Technology And Graduate Teacher Education: An Integrated Approach To Program Design

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Abstract: This paper documents the design and development of a graduate teacher education program in educational technology that bridges educational theory with technological practices through a framework consisting of philosophical, practical and pedagogical dimensions. The program is grounded in principles of media literacy and democratic practice while also engaging students in technological practices, as proscribed through state and national standards for technology in education. The paper emphasizes the need for school-university partnerships, educational technology praxis, and stronger connections with schools and local community agencies to support best pedagogical, as well as technological, practices.

Introduction

Advancements in digital technologies have increased the momentum towards educational renewal at a national level in the United States. At the federal level, *No Child Left Behind,* mandates that all students achieve *technological literacy* by the end of the 8th grade by 2007 (USDOE 2002). Recently established are the National Educational Technology Standards (NETS) for administrators, teachers and students that designate performance indicators in the areas of operational proficiency, productivity, communication, research, problem-solving, and social, ethical and human issues (ISTE 2002). These standards communicate mixed messages about the role of technology in teaching, however. The NETS require teachers to integrate technology throughout their core subject area curricula. In contrast, the state of New Jersey designates *technological literacy* as a separate subject area emphasizing workplace proficiency and computer skills among students (NJDOE 2000). While these national and state standards are important to acknowledge, they alone are insufficient in preparing students to participate as critical and creative users of information. A recent report asserts teacher education programs do not adequately prepare pre-service teachers to integrate technology into their teaching (Bell 2001, Levine 2006). The call for technology integration and standardization coupled with the call to reform teacher education compels higher education institutions to redouble their efforts in preparing teachers in the area of educational technology.

The professional needs of teachers are certainly not limited to mere acquisition of technical skills. According to a recent McArthur Foundation Report, there is a strong and immediate need for policy and pedagogical intervention to address specific challenges among young people, including: 1) unequal access to a participatory culture (that requires technological skills); 2) lack of transparency in the ways media shape young people's perception of the world; and 3) the ethical challenges of preparing young people for their increasingly public roles as media producers (Jenkins et al 2006). Of particular importance to teacher education and schooling is the use of technology as *media for communicating* within and about the world rather than treating technology as a set of value-free tools. Recent media reform efforts call for the uses of digital media and technology to better promote social justice through social networking, for example (Chester 2007). This requires, in part, ensuring that diverse populations within the United States (and worldwide) become both *media* literate and *technology* proficient.

It follows that teacher education programs should provide more than mere technical instruction in the latest digital technologies. Teacher education requires *media literacy*—the ability to access, evaluate, produce and communicate using a variety of media forms (Aufderheide & Firestone 1992). As a framework with philosophical, pedagogical and practical dimensions, media literacy offers a way to become literate in visual and print texts and to examine historical, political, social and economic ramifications of all forms of media and technologies (Tyner 1998). Ultimately, it requires *critical thinking* (Ennis 1993) and the critical habits of mind such as weighing evidence, using reason, and employing ethical standards to think and act (Meier 1995). The challenge for teacher educators lies in sustained focus on completing the *cycle* of media literacy (processes of access, analysis, evaluation, production, and communication) which affords creativity while also requiring a critical perspective of technologies

and their associated media texts. To this end, this paper documents the development of a masters of education program in educational technology at Montclair State University in New Jersey, USA. Educational theory, technological practices, and democratic practices converge through a three-dimensional approach to technology and teacher education. Philosophical foundations, practical design and production, and pedagogical design and application courses together comprise the program.

Institutional Context

While Montclair State University (MSU) was originally founded as a normal school in 1908, it has evolved into a doctoral intensive university with the first doctoral degree in pedagogy in the United States (MSU Statistics 2006). There are currently 40 Masters Programs, and 250 undergraduate majors, minors and concentrations. MSU has a current enrollment of 12,000 undergraduate and 3,900 graduate students. As a result of strategic planning and preparation for its centennial, MSU is amidst a significant growth period in capacity-building of student enrollments and physical facilities. Last year debuted a new 280,000 square foot state-of-the-art academic building that offers fully mediated classrooms, state-of-the art media production labs, teacher development labs, and video conferencing facilities that comprise the ADP Center for Teacher Preparation and Learning Technologies. A separate Office of Information Technology (OIT) on campus provides maintenance and support for the technologies, as well as training for students, staff and faculty. In cooperation with OIT, the College of Education and Human Services has recently begun to make use of video conferencing capabilities supplied through participation in New Jersey's Higher Education Network (NJEDge.Net). The MSU campus consists of six video conferencing facilities across campus. The establishment of a statewide educational video network has assisted the College of Education and Human Services in developing links between the university and many of the school districts it serves.

The pedagogical climate at MSU is currently one of possibility. Although the "classroom of the future" spaces cater to multiple teaching styles, the technology infrastructure has advanced more rapidly than the curriculum and instruction. There does not exist a general education course in technology, per se. Yet within the past year, a one-credit technology integration module was added to the undergraduate teacher education program. The module draws from students' concurrent field experiences in other courses. Blackboard is the standard courseware used across the university, with more than half of the faculty population using it to some degree in their teaching. The university administration is eager to explore the possibilities of online and hybrid courses, as instruction is predominantly face to face mode. Data collected from 29 districts in New Jersey (representing various socio-economic levels and encompassing urban, suburban and rural areas) indicate a high level of interest among teachers in a graduate program that emphasizes educational technology (Tumposky, 2003). It is incumbent upon teacher education programs in New Jersey and the United States to address the growing need for philosophical, practical and pedagogical understandings of communications technology not just in the school classroom, but also in wider public forums.

State-of-the-art academic buildings and fully mediated classrooms aside, it is the Montclair State University Network of Educational Renewal (MSUNER) and its institutional commitment to educational renewal and the maintenance of strong professional development school partnerships with more than twenty school districts in the surrounding communities that makes MSU an ideal institution at which to develop a program in educational technology. The MSUNER, founded in 1995, is heavily steeped in an existing institutional commitment to educational renewal and democratic practice through the Agenda for Education in a Democracy—the goals of which are social justice, diversity and democratic practice in teacher education (Goodlad 1998; Goodlad Soder & Sirotnik 1993; Michelli & Keiser 2005). More specifically, the Agenda portrays teachers as culturally responsive and reflective practitioners who not only promote democratic values and communication in the classroom, but also believe in the potential of schools to promote social justice (Portrait of a Teacher 2003). The assumption is that the aforementioned ideals can be accomplished through a dialogic partnership between teacher education institutions and K-12 schools. It follows that educators should follow this same set of commitments when envisioning the infinite pedagogical and professional potential for new media and technologies and therefore acknowledge the real challenges of (in)equity, (lack of) diversity and social (in)justice as inextricably connected to the educational uses of technologies (Domine 2004). A graduate program in educational technology should not only be technologically rigorous, but should also frame technology within a larger vision and commitment to social justice. Along similar lines, the intellectual and technological facets of a program in educational technology must work together to ensure that all students have the ability to leverage technologies toward social, political and economic ends. Learning how technology can effectively support classroom teaching requires an environment where teacher educators, graduate students, and in-service teachers can learn collectively and collaboratively (Hartshorne Ferdig & Dawson 2005). The

vision for educational technology graduates at MSU is to embrace institutional change, display a commitment to leadership, and to building media literate and technologically proficient educational communities. As agents of change, graduates will ideally take leadership roles as teacher-leaders, technology coordinators, community activists, consultants, supervisors, administrators and professionals within the broad spectrum of education.

Program Design

As part of the initial program design, we compiled a focus group of university faculty to discuss the potential of a degree program in educational technology, inviting colleagues from outside the College of Education and Human Services. Colleagues in the fields of music education, math education, broadcasting, information sciences, information technology and physical education participated in a focus group session and follow up discussions. The dominant themes that emerged from these discussions were: 1) the need for rigorous technological training; 2) the need to emphasize pedagogical excellence; and 3) the need to cater to those in the corporate as well as educational sector. These emergent themes—coupled with an institutional commitment to democratic practice—led to the development of three program concentrations to meet the needs of a diverse student population: Curriculum and Technology Integration, Administration, Policy and Leadership, and Organizational Planning and Development. The student selects an area of concentration based on interests and career goals. In this way, the program invites a diverse population of education professionals—including non-profit administrators, corporate trainers, software developers, community leaders, school principals and classroom teachers. Given the diverse student population comprising the program, it follows that coursework comprising the program of study occur in various contexts, including the local Montclair State University campus, the surrounding school and business communities, and the expansive global community afforded through video-conferencing and web-based instruction. From the interdisciplinary discussions also emerged three essential dimensions that ultimately comprise this masters program in educational technology: Philosophical foundations; Practical design and production; and Pedagogical design and application. Taken together, the "3P" principles reflect the development of a 33-credit program (four semesters and one summer). The program contains both breadth and depth by privileging technological skills along with sustained praxis—connecting media and education theories with technological and pedagogical practices within real educational settings (see Figure 1).

Philosophical Foundations

A foundation in the philosophy of education and technology provides students with a wider lens through which to understand educational technology and some of the pedagogical possibilities. Through three foundational courses, students come to understand the historical, social, political and ethical dimensions of technology within local and global educational settings. They comprehend learning theories, methods and models that are both unique and problematic to the uses of media and technologies within educational settings. Students become aware of, sensitive to, and critical of issues surrounding diversity, equity and access that permeate the uses and promotion of educational technologies both locally and globally. Most importantly, they acquire a language through which to analyze and evaluate policies, institutions, audiences and practices associated with technology in education. These first three courses introduce students to the vast network of multiple media forms and systems that define educational technology. Students achieve an advanced level of critical analysis of past and present educational technology policy. In the first course (*Introduction to Educational Technology)* students construct a Policy Analysis Report that requires in part the compilation of a clear set of recommendations that address an educational technology policy problem. In the second foundational course (*Curriculum and Technology Development: Global Perspectives*), students examine (via web-based technologies) the potential roles, regulations and renewal of the technologies of education within the social and political democracy of the United States, comparing and contrasting epistemologies and practices within the United States with those of a wider global community. The third foundational course (*Assessment and Evaluation of Learning with Technology*) focuses on assessment and evaluation of educational technology programs, processes and products. Students explore formative and summative evaluation using quantitative and qualitative research methods. They select an area of inquiry (a problem or possibility relevant to their field of study and educational technology in general), define a research problem, and collect and interpret preliminary data during the course. Prerequisite to the course is prior theoretical understanding of education, technology and learning; therefore, students take the course during their second year of study, as a precursor to designing a master's capstone project. While the three philosophical foundation courses are predominantly theoretical by design, the coursework also requires students to perform at an intermediate level of technological

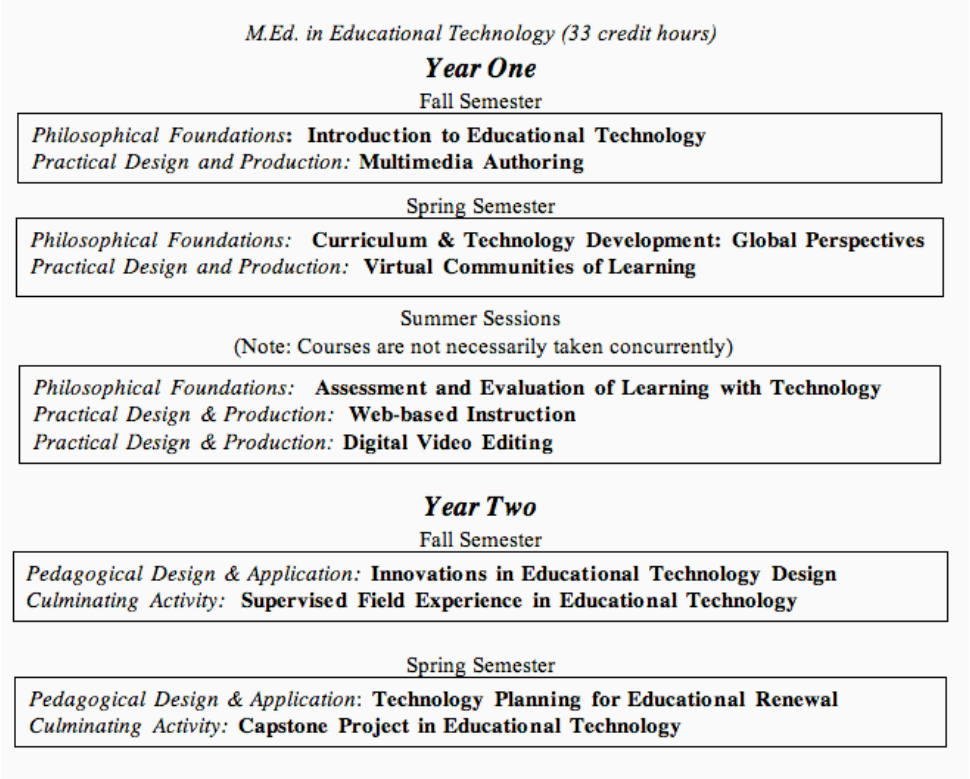

Figure 1: A sample course of study. The focus of the first year is to bridge theories of learning with intermediate-to-advanced proficiency in communications technology. The focus of the second year is to integrate theory, research methods and practical field experiences.

proficiency. These philosophical foundations of educational technology would not be realized to their full extent without practical (hands-on) experiences within the wider educational community.

Practical Design and Production

Research suggests the proliferation of new media technologies is a major influence in driving democratic practices among young people in the United States and even worldwide, providing young people a sense of accomplishment, ownership, and empowerment both individually and collectively (Asthana 2006). Hands-on media production must therefore be both the cornerstone and capstone of illuminating theories of teaching and learning and essential to cultivating active producers and participants in a democratic society. It also requires a widely cast definition of *technology* to include object, print, audio, video, and digital communications. Furthermore, a democratic model for educational technology emphasizes needs-based design, to foster diversity and social justice within local and global educational communities (Marri 2005).

Students enter most graduate programs at MSU with a wide range of technological skills. In order to establish a benchmark for proficency, the program administers to candidates upon admission a technology self-assessment that measures individual levels of technology proficiency (based on the ISTE standards) and identifies areas for further growth and development. If students score below proficiency, they are required to enroll in a prerequisite course (*Critical Basics of Media and Technology Production*) where they can explore, experiment, and practice with a wide range of current media and technologies. This course equips students with the technology skills to progress successfully through the master's program. Upon program exit, students re-take the technology self-assessment with the expectation of scoring at the advanced proficiency level after completing coursework in the area of practical design and production.

To achieve advanced technological proficiency, students complete four courses in the area of Practical Design and Production. Students design and produce non-linear multimedia projects using text, images, sound, graphics, and animation (*Multimedia Authoring*). They experiment with various digital authoring tools to express their non-linear interpretations and critique of U.S. history, for example. Similarly, students gain practical experience in *Digital Video Production* through digitally telling the story of a particular local community. As cybercitizens, they (re)distribute them to a wider educational community on the Web. Students learn the technical (e.g., special effects, animation, graphic design) through a contextualized subject, purpose and locale. Students cater to the needs of the non-traditional learner in *Web-based Instruction*, where they learn the tools of the Web to develop synchronous and asynchronous educational environments. Student explore the direct impact of networked communication technologies through *Virtual Communities of Learning*, where videoconferencing serves as a vehicle for understanding globalization as it relates to education, commerce, politics and culture. Students actively participate in and critically evaluate a virtual community and ultimately design, plan, develop, assess and manage an online community.

In each of the courses mentioned above, students develop a working knowledge of networking technologies (i.e., hardware, software, and internet connectivity) and the critical habits of mind associated with technology troubleshooting. More importantly, these courses allow students to develop an understanding of technological *praxis*—realizing connections between theories of media and education and actual technological practice. The hands-on production work combined with a field-based component allows students to command technologies while representing the communities of which they are apart. The goal is to achieve technological transparency, so that students can move beyond the equipment and focus on how technology is practically applied within a community setting in ways that are educational, communal and ultimately more democratic by design.

Pedagogical Design And Application

In the push for simultaneous renewal of education and teacher education, scholars call for bridging theory and practice through more field-based experiences (Goodlad 1998; Jacobson et al, 1998). From this perspective, teaching with (and about) technology requires more than technical skills; it requires practical wisdom derived from mentoring and field-based experiences, as well as dialogue and reflection about experiences in the field. Pedagogical design and application courses are designed to bridge philosophy, theory, and practice. They help students extend, apply and reflect on their knowledge and skillsets within a specific educational setting. In the course, *Technology Planning for Educational Renewal*, students assist school district or organizational leaders in systemic design and implementation of a technology plan that is customized according to site need (e.g., philosophy, goals, budget, individual staff needs and abilities). Students also conduct a needs assessment, facilitate actual planning meetings among leaders, educators, staff, parents and community representatives and put into practice their technological skillset (i.e., purchase recommendations, arranging technical support). Ultimately, graduates should be able to conduct technology needs assessments within school districts or other educational settings and develop their abilities to apply that information to design, plan, implement and maintain educational technology across an entire system or community.

The integration of field work and course work (on campus) allows students in this program to anchor their theoretical understanding with real practice. In the college classroom setting they explore social, political, economic and moral issues surrounding the uses of educational technologies that occur in the school classroom, or other field setting. *Innovations in Educational Technology Design* provides students with the opportunity to enact principles of access and equity through the understanding and experimentation with various adaptive and assistive technologies both at the university campus (the state-of-the-art ADP Center) and in a field-based setting (i.e., special needs classroom, occupational training center, or other public agencies). Students conduct written case studies and complete an Integrative Educational Technology Plan (IETP) to determine effective strategies for achieving equitable access to education (and technology) for all students and teachers. In this course, students are assessed on their ability to design authentic learning experiences and environments that support the felt needs of learners from diverse backgrounds. In these ways, the program attempts to realize through its students the mission of the MSUNER.

Convergence of Theory & Praxis

A recent report asserts teacher education "is a troubled field, characterized by curricular confusion [and] a faculty disconnected from practice" (Levine 2006 p. 21). To address these concerns, this master's of education degree program distinguishes among philosophical, practical and pedagogical dimensions—while also honoring their inextricable connectedness to each other. The connections are solidified through two culminating courses. Students first engage in *Supervised Field Experience*, which is a sustained (100 hours) semester-long immersion within a setting of their choice. The course is an intensive, one-on-one mentoring experience where the student can draw connections across the philosophical foundations, practical production, and pedagogical application of media technologies within a chosen educational setting. It is also an opportunity for the student to "mine the field" for opportunities where they can engage in educational renewal. The supervised field experience is preparatory to the final (capstone) course.

Capstone Project in Educational Technology requires the student to identify a real educational challenge and then explore its philosophical, practical and pedagogical dimensions. The student works with a college-level supervising faculty member and a field-based supervisor to design, develop, produce, implement and assess an educational technology project in one of three scholarship areas (e.g., discovery, pedagogy and application) patterned after the Boyer (1997) model that positions teaching as research. The student selects one of these areas of scholarship based on his/her professional interests and career goals, and supporting coursework. Discovery scholarship includes research, assesssment, evaluation and/or implementation of educational technology policies and standards. Possible discovery projects include a written thesis on research and development for leaders, superintendents, principals in the areas of theory, policy and/or the development of standards within a chosen area of educational technology. Applied scholarship includes technology planning and coordination in school districts as well as educational consulting in the non-profit and public service sectors. Possible projects include developing a multimedia curriculum project, database development or other product that addresses felt needs within a local educational community. Pedagogical scholarship should ultimately serve the chosen community with modeling and cultivating best practices in teaching. Students may pick a pedagogical dilemma for which educational media technologies can be a positive force. Examples include the selection of an educational goal and technologically scaffold its implementation within a particular setting (e.g., in a classroom, training program, after-school program, museum, etc.) or develop an educational evaluation project or corporate training programs in diversity, leadership or team building, for example.

Throughout this masters program, students develop technological transparency as they continually anchor their theoretical understanding within technological practices. The student is required to successfully defend orally the capstone project before an approved faculty committee. The capstone project is evaluated according to a common rubric and rating scale that aligns standards from the International Society for Technology in Education (ISTE), the Association for Educational Communications and Technology (AECT), the New Jersey Core Content Curriculum Standards (NJCCCS), and the New Jersey Professional Standards for Teachers and School Leaders (NJPSTSL). The cumulative results of the capstone project evaluation, course-embedded assessments, and final technology self-assessment determine a student's readiness to exit the program.

Considerations for Implementation

While this master's program in educational technology as a whole offers students many hands-on, practical experiences that engage teachers and educators in authentic ways, ultimately the program requires teaachers to engage in action research that is theoretically, methodologically and technologically rigorous. It is unclear the extent to which student applicants arrive equipped to engage in simultaneous rigor. It may become more important as the program grows (given the program's emphasis on educational praxis) to emphasize assessment and evaluation of a variety of field-based educational technologies and place less emphasis on conducting academic research, as candidates for this program are less likely to pursue education at the doctoral level and more likely to treat it as a terminal degree to support their professional development.

Recent recommendations from the U.S. Department of Education call for program evidence that includes "a variety of outcome measures that encompass preservice teacher and faculty portfolios, classroom observations of teacher candidates . . . and the achievement of their K-12 students over the years" (Thompson 2005 p. 331). Given that this program is based on three key areas of competencies, it is important to embed performance assessments within specific courses that represent each of these areas and to collect data to determine program efficacy. Data will be collected, assessed and evaluated upon program entry, course completion, in connection with field experiences,

and upon completion of the capstone project. Given the USDOE recommendations, we are currently developing a post-exit survey that identifies perceived technological and media literacy practices of graduates with student outcomes in their future professional settings—to measure potential program impact. Observation-based measures are also under consideration. We are in the process of defining and developing more long term program assessment constructs and measures. As the program progresses, there will be the need to place additional emphasis on gathering data to illustrate the level of *praxis*—to what extent graduates put their learning into practice as agents of change within their schools and districts.

Also under consideration are strategies for grafting in more community agencies and organizations as partners in educational renewal. Ideally, such partnerships with MSUNER will focus on best pedagogical practices concerning a variety of educational technologies and prepare community leaders and educators to find ways to bridge the digital divide that still exists in many impoverished communities across the United States. Not only must educators and community leaders find ways for students to access equipment and services within their schools and communities, but beyond that they need to provide at-risk students with equitable access to a participatory culture where technology skills determine access to and the production of knowledge. The ultimate goal of this master's program in educational technology is to cultivate teachers, trainers, leaders, and technologists that conscientiously use technology daily in the service of social justice, equity, democratic practice and educational renewal. Most importantly, we seek to equip graduates with the ability to critically engage themselves and their students beyond the surface of technological acts towards more creative and responsible roles as media literate citizens.

References

Asthana, S. (2006). *Innovative practices of youth participation in media*. Paris: United Nations Educational, Scientific and Cultural Organization (UNESCO).

Aufderheide, P., & Firestone, C. (1992). *Media literacy: A report of the national leadership conference on media literacy*. Queenstown, MD: The Aspen Institute.

Bell, L. (2001). Preparing Tomorrow's Teachers to Use Technology: Perspectives of the Leaders of Twelve National Education Associations. *Contemporary Issues in Technology and Teacher Education*, *1*(4), 517-534.

Boyer, E. L. (1997). *Scholarship reconsidered: Priorities of the Professoriate*. San Francisco: Jossey-Bass.

Chester, J. (2007). *Digital destiny: New media and the future of democracy*. New York: The New Press.

Domine, V. (2004). How important is technology in urban education? In S. Steinberg & J. Kincheloe (Eds.). *19 Urban Questions: Teaching in the City* (pp. 210-218). New York: Peter Lang Publishing.

Ennis, R. H. (1993). Critical thinking assessment. *Theory into Practice, 32*(3), pp. 179-186.

Goodlad, J. I. (1998). *Educational renewal: Better teachers, better schools (rev. ed)*. San Francisco: Jossey-Bass.

Goodlad, J. I., Soder, R., & Sirotnik, K. A. (1993). *The moral dimensions of teaching*. San Francisco: Jossey-Bass.

Hartshorne, R., Ferdig, R. E., & Dawson, K. (2005). Preparing current and future teachers to teach with technology: An examination of school-university collaborations. *Journal of Computing in Teacher Education, 21*(3), 77-85.

International Society for Technology in Education (ISTE). (2002). *National Educational Technology Standards for Teachers (NETS•T)*. Washington, D.C.: ISTE.

Jacobson, S. L., Emilhovich, C., Helfrich, J., Petrie, H. G., Stevenson, R. B. (1998). Transforming schools and schools of education: A new vision for preparing educators. Thousand Oaks, CA: Corwin Press.

Jenkins, H., Clinton, K., Purushotma, R., Robinson, A. J., Weigel, M. (2006). *Confronting the challenges of participatory culture: Media education for the 21st century*. Chicago: The MacArthur Foundation.

Levine, A. (2006). *Educating school teachers*. Washington, DC: The Education Schools Project.

Marri, A. R. (2005). Educational technology as a tool for multicultural democratic education: The case of one US history teacher in an underresourced high school. *Contemporary Issues in Technology and Teacher Education, 4*(4), 395-409.

Meier, D. (1995). *The power of their ideas*. Boston: Beacon.

Michelli, N. M., & Keiser, D. L. (Eds.). (2005). *Teacher education for democracy and social justice*. New York: Routledge.

Montclair State University Statistics (2006). Retrieved October 23, 2006 from http://www.montclair.edu/statistics/.

New Jersey State Department of Education (2001). Core Curriculum Content Standards. Retrieved December 13, 2006 from http://www.state.nj.us/njded/cccs/.

Portrait of a Teacher (2003). Montclair State University, Center of Pedagogy. Retrieved January 19, 2007, from http://cehs.montclair.edu/academic/cop/about.html#portrait.

Thompson, A. D. (2005). Scientifically based research: Establishing a research agenda for the technology in teacher education community. *Journal of Research on Technology in Education, 37*(4), 331-337.

Tumposky, N. (2003, May). *FSIP (2002-2004) Interim Report.* College of Education and Human Services, Montclair State University.

Tyner, K. (1998). *Literacy in a digital world: Teaching and learning in the age of information*. Mahwah, NJ: Lawrence Erlbaum.

United States Department of Education (USDOE). (2002). *No Child Left Behind*. Retrieved April 3, 2003, from http://www.nochildleftbehind.gov/