"Be not the first by whom the new are tried, nor yet the last to lay the old aside." 1

- Alexander Pope, 1711

It is rather inconceivable that in the dawn of the 21st century we would still be engaged in a discussion of how to integrate technology and the Internet into the curricula of history or social studies teacher education. However, this is the reality of the situation. Although American schools have witnessed the proliferation of computers and computer use in classrooms, going from 630,000 in 1985 to over 8 million in 1998, this same pedagogical phenomenon has not been mirrored by teacher education programs. 2

Researchers still find technology and Internet use in teacher education to be the exception rather than the norm. 3 Numerous research studies in both the United States and United Kingdom have found pre-service teachers are "not well prepared for classroom use of computer technologies." 4 A recent report by the U.S. Office of Technology Assessment confirmed this dismal appraisal of computer use: "despite the importance of technology in teacher education, it is not central to the preparation experience in most U.S. colleges of education today. Most new teachers graduate from teacher preparation institutions with limited knowledge of the ways technology..."
can be used in their professional practice."  

Even in the midst of these turbulent waves of alarming reports on the status of computer use in teacher education, those who continue to champion the cause of technology education have weathered the storm and stayed the course. In the past five years, in fact, their voices have become stronger and their audience has grown dramatically.  

A recent survey of pre-service teachers found that 90 percent of them not only recognized the need for computer training, but lobbied strongly for such integration in their teacher education program.  

This plea for making technology an integral part of teacher education has been echoed by politicians as well. Four years ago, President Bill Clinton made such a plea, positing that, "In our schools, every classroom in America must be connected to the information superhighway with computers and good software and well-trained teachers." An even stronger statement was issued in a 1995 U.S. Office of Technology Assessment Report that placed teacher training as a top priority. The report stated that preparing teachers to "effectively incorporate technology into the teaching and learning process is one of the most important steps the nation can take to make the most of past and continuing investment in educational technology."  

Three centuries later, perhaps neoclassical poet Alexander Pope's appraisal of societal acceptance of innovation is still valid. While computers have become nearly commonplace in the elementary and secondary school landscapes, and the allocation for this technology has gone from the millions to the billions of dollars in annual spending, many of their classroom gatekeepers remain locked in an archaic pedagogical paradigm. The result of this has been described by some researchers as the all too common, simplistic, classroom technology integration strategy of, "Do something. Do anything. Just use it!"  

While this may be an extreme characterization of the current situation, it does raise a number of important questions for pre-service history teacher education programs. In particular, there are two vital questions of greatest importance to the history education community: What is the current state of computer and Internet integration in teacher education? What theoretical and pedagogical frameworks and practices appear to be the most promising for history teacher education?  

Although some researchers warn that any response to these questions is "hazardous in view of the fact that technological change has increased at such an accelerated rate that proposals for pre-service and in-service teacher preparation in technology have a brief shelf life," this should not deter teachers and researchers from attempting to answer these questions. The antithesis argument does not reconcile itself with the reality of the classroom. Many history education graduates will find themselves teaching in school districts this fall where technology is already an integral, and evolving, component of the curriculum. In addition, while education is more susceptible than any other profession to the swing of the innovation pendulum, nearly everyone agrees technology is one innovation that is here to stay.  

.02 Status of Technology Use in Teacher Education (Return to Index)
"Tens of millions of parents all across our nation have watched their children play every kind of video game from *Mortal Kombat* and *Primal Rage* to *Killer Instinct* and *Super Street Fighter*. But the really important new computer game in America is learning. And we are going to put it at the disposal of every child in this country by the end of the century."

- President Bill Clinton, 1995

Although President Clinton's vision of universal computer access in America's classrooms has not yet been realized, it is much closer to reality than it was just a few years ago. The computer-student ratio has gone from 1:125 in 1984, to 1:5 today. The question, however, is not whether the number of computers in American classrooms will continue to grow, we have established this fact, what remains to be seen is whether teacher education programs will be able to prepare new teachers to effectively incorporate computers and the Internet into their history curricula and instructional repertoire. While the statistical data concerning the proliferation of computers in American schools is quite encouraging, the information concerning teacher preparation is not. As an example, a 1995 report by the U.S. Office of Technology Assessment estimated that only 3 percent of teacher education program graduates felt, "very well prepared" to utilize technology in their classroom.

While the integration of instructional technology into teacher education curricula varies greatly from one institution to another, what remains constant is the disparity between the increase in access to such technology in K-12 classrooms and the caliber of technology training afforded to pre-service teachers. Perhaps the current state of affairs is best summarized by Howard Mehlinger and Jerry Willis in the introduction to their chapter, "Information Technology and Teacher Education," in the most recent edition of the *Handbook of Research on Teacher Education*. They preface their review with the following statement, "Much of the literature on information technology and teacher education could be summarized in one sentence: Most preservice teachers know very little about effective use of technology in education and leaders believe there is a pressing need to increase substantially the effective quality of instruction teachers receive about technology. The idea may be expressed aggressively, assertively, or in more subtle forms, but the virtually universal conclusion is that teacher education, particularly preservice, is not preparing educators to work in a technology-enriched classroom."

Mehlinger and Willis are not alone in their assessment. Consider, as well, the following quotes by other educational researchers:

- Sadly, the need to train teachers in the effective use and integration of technology is not new information to teacher education training programs. Researchers have been reporting for at least a decade that schools and colleges of education are woefully behind schedule in areas related to technological uses in today's K-12 classrooms. Individually, most professors recognize technology training as a growing need in their preservice teacher...
education programs. Programmatically, though, they still think it should be taught as a stand-alone course, not necessarily integrated into their specific content area.  

- Teachers are emerging from their preservice training to become part of the problem of integrating technology into the classroom rather than part of the solution.  

- There is little argument among leaders in the field of educational technology that teacher training institutions are not adequately preparing undergraduate teacher education students to effectively integrate technology into their teaching. Thus, our education students are graduating with little knowledge as to the instructional applications of one of the most revolutionary sets of instructional tools of the past two decades.

Although this picture of teacher education appears rather bleak, for many colleges and universities it is still an accurate portrayal. The only thing that has changed in the past few years is the increase in demand by school administrators for teacher education programs to graduate teacher candidates with the requisite skills necessary to integrate technology into their curricula. Economics is certainly a primary motivating factor in this scenario. As one teacher educator has pointed out, "more and more superintendents are reluctant to hire new teacher candidates that are not already trained in the use of technology. Their contention is that precious staff development funds are being eaten away by initial training that should, and could, be provided by preservice teacher education programs." How then should history teacher education programs respond to this demand? What should guide history teacher educators in their attempt to design programs that meet the needs of the twenty-first century?

.03 History Teacher Education Technology Framework: Standards

"If technology is to be widely used, teachers and administrators need training. Training to use technology must be a part of every entry-level teacher's preparation and should continue throughout a teacher's career so that he or she can keep abreast of developing technologies. The most effective training is accomplished within the curricular area in which the technology is to be used."

-National Governors' Association, 1991

A number of events have played a role in determining the course of American education in the twentieth century. In the last quarter of the century, however, no event has played as critical a role as that of the standards movement. The power of standards to "catalyze change in fundamental components of the educational system" is without question. Given this, an excellent starting point for history teacher education programs attempting to integrate technology into their teacher education programs.
preparation curricula are the guidelines and policies imbedded in these standards. Although much is to be learned from the analysis of standards, it still represents only the first step in the development process.²⁶

Numerous professional organizations lay claim to history or social studies teacher education, however most do not make mention of the role of technology in their standards, including those of the National Council for the Social Studies (NCSS). Other professional standards address technology education, though not in any degree of depth. In the Interstate New Teacher Assessment and Support Consortium (INTASC) Core Standards, for example, only one standard/principle mentions the utilization of technology. INTASC Principle #6 states the following: "The teacher uses knowledge of effective verbal, nonverbal, and media communication techniques to foster active inquiry, collaboration, and supportive interaction in the classroom."²⁷ INTASC goes on to define media communication tools as audio-visual aids and computers.

The National Board for Professional Teaching Standards (NBPTS) Social Studies-History Standards also address the integration of technology in history teacher and education curricula. NBPTS Social Studies-History Standard VI, Instructional Resources, states the following: "Highly accomplished teachers select, adapt and create rich and varied resources for social studies and history and use them productively."²⁸ The NBPTS document goes on to discuss how history teachers might apply this knowledge to the classroom:

Teachers develop a deep and rich base of resources, choosing from written materials, electronic media, artifacts and other visual aids. They are aware that technological resources are important sources of information as well. Technology also promotes active learning and can facilitate student discussions in peer groups. They seek to expose their students to the broad assortment of resources, including primary and secondary sources, artifacts, video presentations, on-line services, CD-ROM, and community resources, among others. Such resources serve to make their students more capable and independent learners.²⁹

While these sets of standards may be of some assistance in the integration of technology and the Internet into history teacher education programs, their impact pales in comparison with the only nationally adopted standards for technology education, the International Society for Technology in Education (ISTE) Foundation Standards.³⁰ This set of fundamental concepts and skills for technology integration and classroom utilization is the most comprehensive and inclusive guideline available to history teacher educators. Not only do the ISTE Standards serve as a valuable curricular planning resource, but they are also an integral part of the National Council for Accreditation of Teacher Education (NCATE) accreditation process.³¹ The ISTE Standards address the following eighteen technology concepts and skills:

Basic Computer/Technology Operations and Concepts
Operate a multimedia computer system with related peripheral devices to successfully install and use a variety of software packages.

Use terminology related to computers and technology appropriately in written and oral communications.

Describe and implement basic troubleshooting techniques for multimedia computer systems with related peripheral devices.

Use imaging devices such as scanners, digital cameras, and/or video cameras with computer systems and software.

Demonstrate knowledge of uses of computers and technology in business, industry, and society.

Personal and Professional Use of Technology

Use productivity tools for word processing, database management, and spreadsheet applications.

Apply productivity tools for creating multimedia presentations.

Use computer-based technologies including telecommunications to access information and enhance personal and professional productivity.

Use computers to support problem solving, data collection, information management, communications, presentations, and decision making.

Demonstrate awareness of resources for adaptive assistance devices for students with special needs.

Demonstrate knowledge of equity, ethics, legal and human issues concerning use of computers and technology.

Identify computer related technology resources for facilitating lifelong learning and emerging roles of the learner and the educator.

Observe demonstrations or uses of broadcast instruction, audio/video conferencing, and other distance learning applications.

Application of Technology in Instruction

Explore, evaluate, and use computer/technology resources including applications, tools, educational software, and associated documents.

Describe current instructional principles, research, and appropriate assessment practices as related to the use of computers and technology resources in the curriculum.

Design, deliver, and assess student learning activities that integrate computers/technology for a variety of student group strategies and for diverse student populations.

Design student learning activities that foster equitable, ethical, and legal use of technology by students.

Practice responsible, ethical, and legal use of technology, information, and software resources.

.04 Integration v. Stand Alone Framework (Return to Index)

In addition to reviewing national standards to identify the most efficacious application,
another decision history teacher educators must make is how to best infuse technology education into their programs. One factor that certainly complicates this process is that computer literacy is still, very much, an ill-defined concept, as illustrated by the following quote by one educational researcher:

-while computer literacy is still a popular concept, computer literacy is like motherhood in that most people are in favor of it. But unlike motherhood, it does not have a clear and precise definition.-.33

This definitional ambiguity is reflected in the status of technology infusion in teacher preparation curricula. Currently, teacher education programs are split in their allegiance to one of two prevailing technology literacy paradigms. Approximately half of the teacher education programs have adopted a "stand alone" approach that calls for a specific course to be designated for technology education purposes.34 The other 50 percent of teacher education programs have instead adopted a more integrative approach, in a belief that "technology should be integrated seamlessly into all coursework making the need for a separate instructional technology course obsolete."35

Numerous professional organizations and governmental agencies have joined in the pedagogical crusade to make the latter of these two implementation paradigms the prevailing one. Perhaps the most influential recommendation was one issued by NCATE just a few years ago. In a 1995 standards document, NCATE directed that all teacher education faculty should be "knowledgeable about current practices related to the use of computers and technology and integrate them into their teaching and scholarship."36 Other agencies, such as the U.S. Office of Technology Assessment, have added that efforts must be made to not only implement technology education in pre-service teacher preparation, but that such training must also include exposure to "more sophisticated tools (e.g. the Internet, integrated media, problem-solving applications) that support the development of students' higher-order thinking and problem-solving skills, leading to classroom integration."37

A major criticism of "stand alone" technology courses in teacher preparation is that they do not teach pre-service teachers how to integrate technology in the manner described earlier.38 Many teacher education researchers have investigated these two approaches and believe the integration approach to be more effective in preparing pre-service teachers to teach in technology enriched K-12 classrooms.39 On the other hand, a number of teacher educators still believe an introductory or foundational technology education course should remain in the teacher preparation curriculum. Both of these groups of integration proponents, however, do agree that "unless students see the use of technology modeled in their other courses, unless they have an opportunity to make the connection between technology and instruction in the subject or level they will teach ·they are likely to graduate with limited professional skills in this area and harbor a questionable attitude toward the use of technology in education."40

Research data appear to support this type of integrative approach. In particular, a
recent survey by ISTE of over 400 teacher education programs in the United States identified a critical variable they term the integration factor. The ISTE found the integration factor, which they defined as the teaching of technology skills and classroom application, served as the best predictor of performance in the other technology education components on the 32 item survey. The survey also found that "stand alone" technology course completion did not correlate well with pre-service teacher technology literacy and classroom teaching integration. The ISTE concluded their report with a series of recommendations, many of which directly relate to integration, including a directive that teacher education programs continue to infuse technology education into other courses in the pre-service teacher education curriculum and encourage individual faculty members to model such integration in their instruction. This latter recommendation is echoed by NCATE in their 1997 report calling for universities to provide professional development incentives and academic rewards to faculty, in order to encourage this type of undertaking.

.05 Traditional v. Constructivist Paradigm

Most history teacher educators today agree that the "mere presentation or demonstration of technology-related instruction by a Techie" is no longer a plausible option. There still is, however, much debate over which theoretical or pedagogical framework will best accomplish these ambitious technology goals for pre-service history teachers. The current debate appears to center around two prevailing teaching and learning paradigms often referred to in the research literature as a traditional or rationalistic, transmission-oriented didactic pedagogy versus a constructivist, learner-centered approach. Another way of illustrating the distinction between these two teaching and learning paradigms is found in the comparison between Aristotle and Plato's epistemological positions. Aristotle's reality, founded in concrete knowledge gathering and experience, is analogous with the traditional or rationalistic pedagogical paradigm. While Plato's concept of truth, which is similar to Piaget's concept of schemata, is more aligned with the constructivist pedagogical paradigm.

Over the course of the past decade, a number of teacher education researchers and professional organizations have issued a call for a conceptual swing of the teacher preparation pendulum to the constructivist approach. The constructivist teaching and learning paradigm appears to be an ideal framework for history teacher education programs. In particular, the emphasis on active and engaged student learning and the involvement of learners in the construction of representations of knowledge are germane to integrative history teacher education programs. In addition, the priority given to the connection of new knowledge and previously learned concepts and skills, is another hallmark of history and technology education. The rationale for adoption of the constructivist teaching and learning paradigm in a technology integrated, history education program has perhaps been most eloquently put forth by social studies teacher educator Cameron White:
The merging of technology and constructivism offers much hope for the future of social studies education. A constructivist orientation to teacher education is important if we are to encourage students in schools to develop problem solving and critical thinking skills, and to apply, analyze, synthesize, and evaluate knowledge, skills, and attitudes. 52

The final step in implementing constructivist teaching and learning strategies in the history teacher education curriculum is to make the students aware of the underlying theoretical basis for such activities. 53 Such elucidation is critical for students to understand the epistemological assumptions associated with the constructivist paradigm. If students are unsuccessful in making these connections, the concern by some teacher educators and researchers is that pre-service teachers will simply convert these constructivist practices into traditional, rationalistic pedagogical strategies; perhaps the only ones with which they have any familiarity. 54

.06 Electronic Portfolio History Education Approach (Return to Index)

Once pre-service history teachers have gained an understanding of the theoretical foundation of the constructivist teaching and learning approach, the final step is for teacher educators to implement an integrative program that models and applies the constructivist praxis. 55 The ISTE recommends that all education researcher and teacher educators attempt to "identify, study and disseminate" models of "effective technology integration." 56 One of the most promising of these models makes pre-service teacher portfolios the cornerstone of its approach. 57

Although research on pre-service teacher portfolios has yielded limited information, many studies have suggested that students are more engaged and demonstrate more responsibility for their learning with this approach. 58 Since one of the "essential components of constructivist programs is active student involvement," teacher portfolios appear to be an ideal means for achieving this end. 59 Other benefits of this approach include the ability to: document pre-service teacher performance and professional growth; integrate technology into the teaching and learning process; introduce authentic learning activities in the teacher education curriculum; and produce an ideal marketing tool for future employment--an electronic portfolio. 60 The electronic portfolio approach is also an ideal pedagogical framework, not only for integrating technology in a constructivist manner, but also for addressing many national standards recommendations. The list of professional organizations that support utilization of portfolios in teacher education include the following:

- American Association of Colleges for Teacher Education
- National Board for Professional Teaching Standards
- National Council for Accreditation of Teacher Education
- National Project on the Quality of Teaching and Learning

While the teaching components included in pre-service history teacher education

http://mcel.pacificu.edu/JAH/JAHII2/K12/cantu.htm
portfolios may vary greatly, they should always reflect the goals of the individual teacher education program. There are, however, certain elements that appear to be germane to most models. Utilizing web authoring programs, such as Netscape Composer, pre-service history teachers are able to create HTML documents containing their multimedia, electronic products. These items may then be displayed on student web pages and/or burned on CD-ROM disks. Some of the authentic, constructivist and technology integrated activities that pre-service history teachers may design for their electronic portfolios include the following:

- Unit Outlines
- Lesson Plans
- Unit Evaluation Modules
- Unit Assessment Devices
- PowerPoint Presentations
- Hyper Studio Learning Programs
- Internet Links Pages
- Performance Assessment Activities
- Web-Based Learning Activities
- Interactive and/or Multimedia Learning Displays

Electronic portfolios allow pre-service history teachers to demonstrate both their computer and Internet skills, as well as their knowledge of history. Content knowledge plays an integral role in the development of teacher portfolios. Such knowledge does not have to be sacrificed at the alter of pedagogical innovation. In fact, if implemented in a reflective and systematic manner, the electronic portfolio model is one of the most effective means for integrating technology and content available to history teacher educators today.

**.07 Future Research** ([Return to Index](#))

Although a technology integrated, constructivist approach is a promising framework for pre-service history teacher education, there is still a need to identify examples of successful implementation in other history preparation programs. In addition, there are a number of questions which remain unanswered. For example, what is the relationship between integrative, constructivist teacher program graduates' classroom practice and student achievement? While optimism surrounds current reports that indicate students of teachers who had professional training in computers outperformed those who did not on the 1996 NAEP exam, more studies, specifically focusing on history assessment performance, are clearly needed.

Another research question that should be posed is, What research paradigm and data collection and analysis methods will best guide practice? Because research and practice inform each other, "with research insights leading to program improvement as well as to contributions to the field's general knowledge," this is a critical question for both researchers and practitioners. Given that the phenomenon under
investigation should dictate the educational research paradigm and methodology, however, many researchers will choose to employ naturalistic or qualitative methods. While such naturalistic studies may be of great benefit to classroom teachers and teacher educators, many educational and governmental leaders will still require quantitative evidence that supports the integrative, constructivist teaching and learning classroom paradigm.

.08 Conclusion (Return to Index)

While there is a distinct need to investigate this integrative approach further, this should not diminish the impact this framework has already had on teacher education. Fortunately, we find ourselves far removed from the time when many education and government leaders thought the mere presence of computers in K-12 classrooms was the final step in the technology integration process. Today, there is a recognition by most everyone involved in education that this is but the first step in the process. The preparation of K-12 teachers to integrate technology in their history curricula, in a powerful and meaningful manner, is the next logical step in this journey.

This is the challenge facing history teacher educators at the dawn of the twenty-first century. The goal, quite simply, is that this journey will eventually result in the same type of technology integration we have witnessed in other fields. Many history educators hope that at the close of the twenty-first century we don't find ourselves in the same position as we do today, where many classrooms "resemble their ancestors of 50 and 100 years ago much more closely than do today's hospital operating rooms, business offices, manufacturing plants, or scientific labs."

.09 Notes (Return to Index)


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17. Ranae Stetson and Troy Bagwell.


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35. Ibid, 218.

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