The Availability of Technology Resources in Student Teaching Classrooms in the Metropolitan Detroit Area

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Abstract

Michigan teacher education programs are mandated to ensure that all certification candidates meet national technology standards and state technology expectations for entry-level teachers. The study was conducted to provide teacher educators with information related to the technology resources available in pre-service schools and classrooms in the metropolitan Detroit area. The study found that traditional technology resources are most available and used by student and mentor teachers. The data further reveals cooperating teachers' use of technology directly influences whether their preservice teacher integrates technology into instruction. This information may help teacher educators design instructional opportunities that incorporate strategies for using realistic school/classroom technology resources in field-based placements by all instructional personnel.

Education entities, including teacher preparation institutions, focus their instructional programs towards satisfying related technology integration mandates outlined in the No Child Left Behind Act of 2001 (NCLB, 2008). The legislation contains a primary goal aimed at improving student academic achievement through the use of technology in elementary and secondary schools across America. The Act states that schools will "assist every student in crossing the digital divide by ensuring that every student is technologically literate by the time the student finishes the eight grade" (No Child Left Behind Act of 2001 [NCLB], 2008, Sec. 2402, b, 2, a). NCLB further encourages the "effective integration of technology resources and systems with teacher training" (NCLB, Sec. 2402, b, 2, b). The Michigan Department of Education (MDE) has fully embraced the challenge.

All Michigan school districts seeking funding to support educational programs from federal sources, including the Universal Service Fund and Title I resources, are federally mandated to maintain a State approved Educational Technology Plan (MDE-TP, 2010). The plan must include detailed descriptions and timelines of how technology will be integrated into curriculum and instruction. The descriptions must include examples and illustrations from within content areas and/or grade levels. The districts must also include the professional development plan for ensuring all instructional staff and school administrators maintain and enhance their technological skills in the technology plan (Michigan Department of Education [MDE-TP], 2010).

Michigan teacher education institutions are responsible for preparing their candidates to enter the profession with a foundation related to technology integration. An awareness of what technology resources are available in field-based placements would be helpful in supporting such an effort. Hence, this study was conducted to provide Michigan teacher education programs with

information related to the availability of technology resources in student teaching placements in the metropolitan Detroit area.

Purpose of the Study

This study was conducted to determine what technology resources (a) are available and (b) are being used in the schools and classrooms where pre-service teachers are placed across metropolitan Detroit. This information may help teacher educators tailored their programs to incorporate the educational technology resources available in their students future field-based placements.

Literature Review

The use of technology resources, such as computers, the internet, and wireless technologies, has become a major part of everyday life. Business and industry, academia, and government regularly use internet-based technology such as electronic mail, electronic billing and videoconferencing to communicate with their customers, students and constituents. The use of technology has also influenced teaching and learning in American schools as indicated by the growth in the number of computers and other technological tools available in schools and classrooms. Federal mandates and resources, such as the Universal Services Fund, have supported these efforts. The Universal Services Fund, also known as E-rate, provides schools and libraries with reimbursements for expenses associated with providing internet access, telecommunications services and internal infrastructure to schools and libraries.

The Education and Library Networks Coalition (2007) reported that through E-rate funding, the federal government has spent nearly $19 Billion to help transform American's schools and libraries into modern facilities. There are computers with internet access in 97% of public school buildings across the nation (Snyder, Dillow, and Hoffman, 2009, p. 647).

The federal government has provided the foundation needed for teacher education programs to develop opportunities for pre-service teachers to gain the skills necessary to use technology resources to convey content to their PreK-12 students. This began as early as 1995 when the Office of Technology Assessment indicated that teacher education students "must see technology used by their instructors, observe uses of technological tools in classrooms, and practice teaching with technologies themselves if they are to use these tools effectively in their own teaching" (OTA, 2005, p. 185). To further promote this notion, directives supporting Teacher Training is one of the seven major action steps in the National Education Technology Plan. The first directive under Teacher Training recommendations reads as follows: "Improve the preparation of new teachers in the use of technology" (USDE, 2005, p. 41).

Computers have increasingly become a mainstay in classrooms across America. Snyder, Dillow and Hoffman (2009), reported that computers with internet access are available in 100 % of American elementary and secondary schools. Given this proliferation, it is imperative that teacher educators ensure that field-based students are equipped with the knowledge and skills needed to adequately integrate technology resources into their instructional plans.

The use of technology resources in the PreK-12 classroom has the potential to transform the teaching and learning process for students and teachers. Wighting (2006) found that "using computers in the classroom positively affects students' sense of learning in a community" (p. 371). Research conducted by Fleming, Motamedi, and May (2007) suggest that the more extensively pre-service teachers observe computer technology being used and the more they use computer technology in and out of the student teaching classroom, the more likely pre-service teachers were to report competence in the computer technology skills. They conclude, "it is essential that university personnel who are responsible for student teacher placements consider

the technology available in the primary and secondary school settings in order to increase pre-service teachers' computer technology confidence" (p. 217). Given all the emphasis placed on technology integration across the curriculum, it is important for teacher educators to know what technology resources are available in classrooms where their pre-service teachers are placed. Such information can be used to further customize teaching methods courses, technology courses and other general education classes.

The Michigan Department of Education (MDE) has developed technology standards for newly certified teachers. The Professional Standards for Michigan Teachers (Michigan Department of Education [MDE-PSMT], 2008) include specific technology related standards. These standards are known as: Standard 7: Technology Operations and Concepts.   These are the guidelines that Michigan's Teacher Education programs use to ensure that their certification candidates are able to: "Use of technological tools, operations, and concepts to enhance learning**,** personal/professional productivity, and communication, including the ability to:

a. Understand the equity, ethical, legal, social, physical, and psychological issues surrounding the use of technology in K-12 schools and apply those principles in practice;

b. Successfully complete and reflect upon collaborative online learning experiences;

c. Demonstrate an understanding of and the ability to create an online learning experience, and demonstrate continued growth in knowledge of technology operations, resource evaluation for quality, objectivity, and reliability and concepts including strategies for teaching and learning in an online environment;

d. Plan, design, and evaluate effective technology-enhanced learning environments and experiences aligned with Michigan's Content Standards and Grade Level Content

Expectations and Michigan Educational Technology Standards for each student;

e. Implement curriculum plans that include effective technology-enhanced methods and strategies to maximize student learning;

f. Apply technology to facilitate a variety of effective assessment and evaluation strategies; and

g. Use technology to engage in ongoing professional development, practice, productivity, communication, and life-long learning " (MDE-PSMT, 2008, p. 3).

Method

The study examines what technology resources are available for use by pre-service teachers in their field-based placements in school districts in the greater metropolitan Detroit area. It also explores whether mentor teachers in such classrooms uses technology resources. This descriptive study sought to answer the following question: (1).What technology resources are (a) available and (b) used in the metropolitan Detroit area schools and classrooms where student teachers are placed?

Data collection involved providing an internet-based survey to 205 field-based student teachers during the period March through April 2009. Student teachers, in their final field-based placement, were informed of the study during a mandatory on-campus classroom meeting. Then, the student teachers were sent multiple email messages, using Blackboard through their student teaching course interface, requesting their participation. Both undergraduate and graduate students were solicited. Each has completed the Teacher Preparation program and has successfully passed the Michigan Test for Teacher Certification in their content area majors. 110 of the 205 (53%) surveys were returned. Over 80 % of the placements were in suburban school

districts located in metropolitan area surrounding Detroit. Only 18% of the placements were in schools within the city of Detroit, Michigan.

It is important to note that the survey did not solicit information needed to assess the degree of instructional integration of any of the educational technologies listed. There was also no demographic information collected. The data was analyzed using descriptive, correlation and non-parametric statistical treatments. No incentives were offered for participation and anonymity was guaranteed for their voluntary participation. The researcher analyzed data using the Data Analysis Pack in Microsoft Excel. Student teachers identified whether the technologies were available and used in their field-based placements. Specifically, the following areas were provided as options:

- o   The school has:

- o   My student teaching classroom has:

- o   My cooperating teacher uses for instructional purposes:

- o   I use in my student teaching classroom for instructional purposes:

The survey listed 34 technology resources that may be available for instructional use in schools throughout the area. The survey items were selected based upon a list of items found in in an earlier study (Stephens, 2000) to collect similar data from students enrolled in the same Teacher Preparation program during the 1999-2000 academic year. The items were replicated and updated to reflect current technology resources. For example, the survey sought to gather new data related to wireless resources and the usage of social networking websites. Table 1 lists the 34 technological resources contain in the survey.

Table 1: Technology Resources Available for Instructional Use

1. Audio Tape Recorders	2. Camcorders
3. Camera (35M, Polaroid)	4. Camera (Digital)
5. Computers (Desktop)	6. Computers (Laptop)
7. Personal data assistants (PDA, PALM PILOTS, ETC.)	8. Smartboards
9. Internet Email	10. General office Software
11. Instructional software	12. Internet (WEB sites)
13. Library Databases	14. Listservs
15. Chat Rooms	16. Discussion Groups
17. Overhead Projector	18. Television
19. VCR/DVD Player	20. MP3 player
21. Internet webcasts, podcasts, webquest	22. Internet BlackBoard
23. Internet Virtual Field Trips	24. Cellular Phone (voice)
25. Cellular Phone (messaging)	26. Blogs
27. Wikis	28. Online social networks (Facebook, MySpace)
29. Online social bookmarking	30. Google Applications
31. Google Earth	32. YouTube, TeacherTube or SchoolTube
33. Online Photo sharing (e.g. Flickr)	34. Video conferencing

Results

To better facilitate the presentation of the results of the study, the following categories

will be used: Traditional Technology, Computer Use, Computer-based Applications, Internet-

based Resources, and Digital Technology.

Traditional Technology

Traditional technology on the survey included television, vcr/dvd players and overhead

projectors. These resources were plentiful in the schools where student teachers were placed.

Televisions are prevalent in the schools. There were televisions in 88% of the study

respondents' schools. Televisions also exist in over 80% of the student teachers' classrooms

(student teaching classrooms). Along with vcr/dvd players, existing in 83% of the schools and

66% of the student teaching classrooms, these traditional technologies are used the most of all

technologies on the survey. Over 80% of the cooperating and 74% of student teachers use televisions and vcr/dvd players for instructional purposes.

Overhead projectors are another traditional technology that continues to be embraced in student teaching classrooms. They are in 81% of the schools, 64% of student teaching classrooms and used by over 60% of the instructional staff, both cooperating teachers and student teachers, in those student teaching classrooms. The Pearson's *r* correlation coefficient between the use of traditional technology by student teachers and the use by the cooperating teacher was equal to .99.

Computer Use

Computers are in all the schools where student teachers are placed in the metropolitan Detroit area. There were desktop and laptop computers, 88 and 46% respectively, in the schools where the student teachers were placed. There are also desktop computers in 69% of the student teaching classrooms. To assess the use by the mentor teacher, as observed and reported by the student teacher, a correlation coefficient was computed. The relationship between the availability and use of a classroom computer by the cooperating teacher was significant. The Pearson's *r* correlation coefficient was near perfect at .99.

School-owned laptop computers are available in almost 50% of the schools. Unfortunately, only 2% are readily available in the student teaching classrooms. However, it appears that student teachers are using their own personal laptop computers to support instruction. 51% of student teachers reported using laptop computers in their field-based placements. The data revealed that 28% of the cooperating teachers use laptop computers as instructional aides, as well. Again, these must be personal laptop computers, given the low number of devices reported as available in the schools and classrooms.

Developed in 1991 by Smartboards, or similar devices, are large touch-sensitive interactive whiteboards. They are connected to a computer and allows the teacher to use the whiteboard as a monitor and/or input device. Over 50% of the schools where student teachers are placed have Smartboards. They exist in 16% of the student teaching classrooms. And, 25% of the student teachers report using them in instruction. Unfortunately, only two (2)% of cooperating teachers used this technology.

Computer Based Applications

There are many computer-based applications that can be used to support instruction. In this study, an examination of the availability of General Office software and Instructional software was explored. It was found that 54% of cooperating teachers and 57% of student teachers are using General office software packages, i.e., MS Office, ClarisWorks, and Corel Suite. These packages are available within 65% of the schools and over 50% of the student teaching classrooms, where the respondents were assigned.

Instructional software, applications such as Kidspiration, Inspiration, and Rosetta Stone, are often made available to support the teaching and learning process and reside on computers in schools. The study reviewed the use of instructional software in the student teaching classrooms. The results showed that instructional software is available in over 50% of the schools and in 34% of the classrooms. However, only 35% of the cooperating teachers and 38% of the student teachers are using these resources. It should be noted that the survey did not identify instructional software packages by names or types. Respondents used their own interpretations to respond to this item.

Internet Based Resources

The exponential growth of the internet as a teaching resource is evident in the study's student teaching classrooms. An examination of the instructional use of 13 internet-based resources, Table 2, was explored as a part of the study.

Table 2: Internet Based Resources

Listserv	Chat rooms	Discussion groups
Email	Webcast, podcasts and webquests	BlackBoard
Virtual Field Trips	Blogs	Wikis
Google Applications	YouTube, TeacherTube and SchoolTube	Google Earth

Instructional staff in the student teaching classrooms uses electronic mail or email extensively. Over 70% of cooperating teachers and almost 60% of student teachers use email for instructional purposes. Web-based discussion groups were used by 43% of the student teachers. The other resources were used to a much lesser extent.

Less than 20% of student teachers used any of the other internet-based resources for instructional purposes. Further analysis found that less than ten (10)% used BlackBoard, Virtual Field Trips, Blogs and Wikis.

Digital Technology

The study sought to determine what digital technology, i.e., digital camera, MP3 players, Personal Data Assistants (PDA), cellular phones for voice and messaging, were being used in the student teaching classrooms. The data reflects that digital cameras have replaced 35M and Polaroid cameras as instructional photographic tools. Over 50% of student teachers used digital cameras in their field-based experience. The use of other digital media has yet to take hold.

Cellular phones, for voice and messaging, was used by less than 20% of cooperating teachers and student teachers. MP3 players were used by more student teachers than cooperating teachers, 13% and 3%, respectively.

Discussion

After analyzing the data, several clear themes appear. The survey data continues to support that despite having access to computers and other technology resources, teachers generally clung to more traditional, teacher-centered practices and did not attempt to enhance their teaching with technology. The findings continue to support Bebell, Russell and O'Dwyer (2004) assertion that "Teachers who are brand new to the profession report almost the same amount of use as do teachers who have been in the profession for 11 or more years" (p. 56).

A major finding in the current study is that cooperating teachers will use computer technology if it is available in their schools and/or classrooms. This is important because the use of technology by the cooperating teacher influences if student teachers use such resources. Fleming, et al. (2007) found that "when cooperating and practicum teachers use computer technology, pre-service teachers' perception of their skills were greater than those pre-service teachers who reported no computer technology use by their cooperating and practicing teachers" (p. 209). This foundation may lead school districts and teacher education institutions to provide hands-on, professional development opportunities for cooperating teachers relative to the integration of technology resources. Such training may encourage mentor teachers to attempt new instructional strategies that use new and emerging technology, such as Smartboards.

As reported, only two (2)% of cooperating teachers used the Smartboard technology. This may be due to a lack of knowledge related to proper integration of this resource. Almost all cooperating teachers are tenured; meaning, they have been teaching at least five years.

Unfortunately, they may not have been introduced to Smartboard technology while preparing for the teaching profession. If they completed a teacher certification programs before 1995, this technology was available and was not taught in their programs. Unfortunately, the professional development opportunities offered by school districts may not provide enough time or support for teachers to fully grasps and implement new technology resources. They are usually conducted after or before school and/or during the Professional Development Day. This is where post-secondary teacher preparation programs could assist. Mentor teachers are often away from the classroom once the student teacher takes over, this time can be used to tutor the cooperating teacher in the design and development of technology integrated lessons.

Teacher education institutions may be able to provide hands-on professional development opportunities for cooperating teachers in the effective use of Smartboard and other new and emerging educational technology. In that way, practicing teachers will learn strategies and techniques over an extended period of time. These new skills will then be modeled for the next group of student teachers assigned to their classroom. Teacher educators may wish to include newly certified teachers from their program in this process.

New teachers, who have reached a comfort level with technology integration, are willing to share their experiences publically (Gimbert and Cristol, 2005). This provides a form of peer-modeling and cooperating teachers may also benefit from attending workshops with them, as well. In addition to providing hardware training opportunities, teacher education programs may consider providing training in the effective use on web-based applications to mentor teachers, as well.

When teachers are proficient using internet-based applications, they will be able to provide their students with broader and varied instructional experiences. As indicated earlier,

there are computers with internet access in almost all classrooms across America. Thus, teacher education programs may consider modifying the curriculum to include providing student teachers and their mentors with teaching strategies utilizing the wealth of internet-based resources that can be used to supplement or enhance the content. An exploration of the use of digital technology that accesses the internet may be another topic consideration.

It is hopeful that all teachers will begin to increase their use of digital technology; especially given that cellular phones can now perform many of the digital functions of all the devices in this category. Norris and Soloway (2009) predicts that cellular (smart) phones, equipped with digital technology applications, are the next generation of computers and encourage school districts to begin to relax their apprehension concerning their use in classroom settings. Using digital technology may be a cost effective way to bring current and emerging technology to students right to their desk.

Conclusion

Teacher educators, who place students in field-based experiences in the metropolitan Detroit area, may use this information to tailor their certification programs to maximize the use of available technology resources in these schools and classrooms. The information can be used in teaching methods courses and educational/instructional technology courses. Modeling, at any educational level, is very important to the integration process. As the research illustrates, student teachers will use technology that is modeled during their field-based experiences.

In addition, providing cooperating teachers with opportunities to develop technology rich lessons directly benefits the preservice teachers placed in their charge. Teacher education programs may wish to design workshops or conferences to introduce these partners to various technology resources and their uses in education.

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