the tendency of many students is to collect only the most easily accessible information via simplistic searches (Berson, Lee, & Stuckart, 2001; Breivik, 1998). In addition to intellectual preparation, attention must be paid to concerns over Internet safety and the utility of the Internet as a tool for inquiry and perspective taking.[2]

The Social Studies Forum contains many instructional modules and digital history resources that highlight how technology can be utilized as a tool for critical and responsible social studies inquiry (http://curry.edschool.virginia.edu/teacherlink/content/social /instructional/ k12modules.html). An excellent initial lesson from the Social Studies Forum, "The Bill of Rights in Current Events," is designed to prepare students to access, search, and utilize the Internet (http:// curry.edschool.virginia.edu/ teacherlink/content/social/instructional/ search/home.html). This lesson begins with an introduction to search engines, subject directories, and search techniques. While practicing such strategies, students locate current cases and issues pertinent to the Bill of Rights. As a part of this inquiry process, students evaluate the authority and accuracy of specific web sites. Such activities provide a solid foundation for preparing both teachers and students to become knowledgeable, discriminating, and responsible users of the Internet (see Kleg, 1997). In addition, the WebQuest site (http://webquest.sdsu. edu/webquest.html), developed by Bernie Dodge, serves as an excellent gateway through which to examine many examples of how the Internet can be used to support structured inquiry-oriented lessons. The Webquest concept utilizes a template that provides students with the opportunity to access a range of online resources to explore meaningful and significant questions.

Strategy 2: Teachers should use technology to create authenticity, which facilitates the process of student inquiry and action. Authenticity provides real-world context and comprises two equally important components, authentic social studies materials and authentic social studies inquiry. Clearly, technology is tailor-made for access to authentic historical pictures, diaries, maps, and writings. Mere access to these materials, however, is insufficient; indeed, these materials must be used in the course of authentic inquiry. This "doing" of history is based on the first four theoretical principles, whereby students actively engage with authentic materials and inquiry within both individual and social contexts.

One site that helps the teacher to develop lessons that encourage authentic student inquiry is International Constitutional Law (http://www.uni-wuerzburg.de/law/index.html). This site contains constitutions and other textual material from over 150 nations. It automatically links the user to the CIA World Fact book (http://www.odci.gov/cia/publications/factbook/) and Elections Around the World (http://www.electionworld.org). Teachers can use the available material to help students conduct comparative political studies using authentic materials. Such comparative studies would be difficult, if not impossible, within the confines of a social studies classroom that is driven by the textbook and "teacher talk."

Another excellent example in the doing of history can be found in the work of the Ligon Historians (http://www2.ncsu.edu/ncsu/cep/ligon/about/history/intro.htm), who are Ligon Middle School students collaborating with their teachers, local university professors, and Ligon High School students and alumni on an oral history project that documents the history of Ligon High School and the surrounding predominantly African American community. The site includes class histories, biographies of alumni, an architectural history of the community and a life map of one alumnus that reveals how redevelopment has impacted the local community. Such projects highlight how technology can be utilized to encourage students to be authentic producers, rather than mere consumers, of their history.

Strategy 3: Teachers should use technology to foster local and global social interaction such that students attain multiple perspectives on people, issues, and events. Technology provides an unprecedented avenue to interact locally and globally with others. The Internet provides social studies teachers the opportunity to expose their students to multiple perspectives and contexts beyond textbooks, while also providing a focal point for cooperative learning groups, group discussions, and debates. In addition, chat rooms, audiographics, email, and listservs provide students with the ability to interact with groups of students in other states and countries, as well as distant social studies experts. Based on the first, second, and fifth theoretical principles, this access to multiple perspectives facilitates the broad range of experiences necessary for students to challenge their currently held beliefs and to understand the established beliefs of others.[3]

Bringing the world into the classroom through online newspapers is a powerful example of how the Internet can support teaching about current events, peoples, and cultures of the world, and the international position of one's homeland. Thirty-five newspapers from five different regions - Africa, the Americas, Asia, Europe, and the Middle East - are accessible from Newspapers Around the World (http://www.majbill.vt.edu/history/ewing/global_newspapers. htm). Global newspapers allow students to compare and contrast different

perspectives on similar events, explore the regional significance of a particular process or event, or examine a particular country, culture, or population in-depth.

In addition, a number of sites, such as the Global School House Collaborative Learning Project (http://www.gsn.org/), the UNICEF Voices of Youth Project (http://www.unicef.org/voy/), ePALS (http://www.epals.com), and the International Education and Resource Network (IEARN; http://www.iearn.org/), have been established to facilitate international relationships through telecollaborative projects. Such projects can quickly and efficiently organize relationships among students in different towns, states, and nations. The IEARN network offers a number of ongoing and short term projects in which schools and classes can participate, including Everything After: A 9.11 Youth Circle; Let's Make a Peaceful World Project; Fight Against Child Labour and Exploitation Project; and the Holocaust Genocide Project. Such activities offer the possibility of exploring and revising conceptions of cultures, groups, and individuals over time and space.

Strategy 4: Teachers should facilitate student knowledge construction by using technology to build on students' prior knowledge and interest. A key element in the construction of new and meaningful knowledge is the link between prior knowledge and new knowledge, and when these links are fostered through the student's pursuit of personal interest, the personal nature of knowledge and meaning construction is emphasized and empowered. Based on the first, fourth, and sixth theoretical principles, prior knowledge of personal, local, and world history provides a strong basis for exploring the social studies. A caveat in the use of technology, however, is to not let it become a substitute for personal knowing.

An example of what is possible in the social studies classroom when technology is used to build on students' prior local knowledge is the Bland County History Archives at Rocky Gap High School in Southwest Virginia (http://www.bland.k12.va.us/bland/rocky/archives.html). The Bland County History Archives began with students collecting oral histories from their community. Students scanned historical documents and photographs, saved transcriptions as html files, and created a searchable database, thus developing an online historical archive of their community. The melding of technology, student's prior knowledge, personal interests, and "history of place" at the community level has allowed Rocky Gap's students to construct an ongoing, durable, and organic local history project.[4]

Strategy 5: Teachers should enhance the viability of student knowledge by using technology to provide timely and meaningful feedback. Learning construction is enhanced through the cyclical process of experience, knowledge construction, and knowledge assessment. A crucial aspect of this cycle, often overlooked, is continued knowledge

assessment. This continued, or formative, assessment involves feedback relative to the viability of the knowledge that is constructed. In social studies, theories, concepts, and perspectives must be assessed for their viability in explaining historical events, efficacy in representing others' perspectives, and precision in defining concepts. Technology usage, based on the first, fourth, and sixth theoretical principles, must then provide not just resources and stimuli for inquiry, but also the means to assess the knowledge one is constructing.

A number of sites provide students with the opportunity to assess their developing knowledge. Both the EPA's Recycle City (http://epa.gov/recyclecity/) and the Government Printing Office's *Place the State* interactive games on Ben's Guide to U.S. Government for Kids (http://bensguide.gpo.gov/9-12/games/interactive.html) contain online simulations/games that allow students to test their ideas, hypotheses, and knowledge, and receive immediate feedback. Within Recycle City, the *Dumptown* game lets students choose specific programs to reduce waste while meeting a set budget. In the process of creating the optimum combination of programs for the city, students receive immediate feedback and projections about the levels of waste reduction and the extent of the costs associated with each of their decisions. The feedback allows students to re-evaluate their policy choices based upon their initial goals and budget. Ben's interactive *Place the State* game similarly provides students with feedback when they correctly locate and name a U.S. state.

In addition, sites such as Ask an Expert (http://www.askanexpert.com/) and Ask Thomas Jefferson (http://www.monticello.org/education/asktj/instructions.html) also provide students with the opportunity to ask questions and receive feedback. Effective feedback from these "expert" sites is only generated when students learn to develop questions that act as verifications of ideas and work they are already undertaking, as opposed to questions that merely ask for as much information as possible on a given subject.

Strategy 6: Teachers should cultivate students' academic independence by using technology to foster autonomous, creative, and intellectual thinking. The ultimate goal of constructivism, through the synthesis of all six theoretical principles, is the development of autonomous students capable of engaging in personally meaningful inquiry resulting in viable knowledge. Therefore, technology in social studies should be used primarily to foster academic independence and the ability to think and act. Social studies students must develop the ability to use technology as a tool in the pursuit of large, meaningful questions. The challenge for them is not to memorize a seemingly well-defined corpus of knowledge, but rather to engage that knowledge intellectually and with discipline. According to Scheurman and Newmann (1999), "For knowledge construction to be powerful, it must

be grounded on a foundation of disciplined inquiry" (p. 24).

Teen Hoopla (http://www.ala.org/teenhoopla/activism. html) provides teachers with a powerful resource to engage students in civic learning, deliberation, and action within the social studies classroom. Teen Hoopla connects to such organizations as Greenpeace, Habitat for Humanity, and Amnesty International, and it highlights the potential the Internet has to heighten students' awareness of local and global issues, while providing avenues, ideas, and plans for independent social action. For example, a student can access Scorecard (http://www.scorecard.org/), a free source of environmental information from an organization called Environmental Defense.[5] To access data that identifies local polluters within a community, all that is initially required of the student is a zip code. Once information is gathered about who is polluting the community, and how, Scorecard provides a range of ideas and avenues for how to take action, including examples of how to write letters to the Environmental Protection Agency, access to environmental discussion lists, and details of local environmental groups. If the teacher and students decide to develop a more concerted plan of action, the Constitutional Rights Foundation (http://www.crf-usa.org/violence/action.html) provides a short guide designed to help students organize and implement civic action projects within their local communities.

All of the examples provided in this paper can help students begin to explore and analyze various situations, set goals, gather material, consider options, make decisions, assess knowledge, and consider the consequences of their virtual actions. All of these endeavors maintain the focus on the student's construction of knowledge within the social studies classroom and serve as a break with the traditional transmission model of social studies.

Caveats of Adopting Constructivism in Social Studies Education

The preceding discussion delineated the relationship among constructivist philosophy, theory, and pedagogy, and it suggested that constructivism may serve as a viable framework for the sound use of technology in the social studies. Unfortunately, the adoption of any foundational framework, including a constructivist framework, is not value-free and brings with it potential problems.

One central philosophical problem inherent in constructivism relates to epistemology. A broad historical path running through philosophy addresses how one comes to know and what is the nature of what is known. Is knowledge attained directly through one's sense experience so that an individual's knowledge mirrors a reality external to the individual, as posited by the empiricists? Or, is knowledge the result solely of reasoned thought such that each person creates his or

her own private reality, as postulated by the rationalists? Both extreme empiricism and extreme rationalism lack credible philosophical support; however, while extreme empiricism and rationalism may provide the ends to an epistemological continuum, several players occupy the interior (e.g., skepticism, logical positivism, relativism, pragmatism, phenomenology). So where does constructivism lie on this continuum? Cognitive constructivism lies firmly at the extreme empiricist end of the epistemological continuum, while social and radical constructivism reside more in a middle ground populated by relativism.

Relativism is the general belief that knowledge is always dependent on the observations of an individual or social group. While it is often comforting to take a relativistic position that acknowledges the role of culture or one's personal history in the construction of knowledge, the embracing of relativism brings with it the danger of succumbing to solipsism. Solipsism is an extreme form of relativism that posits that *all* knowledge is knowledge of one's subjective mind, and thus, "the thing and the knower are one, and the world or reality becomes a mere figment of the imagination" (Sahakian & Sahakian, 1966, p. 137). While solipsism brings with it several assumptive difficulties, perhaps the most challenging is that of language. If all knowledge is only knowledge of the knower, then how is language developed, implemented, and interpreted? For the solipsist, there is no knowing of the other, and if one cannot come to know another, then how is one to learn the meaning of the other's words?

To apply the concept of extreme relativism to the realm of social studies, one could focus on the Holocaust denial of such non-historians as Arthur Butz (see http://pubweb.acns.nwu.edu/ ~abutz/index.html), as well as of recognized historians such as David Irving (see http://www.holocaustdenialontrial.org/nsindex.html). Are the views of Butz and Irving viable simply because they are expressed? Thus, can one be a constructivist and not be a solipsist? According to McCarty and Schwandt (2000), "Relativism in all its formsÖrepresents a major critical charge against constructivism in all its guises" (p. 43). To be a constructivist and not an extreme relativist/solipsist, one must ground the viability of knowledge. An ungrounded social studies that embraces the idea that "anything goes" or "every view is appropriate" will soon become vacuous and meaningless (Spencer & Barth, 1992).

This search for grounding is a continual struggle for constructivism (see Cobb & Yackel, 1996; Phillips, 2000), and consequently, is often skillfully ignored as irrelevant to the overall issue of knowledge construction (see von Glasersfeld, 1991; Gergen, 1994). When not ignored, a middle position is often attempted: "[Knowledge] has no ultimate foundation, but neither does it float free, because it is grounded in experiences and practices, in the efficacy of dialogic negotiation and of action" (Code, 1993, p. 29). A social studies built

on constructivism must likewise ground itself in the methods and practices of inquiry and the establishment of viability through dialogic negotiation and interrogation of people and artifacts, or it will succumb to solipsistic perspectives.

While the pursuit of philosophical grounding is important, a more visceral concern is the impact of adopting a relativistic perspective on the psyche of both teachers and students. Teachers and students who have been academically nurtured with the comfort of truths, facts, and certainty may have difficulty adapting to a constructivist framework that is more flexible and uncertain (Fleury, 1997). Hunt (2000) rightly notes that the problem of introducing students "more and more to the uncertainties of history, the limitations of evidence, and the variety of interpretations" (p. 46) can be problematic for the teaching and learning of history. He suggests this is especially true for those students who see learning as nothing more than the "acquisition of a body of knowledge that they can own and recall" (Hunt, 2000, p. 46). Even so, as initially disconcerting as a constructivist framework may be, a more powerful and engaging social studies asks that students and teachers be willing to learn the habits of mind necessary to engage in the ongoing and emergent conversation of history and social studies. Iggers (1997) correctly states:

> To be sure every historical account is a construct, but a construct arising from a dialog between the historian and the past, one that does not occur in a vacuum but within a community of inquiring minds who share criteria of plausibility (Iggers, 1997, p. 145).

Conclusion

This article began with the assertion that while the call for technology integration into the social studies is clear the path has been uncertain. In addition, it stated that this lack of certainty is at least partially due to conceptual underdevelopment. This underdevelopment was addressed throughout the article by aligning philosophical, theoretical, and pedagogical foundations based on constructivism. Carefully mapping out this alignment is key to creating an effective, viable, and robust framework for the integration of technology into the teaching and learning of social studies. How, though, is this framework to be understood and implemented?

It is important to note that this framework is not a prescriptive set of pedagogical strategies for the integration of technology into social studies, that if employed will yield maximal student learning. The framework provided is not "teacher proof"; it requires the presence and involvement of a professional teacher - "an intermediary inventive

mind must make the application" (James, 1958, p. 23). Instead, this framework provides (a) the rationale for *not* adopting strict "how to" pedagogies, and (b) for taking "an informed stance that provides the necessary foundation to create pedagogy that is molded to specific contexts, contents, and constituents" (Doolittle, 2001, p. 513). At a minimum, this means that "teachers should be able to both relate the practice *back* to its origins in learning theoryÖand *project* the likely consequences (pitfalls and benefits) of using the techniques with their students" (Windschitl, 2002, p. 161).

Specifically, teachers must be careful not to fall into the trap of labeling specific pedagogical and technological strategies (e.g., cooperative learning, direct instruction, multimedia, computer mediated communications) as constructivist or non-constructivist. For example, Oliver (2000) states, "Constructivist environments *always* start with a case, problem, ill-defined question, or project" (italics added, p. 5). Yet, Howe and Berv (2000) note, "It is easy to think of ways in which direct, didactic techniques of instruction may be combined with an overall constructivist view" (p. 32). Strategies for technological integration are neither inherently constructivist nor non-constructivist, and indeed the same strategy may be used in ways that are consistent or inconsistent with a constructivist approach.

Moreover, the philosophical tenets, theoretical principles, and pedagogical strategies explored in this article were specifically designed to provide a rationale for implementing constructivist-framed pedagogy and technological integration, without labeling specific strategies, behaviors, or technologies as constructivist or non-constructivist. Milman and Heinecke (2000) and Molebash (2002) both provide solid case studies that demonstrate the need for and benefits of understanding the philosophy, theory, and pedagogy of constructivism in the integration of technology. Milman and Heinecke (2000) describe two teachers that engaged collaborative groups of students in the location, collection, evaluation, interpretation, and integration of primary source data for the purpose of creating an interactive online web site. In this endeavor, the teachers served as facilitators of the process and not directors of content acquisition. Similarly, Molebash (2002) describes a teacher who uses an online digital library and census data to allow students to build, both individually and socially, an understanding of a specific soldier during the U.S. Civil War. What is most important about both of these research studies is that they begin to examine the work of social studies educators attempting the explicit application and synthesis of constructivist philosophies, theories, and pedagogies.

Ultimately, the question to be asked, as Cuban (2001) reminds us, is, "In what ways can teachers use technology to create better communities and build strong citizens?"(p. 197). This is an important question for all social studies educators, researchers, and reformers, as

there is a long history of technology and education literature indicating that if technology-based teaching strategies are simply used to replace non-technology-based teaching strategies, then learning is not improved (see Clark, 1994, Russell, 1999). Cuban (2001) affirms this perspective when he contends that "without a broader vision of the social and civic role that schools perform in a democratic society, our current excessive focus on technology use in schools runs the danger of trivializing our nation's core ideals" (p. 197).

Cuban's (2001) "excessive focus on technology," however, must be clarified. The central issue is not the quantity of the focus on technology, but rather the quality of the focus. Currently, social studies educators are at play in the fields of technology, which results in a disjointed collection of technological integration efforts. In our enthusiasm, we may have side-stepped, or merely payed lip service to, the need for a clear foundation. Specifically, the use of technology in social studies needs to be grounded philosophically, theoretically, and pedagogically. A grounded framework for implementing technology in social studies is necessary for advancing the social studies beyond vacuous memorization into the realm of active inquiry, perspective taking, and meaning making. This article argues that one avenue to integrating technology for the improvement of social studies learning begins with implementing an aligned constructivist philosophy, theory, and pedagogy in pursuit of the development of critically minded global citizens.

Notes

[1] While Becker, Ravitz, & Wong's (1999) work suggests an absolute increase in use of the Internet by social studies teachers, it is important to note that their research also indicates that (a) only 30% of social studies teachers reported students used the Internet during class time, (b) only 14% of teachers reported frequent student use of the Internet during class time, and (c) social studies teachers generally lagged behind their colleagues in English, vocational and business studies, and the sciences in the use of word processing and the Internet in their classrooms.

[2] According to a recently released survey by the National School Board Foundation (2002), a growing number of schools leaders (9 out of 10) are taking the concept of Internet safety seriously; "more than 90% of school districts have installed filtering software" (p. 11). While such filters can go a long way to protecting children, Berson, Berson, and Ralston (1999) stress the vital role teachers and adults must play in supervising children's online activities 'for the sake of safety and learning" (p. 161). Institutes such as Responsible Netizen in the Center for Advanced Technology at the University of Oregon have begun to develop a strong literature base regarding Internet safety and the social and ethical uses of communication technologies (http://responsiblenetizen.org/).

[3] Berson, Lee and Stuckhart (2001) rightly stress the importance of critically evaluating online exchanges that on the surface appear to offer the potential for an exploration of multiple perspectives. They note that such exchanges can just as easily "perpetuate biased views of the world that are informed by interactions with predominantly elite segments of societyÖand are devoid of perspectives which promote pluralism through critical self reflection as well as historical and cultural contexts of power and intolerance" (p. 223).

[4] Pursuing ideas of personal interest, as well as having the opportunity to search and cross reference information, requires a broad range of social studies resources. A number

of sites including Yahooligans, a social studies directory for the Yahoo search engine (http://www.Yahooligans.com/School_Bell/Social_Studies/), and the Awesome Library (http://awesomelibrary.org/ Classroom/Social_Studies/ Social_Studies.html) can serve as gateways through which students can begin to conduct personal searches or group research projects.

[5] In using any site it is important for teachers and students to learn about the ideological agenda of the organization of the site sponsor. Environmental Defense is a not for profit progressive/liberal environmental advocacy group. It is worth noting that Scorecard was selected by New Scientist Magazine as a weblink for learning about the environment and ecology in February 2002 (http://www.newscientist.com/weblinks/categories/environment1.jsp).

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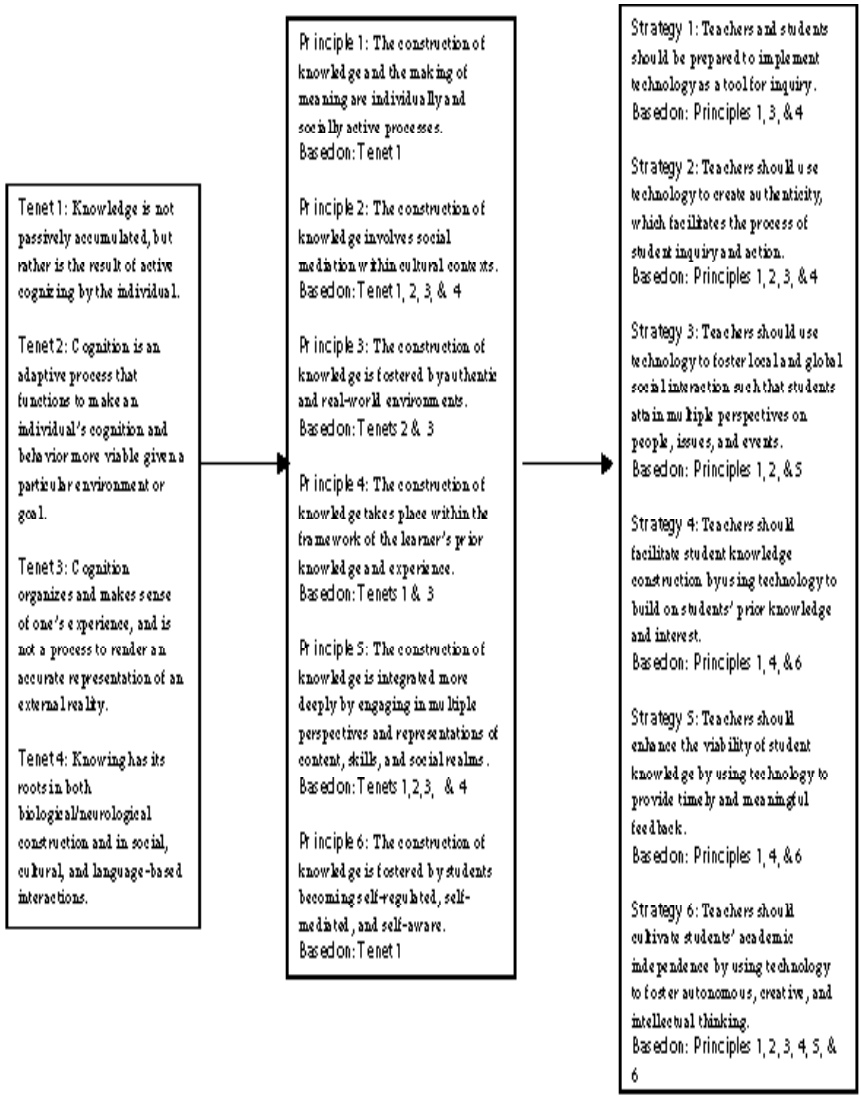
Table 1. Comparison of the Epistemological Assumptions of Constructivism

	Cognitive Constructivism	Social Constructivism	Radical Constructivism
What is the nature of reality?	Reality exists and is knowable to the individual.	Reality exists, but is not knowable to the individual.	Reality may exist, but is not knowable to the individual.
What is the nature of knowledge?	Mental structures and knowledge are accurate (re) constructions of external reality based on personal experience.	Mental structures and knowledge are based on shared social experiences, language, and agreed-upon meanings.	Mental structures and knowledge are viable/adaptable constructions based on personal experience.
How is knowledge constructed?	Knowledge is constructed through direct encoding of the environment, abstraction, and induction.	Knowledge is constructed through the use of language in social negotiation and consensus, and social interaction.	Knowledge is constructed through self-organization, reflective abstraction, and deduction.
What is the foundation of knowledge construction?	Experience and mental processing have primacy in knowledge construction.	Language and social interaction have primacy in knowledge construction.	Reason and experience have primacy in knowledge construction.
What is the function of cognition and knowledge construction?	The function of cognition is personal adaptation to the environment stimulated by a conflict between an individual's existing knowledge and current experience.	The function of cognition is social adaptation stimulated by a conflict between an individual's existing knowledge and social interaction and/or social messages.	The function of cognition is personal adaptation to the environment through the building of a coherent mental structure that is viable and "fits" the environment.
What is the role of "others" in knowledge construction?	"Others" have no privileged position in knowledge construction; social interaction is merely an aspect of the complex learning environment.	"Others" have a privileged position in knowledge construction as co-constructors of knowledge within socially/culturally organized activities.	"Others" have no privileged position in knowledge construction, but rather are simply environmental entities with which one has personal experiences and must adapt.

Figure 1. Relational Delineation of the Philosophical Tenets, Theoretical Principles, and Pedagogical Strategies of Constructivism



Authors

PETER E. DOOLITTLE and DAVID HICKS are Assistant Professors in the Department of Teaching and Learning at Virginia Polytechnic Institute and State University, Blacksburg, VA 24061.