

What Teachers Use; What Teachers Want

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Abstract

The demand for the integration of technology into our K-12 schools dictates the technology curriculum in higher education. Since the evolution of new technologies is continuous and rapid, it is an ongoing challenge to keep post-secondary education current. Teacher education programs are no exception. Today's pre-service teachers are the classroom teachers of tomorrow. They must be prepared for the near and distant futures.

To this end, faculty and staff in higher education continuously strive to be on the cutting edge. There is a constant alert for what's new today and what's coming tomorrow. One is always looking ahead of the curve in order to be prepared for the future. In order to provide information for the updating of a college curriculum, the following study was conducted.

Introduction

The purpose of the study was to identify technology skills and knowledge that are used and taught by public school teachers and others working in the educational field. This information was intended to be used to in the planning and revision of technology courses in higher education but could also be used for the planning of in-service training in the public school systems.

The challenge to planning programming today is not only being prepared for what is to be 2, 3, 5 or 10 years down the road, but what is needed right now. How do we address the very practical needs of today yet be prepared for what's coming? To ascertain present and future needs, public school teachers and others working in the educational field were surveyed. The group included teachers, administrators, librarians, and technology professionals currently enrolled in graduate courses. Participants were asked about their use patterns in the following categories: hardware, media/communications, professional development, software, and other.

Rationale

While it is essential to prepare pre-service teachers for future technology, it is important not to lose sight of the current tools of the classroom. Teachers still use the overhead projector, copy machines, audiocassettes, and various other technologies not considered high-tech. Since there is great diversity in the available technology in classrooms across the country and future teachers cannot anticipate where they will be employed, multiple contingencies must be anticipated. Higher education teacher preparation programs must provide a wide range of knowledge and skills ranging from the simple to the complex.

It is important to be current yet forward-looking for a number of reasons. First of all, if new teachers are not prepared and comfortable with various technologies they have in their classrooms, they will likely not use them. If there is a general feeling of incompetence, they are less likely to try new things as well. In a report by the National Center for Education Statistics (U.S. Dept of Education, 2000) entitled, *Teacher's Tools for the 21st Century*, researchers found that teachers who spend more time in technology training, as opposed to teachers who spent less time, felt well or very well prepared to use it for instruction, and teachers' use of technology was related to their training...." It is then likely that there would be impacts on the quantity and quality of teaching and learning in the classroom.

The overall scope of technology training in teacher education programs is still unknown. According to the National Education Association (NEA, 1998), "At least 50% of today's teachers have not had adequate training and technical assistance in the uses of technology." The NCES report found that 93% of public school teachers in elementary and secondary education indicated that independent learning or being self taught was the most frequent way they were educated in technology. Though 88% received training through professional development, only half of all teachers reported that college and graduate work prepared them to use technology. The NEA implies that many teachers enter their profession with minimal technology training that prepares them for using it in their classrooms and/or curricular area. The report states: "Most teacher preparation programs provided by schools, colleges, and departments of education do not have written, funded and regularly updated technology plans." The data suggests that more technology programs in higher education should be offered and

updated to provide technology training programs to pre-service and public school teachers.

This study included most current technologies, knowledge and skills which may potentially be taught at the college level. Although current data from this study may be used to update existing curricula, it is worthy to reiterate the changing, flexible, and unpredictable nature of this field. Such studies and inquiries should be made regularly. Those who plan programming should avail themselves of such resources and data in order to update programs on a regularly scheduled basis.

Methodology

Research Design

The research design was as a descriptive study. In May 2001, a graduate faculty member at a local university piloted the original survey with teachers at a local elementary school in the southwest Missouri area. One year later, the survey was modified to make it more efficient. The surveys were distributed via e-mail during the summer of 2002. A second distribution occurred during the early part of the fall 2002 semester via post office mailing due to a low return rate. A self-addressed, stamped envelope was also included along with the survey and a letter reintroducing the study. The participants were asked to mail the survey back within a week.

Participants

The participants were graduate students in higher education at a Missouri university during the summer 2002 semester. They were enrolled in the following graduate level classes: Library Science, Educational Administration, Introduction to Educational Research, Educational Counseling, Field Experience, and Career Development from the Department of Guidance and Counseling. Participants included a mixture of male and female graduate students of different ages, positions, interests and training. Consent forms were distributed and privacy insured. Participants selected which technology they use, which technology they teach to others, which technology they neither use nor teach to others (therefore would require no formal training), or which participants would like formal training on (See Table 1).

Table 1. *Sample of instrument for first four items of the Hardware category.*

Hardware Category	I use this technology myself	I teach this technology to others	I neither use nor teach this technology	I would like formal training on this
1. Paper cutter				
2. Copy machine				
3. Overhead projector				
4. 16 mm projector				

Results

Thirty-four (N) out of 63 participants responded to the survey via e-mail and postal mail. The participants included teachers, school counselors, case managers from a local behavior health care clinic, other working professionals, and full-time graduate students. The majority, 19 out of 34 of the participants were teachers (Figure 1). Grade levels taught by participants ranged from pre-school to college. The majority, 63% of the participants, were elementary school teachers (Figure 2). Other working professionals included a tax payer services representative and an accountant. These were treated as outliers and were not included in the data analysis.

Demographics

Participants were counselors, case managers, teachers, full-time students, and other working professionals who were graduate students in higher education at a Missouri university. The survey instrument was pilot-tested twice with a small group of teachers who were graduate students in the College of Education. After the second revision, surveys were ready for distribution. The participants volunteered to be in the study during the summer 2002 semester after the researcher presented the study to their graduate classes. Surveys were first distributed via e-mail but, after a low response rate, they were redistributed via postal mailing. Thirty-four out of 60, or 57% of the participants, responded after the second distribution of surveys.

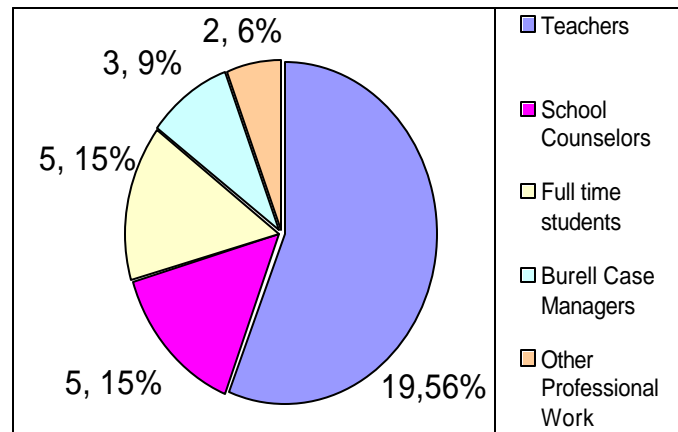


Figure 1. Job Position and Title of Participants.

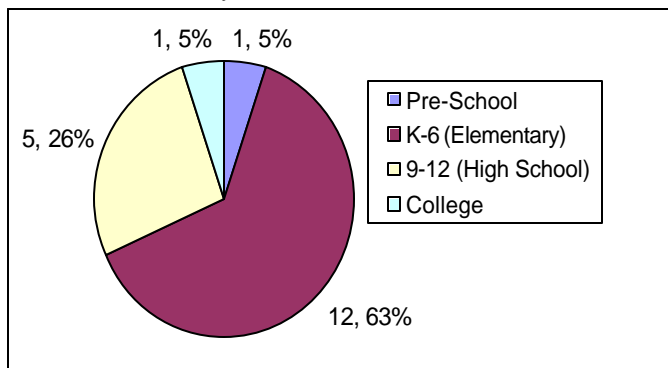


Figure 2. Grade level of teacher participants

taught or take advantage of workshops to further their technical skills. It is assumed that most of these were through in-service programs in their schools. However, this was not asked. They may also have taken courses from other sources such as community colleges.

Other Data Analysis

The technology questions on the survey were organized under the following main headings: Hardware, Media/ Communications, Professional Development, Software, and Other. Each participant was asked to mark the column that *mostly* applied to them: "I Use This Technology Myself," "I Teach This Technology to Others," "I Neither Use Nor Teach This Technology," or "I Would Like Formal Training On This Technology." Therefore, they could only choose one column. The most frequent responses from a total of 34 are discussed in this chapter. The column "I Teach This Technology to Others" was not discussed due to an insufficient number of responses under this option.

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I Use This Technology....

The top three items for each heading in the "I use this technology" column are summarized in Table 2. The results for Hardware were somewhat expected as all of these are common office and educational

The majority (56%), or 19 of 34 participants, was currently teaching. Twelve of the 19 taught in an elementary school. The largest number of participants (41%), or 14 of 34, received most of their technology training by teaching themselves, while only 12%, or 4 of 34, were trained in their college program. All four of these had completed their undergraduate degrees within the last five years.

The demographic data regarding technology training was not surprising. It is apparent that most educators are either self-

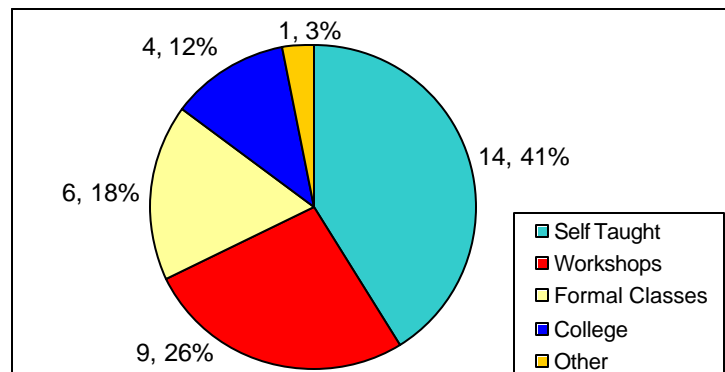


Figure 3. Sources of technology training.

technologies. In the Media/Communications area we also can see some of the most often used media including Bulletin Boards, a low-tech medium. The internet seems to play an important part in Professional Development as the data suggests it is used as a student and teacher resource as well as for collaboration. Word processing ranks number one in the Software category followed by internet searching and finding technology resources and spreadsheets which tied for third place. The Other category may suggest some needs as troubleshooting computers as well as other equipment and technology and diversity issues rank at the top. We could surmise that they spend a significant amount of time in these activities and/or are concerned with these topics.

Table 2. *Top three data rankings for the “I use this technology...” column.*

Hardware			Total of 34
Rankings			
1	Copy machine		33
2	VCR and TV-VCR setups		32
3	Printers		31
Media/Communications			
1	E-mail		
2	Transparencies		27
3	Bulletin boards (design and display)		24
Professional Development			
1	Student resources on the web		
2	Teacher resources on the web		18
3	Collaborative resources on the Internet		18
Software			
1	Word processing		
2	Internet searching (search engines)		26
3	Spreadsheets		24
Other			
1	Troubleshooting computers		
2	Technology and diversity issues		10
3	Troubleshooting a variety of equipment		9

I Would Like Formal Training...

Table 3 shows the most frequent requests for formal training for each of the headings. In the Hardware area, thirty-two percent (11/34) wanted training on Desktop Videoconferencing and other newer technologies such as electronic whiteboards/Smart Boards and interactive television (ITV). This may suggest there is an awareness of their capabilities and potential applications. These technologies may or may not be available on the job or may not be used due to a lack of knowledge and skills. Web site development, not surprisingly, was a major area of interest in Media/Communications. In the Professional Development area it was surprising to find that Locating Free Materials was of high interest. Perhaps this is a reflection of budgetary constraints and a need for instructional materials and information. It was also not surprising that PowerPoint was the #1 Software training request. In the Other technologies category participants were primarily concerned with troubleshooting and repairing all types of technologies. There were also indicators of interest in management issues such as diversity, privacy, and limited access. It is apparent that educators in various settings have concerns and needs not only with hardware and software operations but also the ramifications of its effective, efficient, and lawful use.

Table 3. Data rankings for “I would like formal training on....”

Hardware		Total of 34
Rankings		
1	Desktop videoconferencing	
2	Interactive TV (ITV) and Electronic White Boards “Smart”	
3	Scanner	8
Media/Communications		
1	Web site development	14
2	Desktop publishing (flyers, forms, etc)	8
3	Dry mounting and video as a teaching/learning tool	5
Professional Development		
1	Locating free materials	9
2	Online training sites	7
3	Student resources on the web; collaborative resources on web	6
Software		
1	Presentation (PowerPoint, etc.)	11
2	Interactive Learning Systems; Authoring (Hyper Studio, etc.)	9
3	Databases; Simulations	8
Other		
1	Troubleshooting computers and variety of equipment	9
2	Privacy and limited access (internet issues); equipment repair	8
3	Technology and diversity issues	7

Comparative Analysis

In the area of Media/Communications we looked at those who selected “Neither used nor taught” vs. “Would like training.” By examining the convergent and divergent points we made a number of observations. In the Desktop Publishing area, the number of “Neither use nor teach” responses (7) was very close to “Would like training” (8). This could suggest that, even though it is not used, there are a nearly equal number of people interested in learning these skills. It could be surmised that training in this area would increase use and performance.

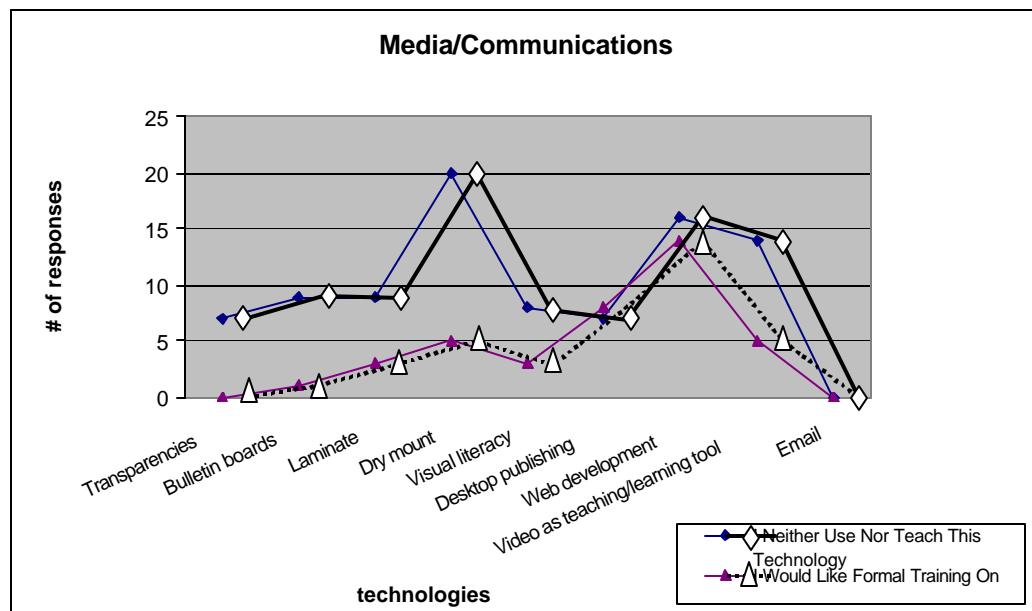


Figure 4. Media/Communications comparisons of “I neither use nor teach” vs. “I would like training.”

Likewise, in the Media/Communications section (Fig. 4), Web Site Development (16) was identified as an area that was not used nor taught but 14 requested training. Similar close relationships may be observed for: Digital camera, Scanner, Desktop Publishing, Student Resources on the Web, Locating Free Materials, Spreadsheets, Databases, Presentation Software (ex. PPT), Internet Searching, and Loading Software. For Dry Mount, Video as a Teaching /Learning Tool, and Visual Literacy a small number of participants requested formal training even though most neither used nor taught these. In this case, even though the number of responses was low, it could be that there was little knowledge of these topics thus resulting in this response pattern. It was surprising that some interest was indicated perhaps warranting a close look at these areas.

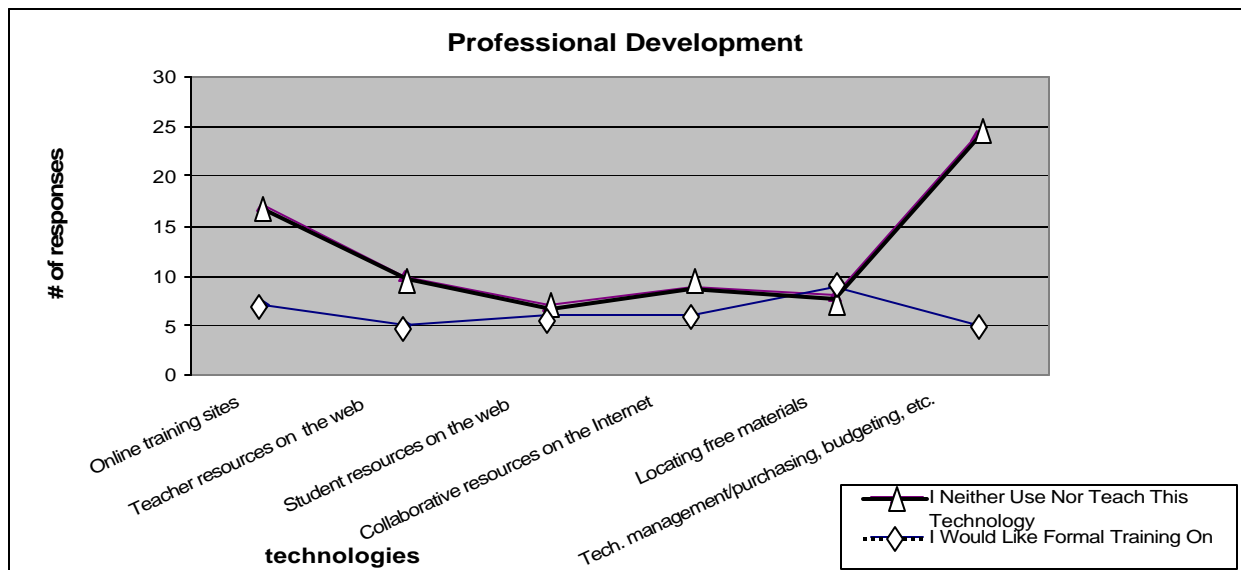


Figure 5. Professional Development comparisons of “Neither use nor teach” vs. “Would like training.”

Professional Development comparisons (Fig. 5) for the same response choices showed some rather dramatic convergent areas between Student Resources on the Web and Locating Free Materials and divergent patterns with Online Training Sites and Technology Management, Purchasing, etc. One may conclude that, for those areas that closely correlate such Internet Resources and Collaborations, participants may increase their use given information and training. On the other hand, for those areas that diverge such as in the Management and Online Training Site areas, it would seem that participants do not engage in these activities and are not interested in training. For example, 24 of 34 neither use nor teach in the area of technology management/purchasing, budgeting, etc and only 5 indicated an interest in learning more about these areas. Given this disparity in numbers, it would seem logical that this would not be an area of great concern for training. However, administrators may want to target these small groups for specialized sessions. It would seem reasonable that convergent areas should be addressed in training programs in higher education and in-services whereas those that diverge would not be as critical.

In the Software category (Fig. 6) we looked at actual use patterns and the desire for training. Again, the pattern of relationships had interesting implications. Apparently, high use areas such as Finding Technology Resources thru the Library and Internet Searching are comfort zones which seem to suggest training in these areas is not needed. The chart shows highly divergent patterns. However, further study is advised as Librarians may have a different perspective on this. Topics that closely correlate or come together on the chart such as Presentation Software (Ex. PowerPoint), Authoring Software (ex. Hyper Studio), Interactive Learning Systems, Simulations, Evaluation of Software, Evaluation of Web Sites, Inspiration, and Kidspiration show a nearly equal number of those who are users and those requesting training. With nearly equal numbers in these areas, it would be logical to address these areas in training programs.

There is another interesting crossover pattern in the Simulations area. More would like training than are actual users. Again, even though the numbers are low, this seems to suggest that more training and information would increase use.

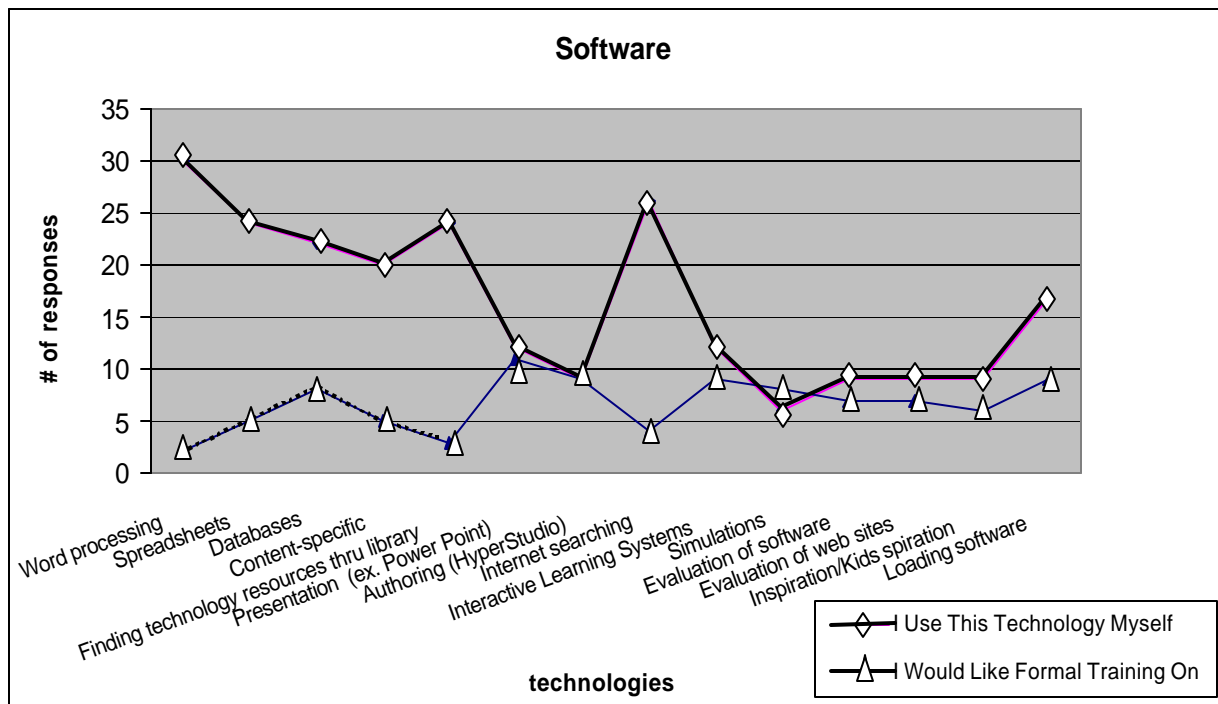


Figure 6. Software comparisons of “I Use This Technology Myself” vs. “I Would Like Formal Training.”

The “Other” category (Fig. 7) included management topics that are not so much “technology” as issues surrounding its use, ex. troubleshooting, maintenance, diversity, privacy and limited access, and purchasing. This chart shows the relationship of “Use” vs. “Neither” vs. “Want training.” It is evident that the majority of participants are not involved in these activities. However, there is seems to be a relationship between “Use” and “Want training.” Two coordinating points are in the “Troubleshooting equipment” area. It appears that users also want to be able to troubleshoot. On the other hand, there are more who indicated they are not “Users” of Internet Privacy and Limited Access topics than “Would like training.” Perhaps, given information and training, more would concern themselves with these issues.

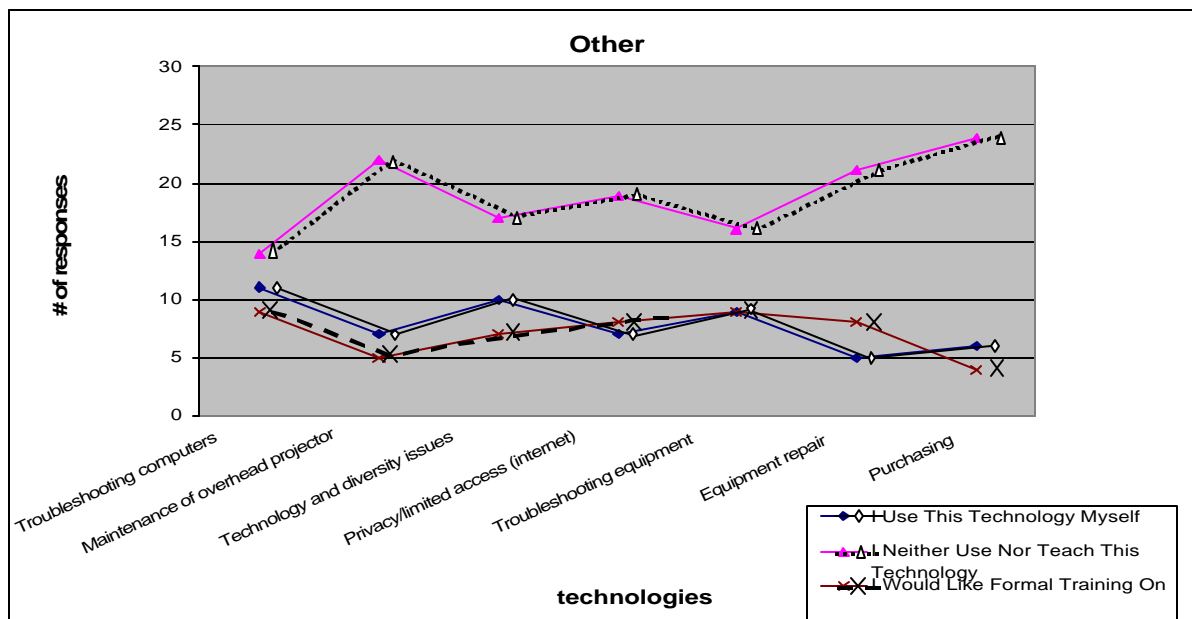


Figure 7. Comparisons of "Use," "Neither use nor teach" and "Would like training" in the Other category.

Data Summary

The top three choices in each category are a mixture of old and new technologies and topics. From a sample population of 34, note the actual counts in parentheses within the table.

Table 4. Top three rankings for the "I use this technology" response.

Category	Ranked #1	Ranked #2	Ranked #3
Hardware	Copier (33)	VCR setup (32)	Printers (31)
Media/ Communications	E-mail (32)	Transparencies (27)	Bulletin Boards (24)
Professional Development	Student Resources (20)	Teacher & Collaborative Resources (tied-18)	Locating Free Materials (16)
Software	Word processing (30)	Internet searching (Search engines) (26)	Spreadsheets & Finding technology Resources through the Library (tied-24)
Other	Troubleshooting Computers (11)	Technology & Diversity (10)	Troubleshooting other equipment (9)

Table 5. Top three rankings for the "I would like formal training" category.

Category	Ranked #1	Ranked #2	Ranked #3
Hardware	Desktop Videoconferencing(11)	Interactive TV & Electronic white boards (tied-10)	Scanner (3)
Media/Communications	Web site Development (14)	Desktop Publishing (8)	Dry Mount & Video as teaching/learning tool (tied-5)

Professional Development	Locating Free Materials (9)	Online Training Sites (7)	Student & Collaborative Resources (tied-6)
Software	PowerPoint (11)	Authoring software, Loading, Interactive Learning Systems (9)	Databases & Simulations (tied-8)
Other	Troubleshooting all Technology (9)	Privacy and limited access & Equipment repair (tied-8)	Technology and Diversity Issues (7)

Table 6. *Data summary comparing present use and areas where training is desired.*

	Hardware	Media/ Communications	Professional Development	Software	Other
Use Now	Copier	E-mail	Student Resources	Word processing	Troubleshooting Computers
Want Training	Video Conferencing	Web Development	Locating Free Materials	PowerPoint	Troubleshooting all technology

Discussion

It is important to note that technologies that are used often should also be considered in training programs. Although this population was not asked if they had training in these areas, one could reasonably assume not all have had in-depth training in even the most commonly used technologies such as word processing. Versions and needs change as well as operating systems and uses. A well-rounded program, whether in higher education or an in-service, would address all areas of potential need. It is also important to note that. We must remember that techniques, presentation tips, design skills, and foundation principles do not change over time and should be included in all programs that educate teachers. In higher education it is especially important to teach the foundational theories of the field of instructional technology as applied to present tools as well as those on the horizon.

Although the data in the areas referring to older technologies may show little interest in training in these areas, it is important to remember that: 1) initial training in the technology may have been inadequate (few know more than basic skills in word processing or how to create a simple one-layer transparency); 2) software is continuously being updated requiring re-training; and 3) new skills and theories in the application of technology require continuous education for our teaching professionals.

Summary

The purpose of this survey was to gather data concerning the knowledge, skills, and technology teachers are using in the K-12 public school setting. Demographic data showed 56% or 19 of the 34 respondents were K-12 teachers followed by school counselors, full-time students, case managers for a behavioral institute, and two undeclared. All were graduates in university courses. Questions focused on what they use themselves, which they teach to others, which they neither use nor teach, and those for which they would like training. This information could then be used to determine changes and updates to the technology curriculum for pre-service teachers at the university level. Although this was a limited survey, it did suggest some possible trends and relationships which seem to be in alignment with current beliefs.

Results were predictable in some ways. The most used technologies were the most available in schools: copy machines, overhead transparency, paper cutters, etc. Conversely, those that were identified as "Neither use nor teach" were either older and/or no longer available (16 mm projectors), managed by a specialist or coordinator (networks, budgets, etc.), or so new they were not likely available (electronic white boards). The latter was evident in the "I would like training...." response as they were mostly the newer technologies. The "Other" category revealed a desire for more troubleshooting knowledge and skills.

Several recommendations are being made. Since 67% of the participants indicated most of their technology skills were self-taught or gained through workshops, it is evident that higher education must

continue to be diligent in the training of our pre-service teachers. Until that portion of the workforce with limited knowledge and skills retires or is trained and/or the current generation becomes the majority, there will be a need to continue with broad-spectrum pre-service technology training programs.

It would also behoove us to remember that those established technologies and media which have a proven track record as being effective and reliable (bulletin boards and transparencies) will continue to be integral in the education of our students. As the data showed, teachers in the classroom are aware of this and are requesting training in these areas. There are many subtleties to the efficient production and use of these media which are not likely learned on the job. Visual literacy skills as well as production skills are required for classroom teachers to communicate with students in an efficient, clear manner regardless of the technology being used. Teachers must be able to create and interpret visually in order to create effective instructional materials. Instructional design and technology faculty, art teachers, and communication specialists in many areas may assist with this very important task of training both visual and verbal communication skills.

This may be accomplished in several ways. Partnerships of various types including those with universities, school districts, community colleges, the private sector, etc. may provide the financial resources and other opportunities required in basic and advanced training programs at all levels. With continuing restrictions on budgets in any one institution, it would seem that these kinds of collaborations would be mutually beneficial.

In order to keep current with the changes in the field of education and technology it is important to conduct surveys such as this as an assessment activity. Items, categories, and needs will change continuously. In as little as two years this picture could change. Therefore, it is recommended that this type of evaluation be used at all levels of education including post-secondary. This would also provide important data for accreditation purposes. It would also be helpful to ascertain not only use pattern but also what they would like training on by allowing participants to select more than one response choice instead of only the one.

Conclusion

In a report by the National Center for Education Statistics (U.S. Dept. of Education, 2000) entitled, "Teachers' Tools for the 21st Century," researchers found that teachers who spent more time in technology training, as opposed to teachers who spent less time, felt well or very well prepared to use it for instruction and, teachers' use of technology was related to their training...." Our challenge as those who prepare educators for the classroom is to be aware of the changing needs in learning and technology and how this may impact our programs while establishing practices based on sound theories and techniques. Diligent observation and feedback is required to meet this challenge.

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