

Action Research Report

ISTE NETS Online

April 24, 2002

INTRODUCTION

This action research project is part of a course that ISTE (the International Society for Technology in Education) offered about National Educational Technology Standards (NETS). The course was designed for classroom teachers to do action research projects which would help to show how NETS works in the classroom. I signed up for the course as a professional development specialist with a focus on in technology because I am very interested in the NETS and wanted to learn more.

As the course began I struggled with what I could do for an action research project. As I reflected it was clear that since I work with teachers it made sense to work on the NETS for teachers. There are ten conditions that NETS describes as essential for teachers who are moving toward a whole new way of teaching and learning with technology. These conditions are shared vision, access, skilled educators, professional development, technical assistance, content standards and curriculum resources, student-centered teaching, assessment, community support, and support policies. In my many school visits all over the state of Missouri I am aware that very few of these essential conditions are in place in schools. At the University of Missouri -Columbia where many Missouri teachers are trained most of the conditions exist. However, when these newly trained teachers move out to schools they find a different situation. I could see that this was a problem, but action research involves trying something out that has some influence to change the situation. I wasn't sure what I could do that would change things that are on such a large scale. My question "What percentage of the essential conditions do most schools have?" was really too big a question.

I wrote the discussion list:

But now in reading articles about action research I am realizing that this question has nothing to do with changing the situation. In many ways I feel powerless to change this situation because it involves SO MANY factors that I have no control over.

Action research seemed practical for a classroom teacher who could try a new method of teaching, or deal with a behavior problem and then based on the results change or not change his/her practice. Since I am visiting many schools all over the state and really am an outsider I am not in a situation where I can change the essential conditions. As I reflected on this I also realized that my unique position allows me to share what I learn with a broader audience than most teachers would have. Although I cannot create actual change, I can share knowledge and in that way influence what schools decide to do.

I received encouragement to keep thinking about the essential conditions and also advice to narrow the topic. Here is one message:

I'm going to make the same comment to you that I'm making to myself as I try to determine just what direction my project will take—I should narrow the focus to something manageable and over which I can have some impact once I have analyzed the data.

Another concern I had is that the NETS for teachers are written with teacher preparation programs in mind. They talk about what teachers should learn in general preparation, professional preparation, student teaching, and finally their first year of teaching. I work mostly with teachers who have been teaching for five years or more. Many of them are still on the first step when it comes to integrating technology. I feel strongly that we need to reach these teachers and to assist in the process they are going through so that the preservice teachers who come to them for student teaching see a different kind of teaching modelled. First year teachers are not often very confident about the way they are teaching. Even if their teacher education involved powerful uses of technology if they are placed for student teaching in a very traditional classroom and/or get their first job in a school where most teachers are very traditional it is likely that they will learn more from their practice than from the theory in classes.

I decided that professional development for classroom teachers was a good focus for my action research project. Although professional development is listed as one of the essential conditions many of the others are related. Teachers develop shared vision as they learn and grow, they become skilled educators through professional development, they learn about student-centered teaching, assessment strategies, and curriculum resources through professional development. So, although my action research project was narrowed, it also connected to many of the other issues.

THE PROCESS

After narrowing the question down I wrote out a process to follow in the actual research. The following is organized in the same way as the plan that I wrote with explanation of what happened at each step.

Phase 1-Question

What does successful professional development for technology integration involve?

One of the essential conditions for teachers to meet the NETS is professional development. At this time schools are populated with teachers who were not educated to integrate technology into their teaching, so there needs to be a heightened level of professional development to help teachers catch up while schools of education also upgrade their programs to turn out new teachers who are ready to use technology in ways that truly enhance learning. What type of professional development works? We know that the traditional one time workshop is not effective, but it is not clear what does work.

I am working in a statewide program called eMINTS (enhancing Missouri's Instructional Networked Teaching Strategies). This is a program that was started in cooperation between the Department of Elementary and Secondary Education (DESE) and MOREnet (Missouri Research and Education Network). The goal of the program is to lift the barriers that teachers usually encounter when using technology (lack of equipment, low bandwidth, lack of tech support, not enough training, lack of instructional support) and see what happens with the learning in the classroom. Because of my involvement in this statewide program I do not have the option of making changes in actual practice. However, I can be a catalyst for change at a different level. What I learn can be shared with a wider audience and it can be used to guide us as the eMINTS program moves into the future.

Phase 2-Plan of Action

This particular action research project will focus on descriptions of various types of professional development and support that teachers receive. An analysis of data found will be included.

The first step of my plan will be to collect data. A survey was designed (see Appendix 1). An email requesting participation in the completion of the survey was sent out to educators in Missouri whose job responsibility included technology professional development and curriculum support. After that data was collected and reviewed the email was sent out to a broader audience through discussion lists and the results of that survey compiled. The Missouri information was shared at a conference in Southwest Missouri in March. These results were then compiled and are included in this report.

The following action research project contains the results of the two surveys and some comparisons between them. It also makes some suggestions based on the data about ways to deal with the problems presented.

Phase 3-Collection of Data

The survey (Appendix 1) was designed online at formsite.com and an email was sent out to people who had been identified as technology curriculum support specialists for their schools or school districts in Missouri. I received 20 responses from the 40 requests sent out. The results of this survey were collected and entered into a FileMaker Pro Database and the data was analyzed and compared in various ways.

An invitation was then sent out to several discussion lists asking people who described themselves as technology-curriculum support specialists to complete the same survey. I received 44 responses from out of state. These results were also entered into a FileMaker Pro Database and the analysis of this data is included below as well as comparisons between the larger survey and what was found only including Missouri professionals

The fact that most of the responses to the survey were from people who included professional development as part of their job description showed me that I had targeted the correct professionals. In the survey responses there were only five people who were not involved in professional development. Three of these were library media specialists, another title was computer teacher and the other one was an language arts teacher.

I had planned to compile a list of various models that were shared in the survey, but I was disappointed at the lack of variety in the results. The models that were suggested are included below.

A few of the responses prompted further questions and this was done through direct email to the individuals I selected for follow up.

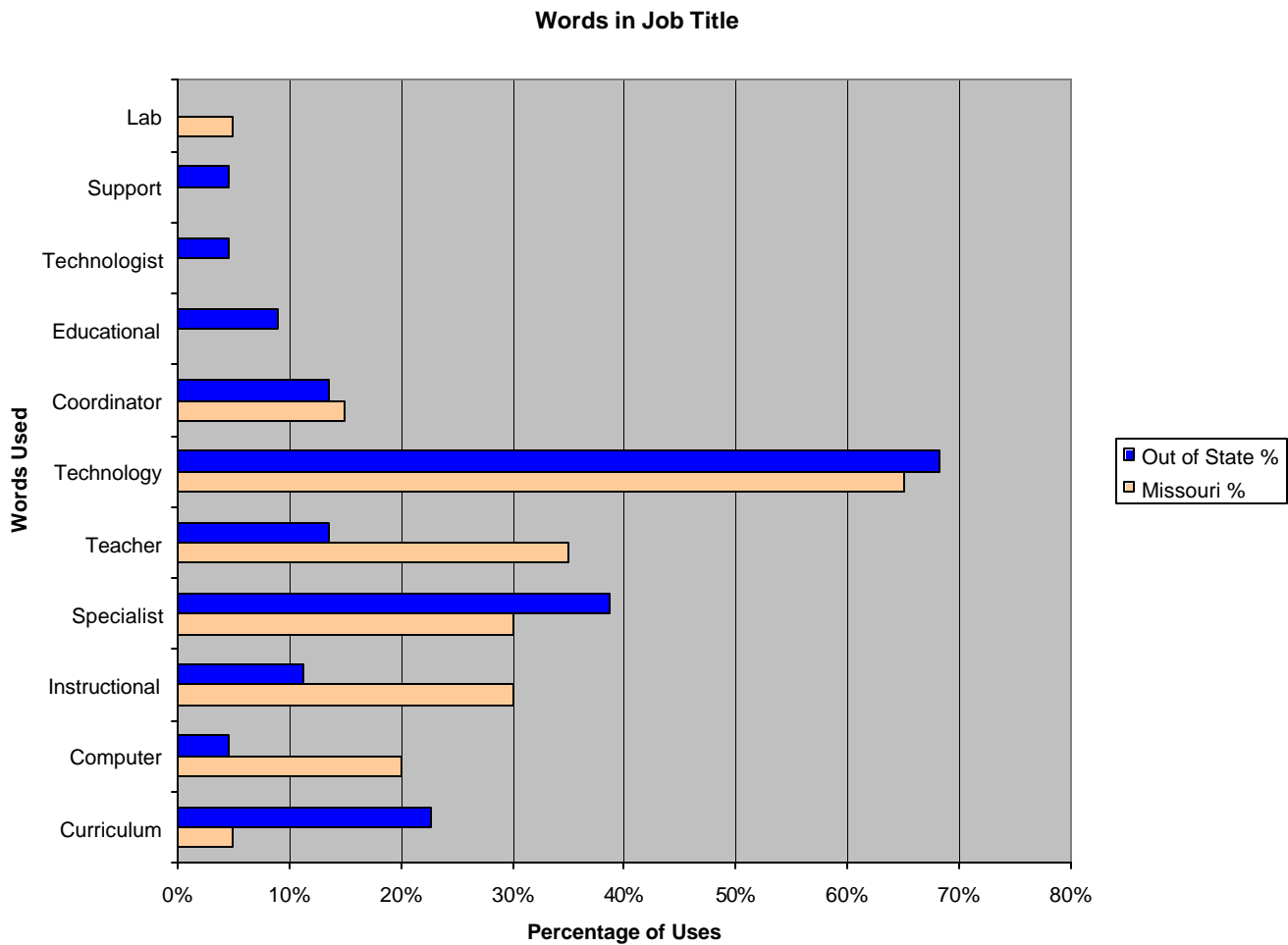
Phase 4-Analysis of Data

JOB TITLE

Once the data was collected and entered into the FileMaker Pro Database a few surprising results were observed. In Missouri there was a large diversity of titles for professionals who provide technology-curriculum support in school districts (see Appendix 2). Only three out of 20 responses (15%) in Missouri had the same title (Instructional Technology Specialist). Even among those with the same title the job descriptions were not the same. This observation holds true with the out of state survey (also in Appendix 2). Out of 44 records eight responses (18%) had the same title (Curriculum Technology

Specialist). These responses were all from the same state, but even among the same title in the same state there were large variations in the duties that these individuals performed.

It is interesting to compare this with our understandings of other job roles in schools. The roles classroom teacher, principal, aide, superintendant, special ed teacher all evoke fairly clear visions of a job description. Although people with these titles perform a variety of duties depending on where they work, the range of responsibilities is fairly clear. This is not true with those whose role is supporting technology.



It would be helpful if there were agreement on one title for the role of technology/curriculum support. As this graph shows even among those who have this as their primary duty the titles vary greatly. The list in Appendix 2 also shows that many people with other job titles (librarian, dean, english language arts teacher, directors) also perform many technology/curriculum support tasks.

PURE TECHNICAL SUPPORT

The second observation in Missouri was that pure technology support was extremely lacking in the majority of schools. The survey offered a scale of support ratios ranging from an ideal 50 computers to each full time support person to over 300 computers for each full time support person. Overwhelmingly, “over 300” was indicated as most school’s ratio (15/20 or 75%). The ratio of technology support for out of state survey was a bit better. Only 19 out of the 44 responses (43%) had over 300 computers per full time person. Five more responses said that one person supported less than 300 computers which brings the total to 55%.

In a statewide report called the 2001 Missouri School District Computing Census it was noted that Missouri has an average of 3.25 district staff FTE and .8 building-level staff FTE. These professionals are responsible for all training and support. I did not find this figure to be very helpful because it combines the various roles for technology support (pure technical support, planning and direction of the district technology, and professional development). Also a total number of computers was given, but it was not in terms of a ratio of support professionals to computers. Since it is a statewide average it does not really reflect the situation of most individual schools in the state. There are districts with very little technical support of any kind and districts with adequate support.

According to the Technology Support Index which was created by ISTE with funds from the Gates Foundation (<http://tsi.iste.org/>), and also from other resources listed in the bibliography, an ideal ratio of tech support people per computers is 50-75 computers for each full time person. In the survey discussed here the only choices were

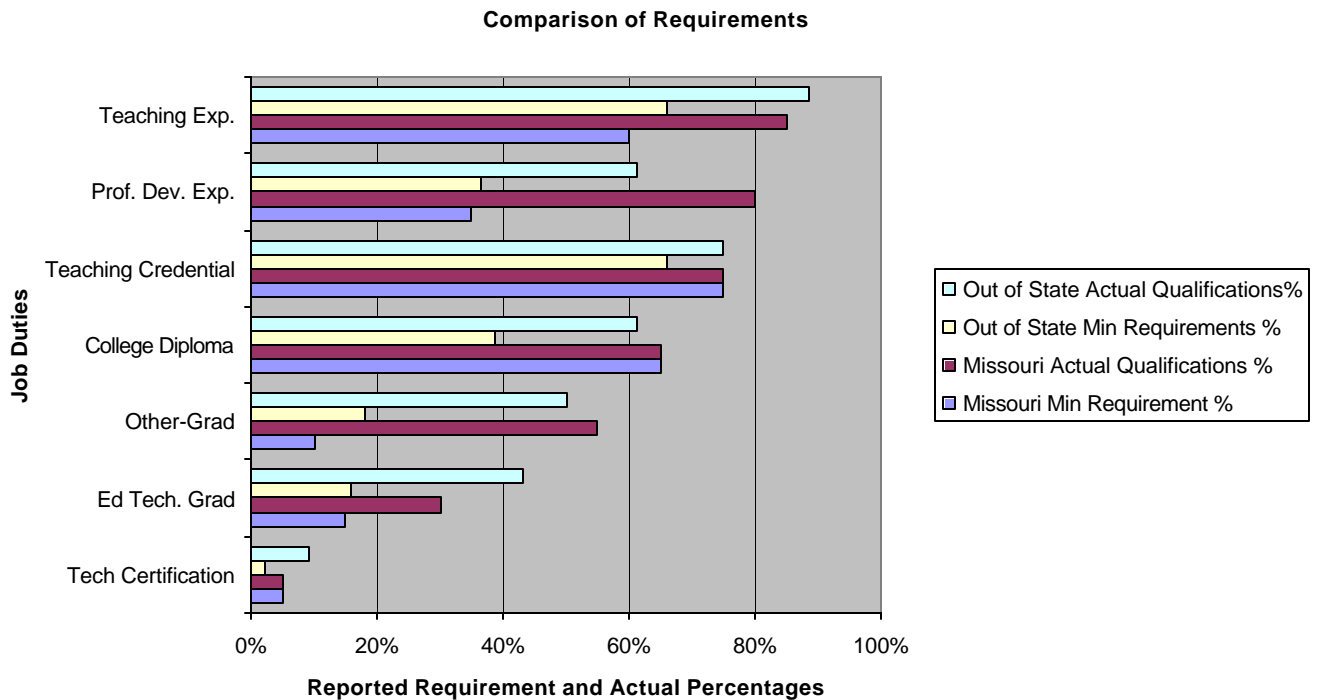
- ✧ Less than 50 PCs and/or Macs for every full time support person.
- ✧ Approximately 50 PCs and/or Macs for every full time support person.
- ✧ Less than 100 PCs and/or Macs for every full time support person.

However, only four responses out of twenty for Missouri (20%) and seven responses out of 44 for the larger survey (16%) selected these three.

COMPARISON GRAPHS

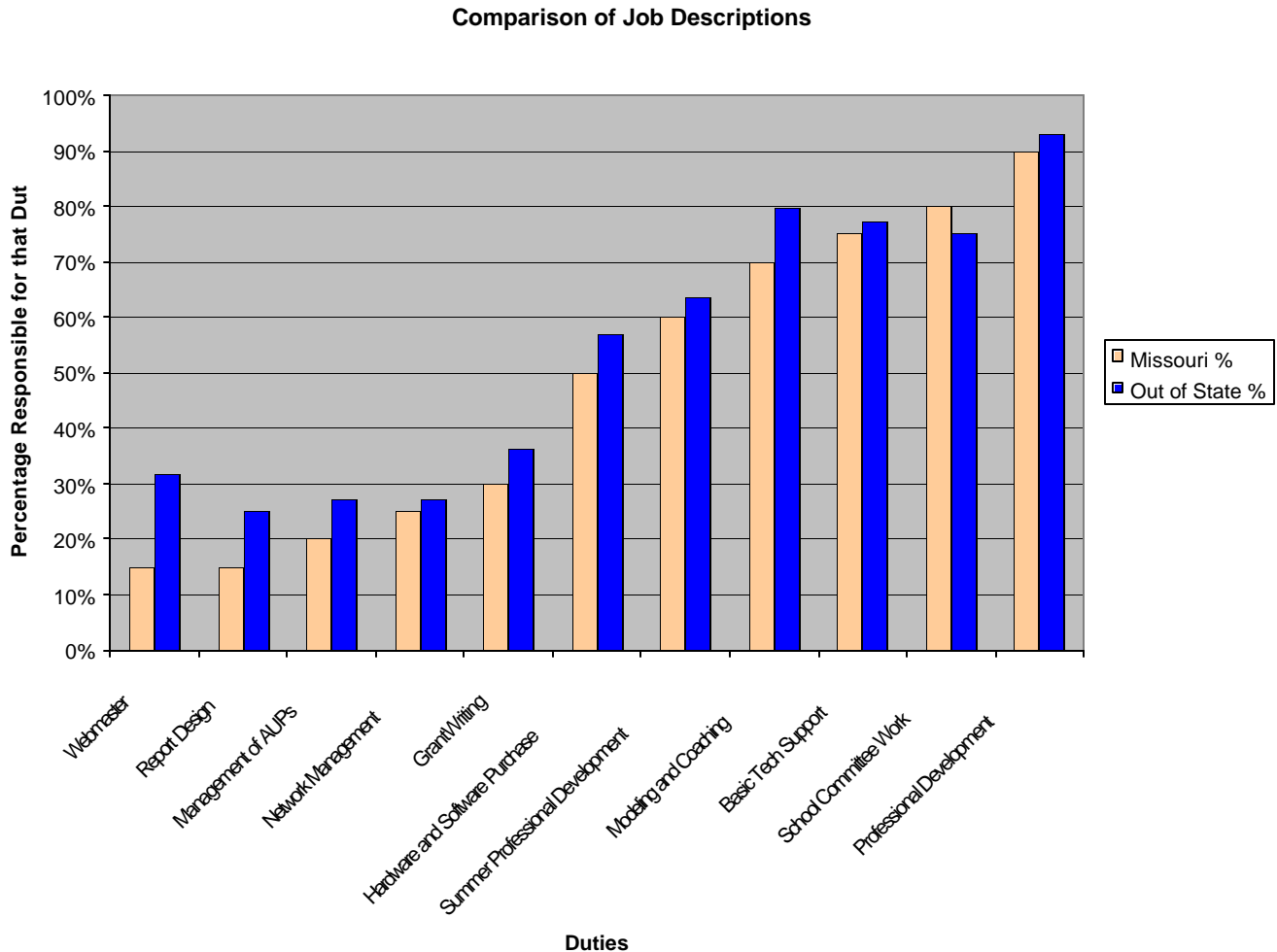
Comparison of Required Qualifications

This chart shows the responses concerning the required qualifications for the job in each of the surveys compared to the actual qualifications of the people filling these jobs. I found it encouraging that teaching experience was required for most of these positions. Another interesting finding was that most of the people who fill these positions are have higher qualifications than are required for the job.



Comparison of Job Descriptions

It is interesting that the people surveyed were very involved with professional development, committee work, basic tech support and modeling and coaching. Very few of them performed network management, management of AUPs or webmaster duties.



MODELS FOR SUCCESS

Another surprise was the lack of working models shared in the longer answers in the survey. I was hoping that there would be several workable models that could be shared and built on. Although these were “ideals” rather than actual working programs I hoped they could be starters for developing a working program. Many of the ideals shared involved hiring more personnel. It was often suggested that one technology-curriculum support person be hired per building, or for a certain number of staff or students. After noting the lack of pure technology support there is NO doubt that schools need to hire more technology support personnel. However, money was often listed as a barrier to creating a successful technology curriculum support system. Unfortunately, no one suggested how to remove this barrier. Another complication is that often hardware and software is a grant funded purchase. These grants often indicate that they may NOT be used for hiring personnel.

Some of the Ideals shared were:

- A well trained staff of curriculum technology support people who are backed by efficient technology support staff at a central office. A full time person (constant presence) for each school.
 - Flexible, personable instructional technology support person.
 - Technology support personnel working closely with teachers in their actual work environment.
 - Ongoing, onsite training, just in time support
 - Active administrative support
 - Time for teachers to collaborate on projects and learn developmentally
 - Time during the school day for training
 - Pay for teachers as they spend time learning and changing.
 - Focus on curriculum goals rather than on machines. Education is considered the business, not computers
 - Using technology should not be an optional activity for teachers. There needs to be some requirement.
 - Adequate budget
 - Regularly planned updates of software and hardware
 - Quick repair of machines so that they are useful.
 - Commitment to long range planning
- In many cases it was clear in the comments that these things were NOT happening in the respective locations.

BARRIERS

- There were many overlaps between the ideals and the barriers. Here is a list of the main barriers:
- Teacher apathy
- Teachers too tired after school to pay attention to training
- No compensation for teachers who do put in extra effort
- Lack of repair technicians.
- Communication between technical people and curriculum people is poor.
- Since machines are not repaired teachers do not trust them or plan to use them.
- Time-trying to support more than one building or even a whole district.
- Time-Spending too much time repairing equipment, so there is no time for modelling and coaching.
- Time-for teachers to learn and plan with their support people.
- Reluctance of teachers to take ownership of machines and do basic troubleshooting.
- View of support person as someone who is there to fix machines rather than someone who is a colleague in teaching. (“a screwdriver with legs”)
- Out of date equipment
- Lack of administrative support, poor leadership and vision
- Lack of systemic change
- Pressure to “cover the material in the book”
- Technology viewed as an add on.
- Lack of funds
- Mix of platforms

15 people in the out of state sample and 11 in the Missouri sample mentioned time. This is such a common barrier, but it is one that is rarely dealt with in any way. One thing that I would like to see come out of this action research project is a review of schools that are dealing with the lack of time issue in creative ways.

It was interesting that only one person in the Missouri sample mentioned anything financial. Close to 15 mentions of money, funding, or funds were mentioned as barriers in other states.

ADVICE

- Much of the advice given reflected the answers to the questions on ideals and barriers, so I will not repeat those comments. Below are some comments that I thought were especially helpful:
- Hire teachers who are successful integrating technology
- Have clear expectations for the role of the person doing curriculum technology support.
- Be prepared to spend money with a vision for technology integration. Long term commitment of time and money.
- Involve all stakeholders (community members, parents, etc...) Work to get everyone's "buy in"
- Provide teachers with first hand examples of best practices (presentations by colleagues, regional resource consultants, opportunities for conferences)
- Be patient! Keep a positive attitude.
- Offer teachers computers that can be taken home or with faculty discounts. Train them first in something that they see as useful (email, gradebook software, etc...)
- Educate administrators
- Trust your teachers.
- Avoid fads in purchase of software and hardware
- Plan in accountability

CURRICULUM SUPPORT VS. TECHNICAL TROUBLESHOOTING

One of the most common frustrations mentioned by these professional development people was that much of their time is used fixing hardware and software problems. Here is a selection of comments from the surveys.

- "allow me to work with teachers and their students instead of working with machines"
- "Split up responsibilities. Have staff who do hardware support/maintenance, and others who do instruction and integration as well as staff training."
- "I would also like to see the infrastructure set up in such a way that ones time wasn't consumed with troubleshooting before teaching the technology was actually able to begin."
- [ideal] "Technical and instructional people have a good working relationship. Education is considered the business not computers."
- [ideal] "Technical people giving support, teachers doing teaching"
- "enough repair technicians to free us from these tasks"
- "One CTS per school who could do technology integration and some light tech support. AV repair who would do repairs on computers, installations, and troubleshooting for new application questions"
- "Enough technical support available to fix machines and software glitches in reasonable time so that I can focus on instruction and integration of technology"
- "Dedicated staff to maintain systems. Dedicated staff to support "technology integration"
- "To really integrate technology, you need both technical and instructional support. "

- “we should not be required to fix computers at all. When we do, we never get around to helping with integration.”
- “I like what I have now except that I feel that our Technical Support Personnel focus on machines instead of supporting the curriculum goals.”
- “You need someone to provide the technical support and upkeep of equipment and someone to provide integration support. They are not the same job.”

The lack of technical support personnel is also shown in the DESE annual Missouri School District Computing Census. One of the priorities for 78% of districts in the survey was curriculum integration and instructional integration. In the 2001 school year “on average, schools schedule two days for professional development activities where teachers can learn or upgrade their technology skills”.

Phase 5-Plan for Future Action

The results of this survey were shared with those who participated and requested the results. I also presented the Missouri portion of the results at a conference in Springfield, Missouri in March 2002. The survey results have convinced me that professional development is only a part of adequate technology support and that technology integration cannot occur until these needs are addressed.

As I did this action research project it took a different direction than I had expected. By sending out the survey I was hoping to find some good models for the role of technology-curriculum support. However, what was obvious from the results was that there is such a lack of both kinds of technology support that people working in schools have difficulty even talking about better ways to do things. Rather than coming up with an action plan for professional development in schools I have come up with a clear indication of the great needs for personnel in this area. Pure technical support is clearly lacking, but many of the respondents emphasized that to make progress in technology integration there are two support roles needed. One is the pure technical support, and the other is a form of curriculum technology support. People mentioned that this needs to be someone who has a teaching credential and teaching experience, not just technical expertise. Without sufficient technical support, however, these people end up spending most of their time working on equipment instead of teaching people. The roles are complimentary and it is important that there is good communication between the people in the different roles

Since time was mentioned so often as a major barrier I think this is the direction that I would like to focus future action research. My question might be “What models are already existing that allow teachers professional work time?”

Other questions that I am interested in are:

What models of technology support really work?

Can we develop a workable model within our current program or in the state of Missouri?

How can schools fund the personnel that most of the ideal situations talked about?

APPENDIX 1-THE SURVEY

Technology-Curriculum Support

Name

email address

Please send me results of the survey.

I work in Missouri.

Yes

No

Title

This title is descriptive of the position that I have.

Agree

Somewhat Agree

Neutral

Somewhat Disagree

Disagree

Approximately how much time do you spend each week in supporting the integration of technology into instruction?

Less than 10 hours per week.

Half Time

Full Time

Other

How long have you been in this job?

Please check the qualifications required by your school for the job you perform.

High School Diploma

College Diploma

Teaching Credential

Graduate Degree (in any subject)

Graduate Degree in Educational Technology

Teaching Experience

Professional Development Experience

Technical Certification

Other

Please check the qualifications that you have.

High School Diploma

College Diploma

Teaching Credential

Graduate Degree (in any subject)

Graduate Degree in Educational Technology
Teaching Experience
Professional Development Experience
Technical Certification
Other

Place a check beside the duties that best describe your major responsibilities. Check all that apply."

Professional development in technology
Basic technical support
Management of the network
Equipment repair, hardware and software purchasing
Working in classrooms by modeling and coaching
Webmaster
Grant writing
Report design and/or writing
School Committee Work (IEP, MSIP, curriculum, technology)
Planning and delivering summer professional development
Collection and Management of AUPs
Other

How many teachers do you support?

What Grade Levels do you support? (you can select more than one)

K-5
Middle School
Junior High School
High School
The whole district

Are there other Technical Support People who do only Technical support in your district?

Yes
No

What is the ratio of Technical Support Personnel (purely technical support) to computers?

Less than 50 PCs and/or Macs for every full time support person.
Approximately 50 PCs and/or Macs for every full time support person.
Less than 100 PCs and/or Macs for every full time support person.
Less than 200 PCs and/or Macs for every full time employee.
Less than 300 PCs and/or Macs for every full time employee.
More than 300 PCs and/or Macs for every full time employee.

Based on your experiences, describe the ideal technology integration support system.

Describe some of the barriers you have experienced in trying to provide a technology integration support system

FINAL QUESTION: What advice do you have for schools or districts that are developing technology integration support systems?

APPENDIX 2-JOB TITLES

Job Titles in US Survey	Job Titles in Missouri Survey
Academic Dean	Accelerated Reader/Technology Coordinator
Academic Technology Coordinator	Applications Specialist
Computer Science Department Chair	Computer Lab Teacher
Computer Teacher	Computer Teacher
Curriculum Technology Specialist	Elem. Tech. Teacher (K-5)
Curriculum Technology Specialist	Elem. Technology Teacher
Curriculum Technology Specialist	Elementary Computer Instructor K-4
Curriculum Technology Specialist	Elementary Lib/Ed Facilitator/District
Curriculum Technology Specialist	LibCoordinator
Curriculum Technology Specialist	Elementary Technology Instructor
Curriculum Technology Specialist	Instructional Technology Coordinator
Curriculum Technology Specialist	Instructional Technology Integration Specialist
Director, Instructional Technology	Instructional Technology Resource Teacher
Director of Academic Technology	Instructional Technology Specialist
Director of Educational Technology	Instructional Technology Specialist
Director of Technology	Instructional Technology Specialist
Director of Technology, Library, Curriculum	Technology Coordinator Elementary
District Technology Coordinator	Technology Curriculum Specialist
Education Technology Specialist	Technology Teacher
Educational Technology Specialist	Technology Teacher, a.k.a. Computer Teacher
Educational Technologist	Technology Trainer
Educational Technology Resource Teacher	
educator	
English Language Arts Teacher/Educational	
Technology Support Person	
Information Technology Administrative Assistant	
Instructional Technologist	
Instructional Technology Coordinator	
Instructional Technology Specialist	

<p>K-12 Instructional Technology Coordinator Library Media Specialist (librarian) Media Specialist Professional development staff Professional Development Team Member school librarian teacher, English and Social Studies technology coordinator - lower school Technology Coordinator/Computer Teacher Technology Curriculum Integration Teacher Technology Director Technology Integration Specialist Technology Resource Specialist Technology Specialist Technology Support Specialist</p>	
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ANNOTATED BIBLIOGRAPHY

Beattie, Richard M. (2000). Electronic School. The Truth About Tech Support. Accessed online 1/29/2002. <http://www.electronic-school.com/2000/09/0900f3.html>

NOTES: Makes the point that the tech department is really the heart of the technology program in a school. Tech people should feel as comfortable in the teacher's lounge as in the computer lab. Mentions corporate standard of one support personnel for every 50 PCs. The type of technology support role needed in a K-12 educational environment still needs to be defined. "this work is about more than machines. It is ultimately about one's impact on the educational process and on the lives of the people in the front line of the process."

Ronnkvist, Amy, Dexter, Sara L., Anderson, Ronald E. (2000). Technology Support: Its Depth, Breadth, and Impact in America's Schools. Report #5 of Teaching, Learning and Computing: 1998 National Survey. Center for Research on Information Technology and Organizations, University of California, Irvine and University of Minnesota. NSF Grant # REC-9600614
Online at: <http://www.crito.uci.edu/tlc/html/findings.html>

NOTES: This study came to the conclusion that "successful integration of technology into the classroom requires the availability of qualified technology support." Defined as NOT simply technology support, both the technical and instructional domains of support. Recommendation for "specific training and qualifications" for this role. Need for Technology Support Certification. Strong statement that if teachers are going to be more successful in their use of technology then professional development opportunities need to increase.

Carvin, Andy (1999). The Digital Beat. Technology Professional Development for Teachers: Overcoming a Pedagogical Digital Divide. v. 1, no. 16.

NOTES: Makes a case for attention to be turned to successful professional development for teachers to use the Internet successfully. Uses Henry Becker's studies to show that teachers who teach in a Constructivist way are the ones who tend to use technology with their classes and also those who work more collaboratively with their peers are those who tend to "get it". "New teaching strategies can require as much as 50 hours of instruction, practice and coaching before teachers become comfortable with them" Andy quotes from the 1994 Department of Education Prisoners of Time report. Ends with support of the PTTT grants for higher ed... which don't exist now under Bush...

Moskowitz, Steven. (2001). eSchool News. ESN Special Report.

NOTES: This is a list of 10 things that schools can do to reduce the Total Cost of Ownership in order to make technology more affordable. Number 8 is Provide Adequate Technical Support. "In a business environment a full time computer support person generally is required for every 50 to 75 computer users." "The TCO report that schools have extremely low technician to computer ratio- more like 500 to one. Number 12 Invest in Professional Development. Well designed staff development program. Not only clear instructions on how to use equipment, but also effective integration.

Murray, Bridget. (2001). Technology & Learning. Tech Support: More for Less.
<http://www.techlearning.com>

NOTES: Review of three locations problems with tech support and the solutions. Surprising in that in the year 2001 there was little mention of the importance of professional development.

Consortium for School Networking (1999). Taking TCO to the Classroom. A School Administrator's Guide To Planning for The Total Cost of New Technology.

NOTES: Makes the point that there are many costs to technology that are not at face value. When employees waste time trying to troubleshoot hardware or software problems that is a cost. When the network is down or computers are not working that is a cost. "The budget item that arguably is most critical to a school district's ability to achieve its technology goals is staff development." "Inadequate staff training will lead to under-utilization of computers-and a loss of return on a school district's investment in technology. Smart Valley, the Silicon Valley initiative recommended One network manager at the county level, one network manager at the district level, and a half time network technician at each school. California Department of Education envisioned that there would be one district or county-level support person for every three schools and that each school would have a half time technical person onsite.

Evaluating the 2001 MAP Results for eMINTS

Online at <http://emints.more.net/evaluation/reports/map2001-emints.pdf>

NOTES: Shows that there are significant results when technology is used in third and fourth grade classrooms in the eMINTS program. Further shows that the greatest gains are made by students whose teachers have adopted a student-centered approach. Also shows that teachers in the eMINTS program show significant change over their two years in training toward a more student-centered approach to instruction.

George Lucas Foundation

<http://www.glef.org>

Then follow these links:

[Home](#) > [Skillful Educators](#) > Ongoing Professional Development

NOTES: Sherman Oaks Elementary is a Charter school in California. This is one example of a school that is doing some creative change to meet the problem of finding time for teacher's professional development.

ISTE's Technology Support Index

<http://tsi.iste.org/>

2001 Missouri School District Computing Census

<http://www.dese.state.mo.us/computingcensus/2001/>

Missouri State Technology Plan

<http://www.dese.state.mo.us/divimprove/instrtech/techplan/02-06statetechplan.pdf>