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AUTHOR	Morris, Maxine
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ABSTRACT

This study examined new teachers' use of technology in the classroom. Data were collected from 28 former elementary and middle school majors who were currently teaching in schools near the university they had attended. Teachers completed a survey instrument, and the researcher visited their classrooms. Very few of the teachers had easy access to technology. Limited computer lab time for students, absence of technology correlated to objectives and tests for the district, and lack of multiple, up-to-date computers in the classroom challenges most teachers' efforts to integrate technology into the curriculum in a systematic, viable way. While participants reported using traditional technology such as overhead projectors, videos, and laser discs as part of their instructional delivery systems, most felt that the Internet was a more motivating and captivating mode to use with students for a variety of learning activities. Teachers were eager to expand their repertoire of techniques and expressed great interest in finding out what was working for other teachers. (Contains 32 references.) (SM)

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Title of Session:

How New Teachers Use Technology in the Classroom

Proposal Strand:

Collaborative Leadership for Teacher and Student Achievement

Summary:

Findings and recommendations from a study will be presented on how recent graduates from one teacher training institution who teach in the service area integrate technology into the classroom.

Session Organizer:

Maxine Morris, Ph.D.
Associate Professor
306 Hughes Hall
Pittsburg State University
Pittsburg, KS 66762
620-235-4509
FAX 620-235-4520
mmorris@pittstate.edu

Biographical Data

Maxine Morris is Associate Professor at Pittsburg State University. Her teaching and research interests include informational and instructional technology, integrating technology in the content areas, and mathematics methods for elementary teachers.

How New Teachers Use Technology In the Classroom

Maxine G. Morris

Introduction

Teacher education programs across the country endeavor to provide preservice teachers with the computer and technology skills needed to design and deliver instructional activities that are motivating for students and make the curriculum come alive. One of the vehicles for achieving this goal is an information and instructional technology course which includes background knowledge, theory, activities, and hands-on experiences with a variety of applications and equipment. In order to determine how new teachers in the field were applying what they learned in the course offered by a Midwestern university, the instructor visited former students and gathered information regarding (a) the technology resources available; (b) the technology the teachers wished they had; (c) ways they were integrating technology into instructional activities; and (d) the software packages and tools they used most often. Recommendations for additions/revisions to the course curriculum were also sought.

Method

The data for this study was obtained from twenty-eight former Elementary Majors who were currently teaching in schools near the university during the beginning of the 2000-2001 school year. The teachers were contacted by the researcher, told about the project and its purposes, and asked to complete a survey instrument and have the researcher visit their classrooms. All of the teachers contacted were willing to participate in the project. On a typical visit, the researcher observed a teacher and collected the survey information during the teacher's planning time.

Data Collection and Analysis

The Technology Survey Fall 2000 was used to gather the data. The instrument included fill-in-the-blank and open-ended questions and check-off lists that reported access and use information. Frequency data were tabulated for the responses.

The study included eighteen females and ten males teaching in fourteen elementary and middle schools within fifty miles of the university. All participants had graduated within the last five years. The students' enrollment in the information and instructional technology course was during a period of unprecedented advances in informational technology, namely the universal availability of the Internet to the world and, in particular, to the university in 1997. Their experiences and proficiencies with computers and technology varied due to (1) the content of the course at the time they were enrolled in it; (2) current access to the latest technological advances; and (3) the ability to upgrade their skills through personal commitment and discovery or formal staff development since graduating.

Findings and Discussion

Computers and attempts to integrate them into the curriculum have been part of the elementary and middle school environment since the mid 1980s when districts began setting up computer labs for computer assisted learning, keyboarding practice, math (Logo™) constructions, and writing activities. As part of a large Midwestern district, the author was involved in some early efforts to use the power of the computer to enhance classroom instruction. In 1985, using word processing software that was so new it had no documentation with it, a team of elementary teachers designed writing

activities that would help students learn how to use a word processor while producing activities that met district language arts objectives.

Today, suggestions and guidelines for integrating technology into the curriculum--everything from computer assisted learning to constructing Internet pages--abound on the Internet and in journals (Barnett, 2000; Bedient, Scolari, & Randolph, 2000; Cardwell, 2000; Coulter, Fieldman, & Konold, 2000; Harris, 2000; Insinnia, Skarecki, & Tucker, 2000; Kwajewski, 2000; McGillivray, 2000; McNally & Etchison, 2000; Painter, 2000; Randolph, Bedient, & Scolari, 2000; Tiene & Luft, 2001-02). The advent of standards-driven curriculum has raised new issues about how instructional technology can be used more effectively to accomplish the objectives inherent in the standards and expedite the assessment process (Barnett, 2000; Bowens, 2000; Harris, 2000; McNabb, 2000; Moursund, 2000; Sage, 2000; Sun, 2000). At the heart of the problem, issues of access and equity still impact an individual school's ability to participate in the new approaches being presented.

Access to Technology

The current study showed great disparities of access and equity in the fourteen schools represented in the study. Access ranged from a 1994 model as the only computer in the classroom to a set of five new computers for student use in two other classrooms. Ten of the buildings had labs with twenty to thirty computers, and two buildings had two labs each for a total of fifty computers per building. A school with considerable enrollment (four to six sections of each primary grade) did not have a computer lab for student use and each classroom had only one computer. Another building, much smaller in

enrollment, did not have a computer lab, but each of the teachers surveyed had two up-to-date computers in his/her classroom.

In order to assess the effects of instructional technology in a standards-driven world, Barnett (2000) contended that a solid technology infrastructure is essential to the assessment process. Easy access is one prong of the infrastructure that includes: (a) a low hardware-to-student enrollment ratio with hardware that is capable of accessing the Internet efficiently and running today's software; (b) software that is correlated tightly to the curriculum to ensure academic improvement; (c) high-speed Internet access to encourage student use; and d) computers in the classrooms--once a week access cannot be expected to affect instruction.

Only two classroom teachers with five new computers in their classrooms and access to computer labs with thirty computers could satisfy Barnett's definition of "easy access." The other teachers simply did not have "easy access" for students in their rooms. The availability and access to technology in the schools in this study were similar to the inequitable conditions cited in the literature (Benson, 2000; Coley, Cradler, & Engel, 1997; Jerold & Orlofski, 1999; Lemke, Quinn, Zucker, & Cahill, 1998; Neuman, 1991; Roblyer, 2000). Socioeconomic conditions and rural/urban geographic location were the same factors that impact the buildings represented in this study. Much remains to be done to provide all students in this area with easy access to adequate hardware capabilities by today's standards and high-speed Internet connections.

The technology universally available in the buildings were computer, printer, VCR, laminating machine, and Xerox copy machine. Two of the fourteen buildings did not have a video camera and four buildings did not have a digital camera. Only one building had a digital camcorder available to

teachers. While digital cameras are not an absolute necessity compared to a copy machine, they do expedite the process of inserting photos (images) into applications and on web pages. Digital camcorders, which are new on the market and cost over $600, are probably not yet a priority item for most schools. Another five years will most likely change the way teachers would respond to the item on a follow-up survey.

All but one teacher had at least one functional classroom computer with an Internet connection. The teacher without one viewed the situation as a hardship and an impediment to good teaching. Four teachers did not have readily available VCRs and eight did not have overhead projectors in their rooms. Some of the teachers without these items remarked that they wished they had them in the room, as it was not always possible to obtain one for a specific time period. Often, more than one teacher needed the same piece of equipment at a given time. Forced flexibility wasn't always easy to accommodate and certainly did not facilitate the integration of technology into the curriculum on a routine basis.

What technology did the teachers in the study have on their wish lists? Eleven wanted more and updated computers for students to use in their classrooms. Eight wanted printers to eliminate the need to leave the classroom in order to get hard copies from a network printer. Obviously, these teachers were hoping to provide "easy access" for their students and rightly so, as reported by Lemke, Quinn, Zucker, and Cahill (1998). In their study, students who used computers in the classroom did significantly better on standardized tests than students who used computers in a lab and teachers were more likely to integrate computers into their instructional plans when the computers were in their classrooms.

Two of the teachers in the study had been awarded a grant that

funded multimedia software and equipment, Smart Boards, printers, Internet connections, and a computer with accompanying furniture for each student in their classrooms. It will be interesting to see what effects the new electronic classrooms will have on student achievement. The rest of the schools included in this study will want to focus on increasing the number of up-to-date computers in the classrooms if they want to increase their chances of better test scores and greater incorporation of technology into the instructional pathways.

Other technology items that teachers desired were: PC-TV converter, scanner, digital camera, software for the classroom computer, Smart Board, overhead projector, Internet connection in the classroom, camcorder, video camera, science videos, and a twenty-first century classroom. This list suggested that the teachers had instructional dreams that were on hold due to the lack of at least one essential ingredient.

Integration Strategies

What were the teachers' favorite ways of integrating technology into content area lessons? Not surprisingly, the approaches used by the teachers increased in sophistication as the grade level increased. Kindergarten and first grade teachers generally used computer assisted learning software and videos to add excitement to their instructional plans. Second grade teachers experimented with using what the Internet had to offer. One creative teacher used the Internet to find items that began with the specific letter of the alphabet that was being learned; for example, S sports. She commented, "The kids loved it!" All of the third grade teachers in the study reported that their best plans used the Internet to locate information or games that supported the instructional objective. In addition, one teacher used science

videos to give visual learners a way to learn the content through their preferred learning style. Fourth grade teachers used the Internet as a resource for research projects and to locate math, science, and social studies sites that correlated with lesson objectives. The Internet was a favorite among the fifth grade teachers as well. In addition, they found some science software and laser disc science topics to be highly motivating to their students. Using the Internet as a resource and presentation software as the mode of reporting was the favorite of sixth grade teachers. Audio book tapes, computer games, and computer activities that correlated with the reading programs were the choices of the special education and Title I teachers. In summary, kindergarten and first grade teachers found that videos and computer assisted learning software were the most motivating technologies for their students. Second through sixth grade teachers felt that the Internet and its resources were natural motivators to student involvement in a lesson. Computer applications used to present research projects in novel ways and videos were highly effective as well.

While the strategies used to integrate technology into the curriculum by the teachers promoted learning and excitement about learning, they were rather narrow in scope. This gives credence to a recent article by Benson (2000) which maintains that the need for support for teachers to integrate technology following training has been underestimated. More dialogue and research is needed regarding training standards, technical support, access to technology, and a system of accountability. While more research is definitely in order, what teachers in the field apparently need immediately is support--ideas, mentoring, mini staff development courses, frameworks, and time to explore. A generous amount of relevant ideas and strategies can be found in the literature. The following list gives an idea of what is available in recent

journals: ideas for using the RAC Model which provides a framework for the integration of technology into content areas (Bowens, 2000); ideas for foreign language, art, music, health and physical education (Bedient, Scolari, & Randolph, 2000); a process for integrating technology into the curriculum (Coulter, Fieldman, & Konold, 2000); ideas for using online resources in the classroom (Coulter, Konold, & Fieldman, 2000); learning activities and projects (Harris, 2000); online simulations (Hartley, 2000); hints for using the internet with students (Insinnia, Skarecki, & Tucker, 2000); ideas for tapping into the power of the web (Kwajewski, 2000); ways for technology specialists to provide support to the teachers in their buildings (McGillivray, 2000); ideas for using images with fourth grade students (McInerney, 2000); ideas for using a variety of software applications to teach the same skill or concept (McNally & Etchison, 2000); ideas for using the various applications of AppleWorks™ in the classroom (McNally & Etchison, 2000); ways to nurture collaboration among students (Painter, 2000); twenty-six ideas for science, mathematics, and consumer education (Randolph, Bedient, & Scolari, 2000); and problem-based learning (Sage, 2000).

Internet Use

How did the teachers in the study typically use the internet as a resource in their classrooms? Their responses were easily classified into the following categories: information, teaching ideas, lesson plans, supplemental activities, on-line games, sites that have activities that meet state standards, and book orders. During the interview part of data collection, a number of the intermediate and middle level teachers talked about how much time it takes to locate quality resources. They wished they could find a reliable resource for relevant and appropriate sites to support their content areas and objectives.

Their problem is not unique. Other educators (Randolph, Bedient, & Scolari, 2000) have noted that the Internet may contain millions of sites that seem appropriate for use in the classroom; however, without the time to investigate the sites, a teacher has great difficulty finding first-rate sites. Internet sites that contain student activities that are aligned with a school's curriculum objectives are on the web and some involve sizable subscription fees for the building/district. Some school districts maintain pages of activities that are aligned with their objectives. Some states have sites that provide activities correlated to the state standards. National learned societies for content curriculum maintain sites replete with resources correlated to standards and benchmarks.

Factors Affecting Use of Technology

How did teachers decide what technology was appropriate for a lesson? When the participants selected technology for a particular lesson, many looked at how user friendly it was for the lesson and the children. Ease of use and a low stress factor were important to those who wanted to be able to use the technology with a high degree of confidence that it would function properly or would not be too frustrating for the children. Availability and access to the technology were the next most popular responses. The availability and access criteria were not surprising considering the fact that basic technology like overhead projectors and VCRs were not available in at least eight of the twenty-eight classrooms included in the study. These teachers confirmed the finding that easy access is an important component to the effective integration of technology/computers into the curriculum (Barnett, 2000; Neuman, 2000). What would go with a lesson and how appealing it would be to the children were guiding factors for nine teachers, while state

standards, curriculum considerations, hands-on capability, and time factors were considerations noted by at least two teachers for each. Most of these responses illustrate that the teachers in the study are still struggling with how to systematically select technology for a particular lesson.

Software Use

When asked how they use educational software packages with their students, the teachers most frequently said they used software for reinforcement and free time. Others used software packages during their specified lab times for keyboarding, language arts activities, and computer assisted learning. Individual practice, remediation, to meet state standards, and enrichment rounded out the field of responses. Even though all but one elementary building in the study used a computerized reading program, the teachers did not mention it in this part of the questionnaire. Another type of software package used in all the schools with labs, but not mentioned by the teachers, was keyboarding. Some of the schools had an established keyboarding scope and sequence with one type of software and objectives for the primary grades and another type of package and objectives for the intermediate grades. Overall, these young teachers were eager to locate software packages that had proven success records for student achievement.

Is educational software having a positive impact on student achievement? Is educational software worth integrating into the curriculum? Moursund (2000) recently discussed a meta-metastudy (Kulik, 1994) of computer assisted learning (CAL) that found

> Over a wide range of instructional areas and student levels, a gain of approximately .35 sigmas is achieved. This means that the average student moves from the 50th percentile to the 64th

> percentile. Moreover, students achieve this gain in approximately 30% less time, as compared to control groups. These CAL results are significant, and research is continuing on improving CAL It is clear that CAL is an important component area of SoTL--Science of Teaching and Learning (p. 5).

Moursund (2000) believes CAL provides a vehicle for improving our educational system and it can be thought of as an attempt to computerize some of the results from brain, mind, experience, and school research (Bransford, Brown, & Cocking, 1999). In a recent publication, McNally and Etchison (2000) offered a number of suggestions for ways to effectively use software applications to promote student achievement. Three examples are: (1) using a variety of software applications to help teach the same skill or concept; (2) using productivity tools, and (3) using electronic databases of information. Is software worth integrating into the curriculum? Yes, provided it is quality and supports a district or state learning objective.

As this researcher perused the list of favorite software packages compiled from the participants' responses, an old favorite, Oregon Trail™, from the early 1980s appeared again and again. . .evidence that it has stood the test of time and that its objectives and activities are still relevant and motivating. Other packages mentioned were those that commonly provide individual practice with basic concepts that many children struggle to master. It has long been accepted that the computer is an excellent, impartial, patient, one-on-one tutor where drill and practice are the keys to attainment of a concept. It has the potential to achieve significant gains in student learning without the high cost of individual tutoring (Moursund, 2000). Thus, these types of software programs are useful tools for teachers. Such programs free

a teacher to work with students on concepts that cannot be delivered effectively by a computer.

Which productivity tools--software packages that people use to perform their daily activities more effectively and efficiently--did the teachers in the study use with their students? True to expectations, the majority used word processing, followed by draw and paint, and *Kid Pix*™. Spreadsheets, *PowerPoint*™, *HyperStudio*™, and databases were used by fewer than one/third of the teachers. All of the teachers had learned how to use these tools during the preservice course, but some volunteered that they had not found the time or opportunity to use them with students, and some did not have access to the tools in their buildings.

Suggested Revisions

The final item on the survey solicited recommendations for revisions to the preservice technology course. Many of the suggestions had already been added to the course since the respondents were enrolled in it. New suggestions were evaluated in terms of the college's technology plan and the standards and indicators of state and national accrediting agencies. Suggestions that fit the criteria were added to the course. A major task was to determine what to eliminate from the syllabus in order to provide room for the new, especially in light of one participant's response, "I could have seriously benefited from two full semesters in the course."

Summary

The findings in this study show that "easy access" to technology was enjoyed by fewer than a handful of the participants. Limited computer lab time for students, the absence of technology correlated to objectives and

tests for the district, and the lack of multiple, up-to-date computers in the classroom challenged the majority of the teachers' efforts to integrate technology into the curriculum in a systematic, viable way. While the participants reported using traditional technology such as overhead projectors, videos, and laser discs as part of their instructional delivery systems, most felt that the Internet was a more motivating and captivating mode to use with their students for a variety of learning activities. More up-to-date computers and high-speed Internet connections for student use are needed in most of the classrooms.

One way to obtain state-of-the-art technology would be for the teachers to write and receive grants. Staff development and release time to help new teachers write grants to obtain what they need/want are necessary ingredients to ensure that their efforts are successful. Districts that have not correlated technology to their standards and objectives could expedite the planning and assessment processes of their teachers by doing so.

While the strategies used to integrate technology into the curriculum by these teachers engendered success and promoted learning, the teachers were eager to expand their repertoire of techniques and expressed a great interest in finding out what was working for other teachers. A need exists for (a) workshops that focus on integration strategies; (b) an efficient and effective way to disperse or make readily available ideas that promote student learning; and (c) a routine way for teachers to share their success stories with their colleagues.

Preservice technology and methods courses need to continue to help students learn to use information and instructional technology in proven ways to promote student learning. The integration of technology into the content areas must receive significant coverage in all methods courses. Visits by

professors to new teachers in the field are highly recommended as a means to keep in touch with what new teachers encounter in their first experiences and to obtain feedback concerning how the curriculum of teacher education programs can remain current and on the cutting edge.

Internet Resources

http://www.wested.org/tie/techplan/curplan.shtml.
Tools to develop a technology-enhanced lessons appropriate for school curriculum and student learning goals.

http://www.ncrtec.org/capacity/profile/profile.htm
North Central Regional Technology in Education Consortium's Learning with Technology profile tool.

http://marcopolo-education.org
Standards-based lesson plans, activities, links, and resources. Links to state standards and resources.

http://sitesforteachers.com
Over three hundred links to sites providing resources for teachers.

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Organization/Address: Missouri Southern State University 3950 East Newman Road, Joplin, MO 64801	Telephone: 417-625-9625	FAX: 417-659-4387
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