Stakeholder Perceptions of the Use and Value of Computers and Technology in an Elementary School Setting

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Abstract

The purpose of this study was to describe the status of classroom computer use at an elementary (K-6) school with a population of 676 students in a rural county in the mid-south. A further purpose of the study included examining and describing the patterns of beliefs or attitudes toward the use of technology in education and the skill levels necessary for use. Teachers, administrators, and parents within one school were observed and surveyed offering qualitative and quantitative data in order to make recommendations regarding the direction of technological development for the school and determining the types of training needed.

Keywords: educational technology; teacher professional development

1. Statement of the Problem

School systems must constantly appropriate funds and make plans for implementing new technology into classrooms. Technology expenditures often represent a large portion of allocated monies earmarked within schools. Societal trends lean toward embracing new technological advances in all aspects of our lives, including in the classroom. This is evidenced in the rapid growth of computer ownership, hand-held electronics, and Internet access over the last few years. Teachers who apply for and receive grant money for technology must report levels of success to the grant appropriators. School boards, superintendents, technology coordinators, administrators, and the public in general need to know how effectively teachers use computers and whether students leave school with the skills and interest to function in our technological society.

By examining one school as a case study, one may probe such barriers and facilitators such as equipment, time, technology support, and administrative support of teachers. To understand the strengths that support effective technology use in education, and learn about the weaknesses that may inhibit the effective use of technology as a learning and teaching tool, one might examine a school's expenditures on technology, technology use by teachers, and attitudes of parents, teachers, administrators, supervisors of instruction, and technology coordinators regarding technology use. Do teachers feel adequately prepared to integrate technology in the state-mandated curriculums? What effects do teachers' beliefs regarding the importance of technology have on the way they use technology in the classroom? What similarities or differences appear in expectations relating to technology use in the classroom held by teachers, by administrators, and by parents and how might these similarities or differences effect present or future uses of technology in the classrooms?

2. Purpose of the Study

The purpose of this study was to describe the status of classroom computer use at an elementary (K-6) school with a population of 676 students in a rural county in the mid-south. A further purpose of the study included examining and describing the patterns of beliefs or attitudes toward the use of technology in education and the skill levels necessary for use. Teachers, administrators, and parents within one school were observed and surveyed offering qualitative and quantitative data, in order to make recommendations regarding the direction of technological development for the school and determining the types of training needed.

3. Need for the Study

Schools systems and administrators need to know the amount and type of computer utilization in their school buildings as a means of appropriating money for technology expenditures and for providing appropriate staff development.

State and county monies, Parent Teacher Organizations, grant appropriations, and fund-raising activities all played a part in the build-up of computer and technology ownership at the participating school – with continuing requests from teachers for more equipment and software. By merely looking at the expenditures and the amount of technology on-hand at the school, it *appeared* that technology played a major role in the education process; a closer look might confirm or negate that appearance. If teachers continued to request computers and other technologies for their classrooms but neglected to use those computers for educational purposes, how did students benefit from this expenditure? What did teachers say regarding the reasons they did or did not use technology in their state-mandated curricula?

Perhaps the most significant aspects of this study related to the comparisons of feedback on issues regarding the use of technology in education from the primary stakeholders at the participating elementary school, i.e., teachers, parents, administrators, supervisors of instruction, and technology coordinators. Much published documentation exists dealing with the benefits and barriers schools encounter in their attempts to integrate technology; however, the extensive body of research reviewed for this study did not explicitly provide findings comparing and contrasting the expectations each group of stakeholders hold for the use of technology in an elementary school setting. This study added to the literature a discussion of views and beliefs of the stakeholders in one such elementary school and shed light on how a school might more efficiently and effectively plan for future technology expenditures and integrative programs.

4. Review of the Literature

4.1 Teachers and Technology

Research indicated that teachers must use computers competently in their classrooms, both as vehicles of pedagogically sound instruction and for classroom management. They must have knowledge of hardware and software applications (Hardy, 1998; McNamara, 1995; Siegel, 1995).   However, Rosenthal (1999) found that only 20 percent of the nation's 2.5 million public school teachers felt comfortable using technology in their classrooms. These findings underscored other research (Siegel, 1995; Schrum, 1999; Strudler & Wetzel, 1999) which indicated that even if teachers hold positive attitudes toward technology, the lack of time, access and support needed for teachers to feel competent in using technology in instruction may keep teachers from becoming comfortable with technology in their classrooms.

Poole & Moran (1998) suggested that limited and/or inadequate staff development prevents teachers from utilizing existing technology in their teaching. The authors continued stating, "One-shot workshops, added expense of training, lack of continued support, isolated knowledge, unawareness of school needs, lack of knowledge and support from leadership all contribute to the ineffectiveness of technology staff development" (p. 60). Studies showed that most teachers do not learn to use computers from taking college courses, attending seminars or workshops, or through traditional in-service programs (Galloway, 1997). More continuous training (Hardy, 1998) in the use of technology in education over the course of seven years may provide teachers with the experience, comfort, and confidence to successfully incorporate technology into instruction.

Braun (1993) underscored the types of training in technology teachers need as he reported conclusions drawn from research done by the International Society for Technology in Education (ISTE), "Teachers need training in the uses of technology in their curricula; time to develop these uses; and support from their administrators in a risk-free environment – and they need these on a continuing, long-term basis" (p. 67). While many people recognize the need for staff development related to technology, Bailey (1997) stated, "Even though there is considerable information about the general characteristics of effective staff-development practices, there have been minimal amounts of information specific to technology staff-development programs" (p. 58).

Teachers need models to follow when integrating technology into the curriculum. Sherry, Billig, Tavalin, & Gibson (2000) suggested that teachers need mentors, specialists who help guide their understanding of technology, and on-line resources available to them as they attempt to use technology in curriculum integration. This support structure for teachers provides a level of empowerment to the teachers both as learners and as users of technology. Thornburg (2000) made another interesting observation as he noted, "Technology is not the point – learning is" (p. 5). In the author's reference to "technological fluency," he suggested teachers should not stop with students merely knowing how to use computers, but teachers should set examples of how to use computers as tools for learning.

5. Research Methods and Procedures

This research project sought to gather and interpret data from surveys administered to teachers, parents, and administrators on the use of technology in education, describing the status of technology use and related attitudes. "Qualitative methods permit the evaluator to study selected issues in depth and detail" (Patton, 1990, p. 13). In-depth examination of data gathered via surveys allowed the researcher to isolate and investigate key issues related to the perspectives of the stakeholders regarding educational technology. The participants in this study met the definition of "criterion sampling" (Patton, 1990). The participants included administrators, teachers, a technology coordinator, a supervisor of instruction, and parents of students at the participating elementary school. Most stakeholders expressed an interest in the use of technology in education and their attitudes and technology skills help to shape the implementation of technology at the school.

5.1 Data Collection

Teachers from the participating school and parents of children in the school served as participants in these surveys. Administrators, teachers, parents of children in the school, the school system's technology coordinator, and the supervisor of instruction for the county school system also participated by responding to surveys administered by the researcher. The qualitative surveys allowed for open-ended responses of participants reflecting Patton's (1990) research methodology as he stated, "Qualitative methods permit the evaluator to study selected issues in depth and detail" (p. 13). All stakeholders who participated shared an interest in and knowledge of the use of technology in education at this particular school, and their attitudes and skill levels in technology helped to shape the progress at the school. Collection of data utilized a variety of methodologies including: observation notes, individual surveys, and field notes from related pilot studies. Observation notes provided the researcher with opportunities "to write down feelings, work out problems, jot down ideas and impressions, clarify earlier interpretations, speculate about what is going on, and make flexible short – and long-term plans for the days to come" (Glesne and Peshkin, 1992, p. 49

This study focused on "drawing a picture" of the dynamics and beliefs that shape the use of educational technology at one elementary school based on information gathered from the previously identified stakeholders. Lawrence-Lightfoot and Davis (1997) referred to this process as "social science portraiture." The authors described this process as "a method of qualitative research that blurs boundaries of aesthetics and empiricism in an effort to capture the complexity, dynamics, and subtlety of human experience and organizational life" (p. xv).

5.2 Survey Instruments

Surveys served as rich information sources for this study and originated from several sources. The following paragraphs describe the origin of the surveys, the purposes of each survey, the participants, the administration of surveys, and analysis of surveys.

The "Teacher Survey" emerged as a result of a qualitative pilot study conducted prior to the beginning of this research project. The purposes of the Teacher Survey included gathering demographic information relating to grade levels or student population taught and years of experience in education. Other topics of the survey included the history of each teacher's general computer use, the history of each teacher's Internet use, and attitudes and beliefs relating to technology use that reflect their own personal experiences including the role of technology in teaching and learning, perceived attitudes of administrators and parents, and issues related to technology training and skill levels. Questions included in this survey reflected both open-ended queries that allowed for teachers to use their own words and elaborate freely, and questions that fit the Likert Scaling model. The Teacher Survey sought to gather information from all regular classroom teachers, special education teachers, speech teachers, art teachers, music teachers, physical education teachers, librarians, and guidance counselors at the participating elementary school.

The questions in the Qualitative Parent Survey addressed some of the same issues as the teacher surveys, i.e., the amount of priority placed on technology at the participating school, the roles of parents and teachers in preparing children to use computers and related technology, and parent attitudes and beliefs relating to the use of technology in an elementary school as a teaching and learning tool. The primary purposes of this survey included expanding and extending the information gathered by the elementary school and comparing and contrasting commonly held beliefs of parents with those of teachers and administrators at the school.   Parents and guardians of students at the participating school comprised the participants in the Qualitative Parent Survey.

Approximately 504 different households represented the students enrolled at the participating school. The principal investigator developed the "Request for Information from Supervisor of Instruction" survey. This survey included criterion-based questions designed to gather the same types of qualitative information as requested on surveys from teachers, administrators, parents, and technology coordinators. The purposes of this survey included gathering information on past professional development in the area of technology for teachers at the participating school and sharing attitudes, beliefs, and visions relating to the use of technology as a teaching and learning tool at the elementary school. This survey laid the foundation for comparing and contrasting responses among different groups of stakeholders.

6.0 Results

The purpose of this study focused on describing the status of classroom computer use at an elementary (K-6) school. A further purpose of the study included examining and describing the patterns of beliefs or attitudes toward the use of technology in education and the skill levels necessary for use. Analysis and interpretation of the data allowed the principal investigator to "paint a picture" of the status of technology use at the school, to make recommendations regarding the direction of technological development for the school, and to determine the types of training needed.

The particular problem at this school lay in the skills-based, sequential, teacher-as-expert models of instruction found in most, if not all, classrooms to varying degrees. Since these teachers viewed themselves as the providers of knowledge and information, the fact that they felt incompetent in technology removed technology integration from the realm of instruction. These teachers perceived learning as skills-based. Under that premise, they viewed their *own* learning as skills-based … not in a social-constructivist multi-path method. As a result they wanted skills-based, sequential, teacher-centered instruction in technology that would make them "experts" in their own classrooms. Then they would feel confident enough to provide skill-based, sequential, teacher-centered technology training for *their* students. This would all occur without any regard for integration or pedagogical change.

What readers witnessed in this study was a school full of teachers trying to do what they were asked to do: by-and-large a school of genuinely caring teachers who tried their best to comply with what was asked of them by administrators, parents, school board members, and the school superintendent. In many ways their hands, and keyboards as the case may be, were tied. Teachers received pressure to integrate technology and new teaching philosophies into classrooms where a true mismatch of practices existed – very much like trying to insert a square peg in a round hole – no amount of force will make it a good fit and they will exhaust themselves in the process of trying. For teachers to find a level of comfort with technology integration they must align practice so they will have a place to "plug in" new innovations that move teachers and students into an arena where authentic, constructivist learning is central.

It is this researcher's belief that history will look back on this period of time and change in education and in society with a kind eye toward the teachers who were asked to function in a constant state of disequilibrium. Comfort zones in American classrooms are almost non-existent. Standardized testing, value-added assessments, newspaper publications of test scores, school report cards, over-crowded/under-funded schools, and pressures to teach more diverse students without proper materials or training keep teachers at a point that anything else is *too much*. Aside from all the barriers already discussed in this study, issues of unreliability, bandwidth, compatibility, and other technical issues make the effort to use technology seem overwhelming and complicated. So how do teachers make *peace* with technology? The truth may lie more in the hands of administrators, technology planning committees, school boards, and society than with teachers.

Teachers need to make their wishes known to administrators, and take an affirmative role in seeking out "best practice" and learning theory that will enhance their effectiveness in the classroom. Only deep changes in beliefs and practices will make technology integration meaningful and worth the effort. Teachers need to be open to change, form collaborative working relationships with administrators and other teachers, and energetically support the school's technology plan once in place. While this is a challenging time for educators, it is also a time when history is made, molds are broken, and new courses charted. Parents have a vital stake, namely their children's future, in the successful implementation of technology at any school. Parents in this study appeared acutely aware of the future ramifications of computer and technology literacy for their children. As reflected in survey comments and from the pilot study, parents feel a sense of responsibility to share the charge of providing technology opportunities for their children.

Many of the parents expressed disappointment and disillusionment over the lack and use of technology at the school. Standing back and looking at the dynamics of the situation as it exists at the school regarding the use of technology, it would be nothing less than a miracle if parents, teachers, and administrators *were not* disillusioned. No real plan exists that defines purposes, sets goals, outlines future plans, measures successes, or communicates among the stakeholders. For all stakeholder needs to be met with such a lack of structure would be highly unlikely.

If parents really want a "say" in the direction of technology implementation at the school, they must make their interests known to administrators and to teachers. Parents should volunteer to serve on technology planning committees, attend functions at the school to get a feel for needs and accomplishments, and support the innovative changes in classroom practice that would need to occur. Administrators and teachers should plan open events, like technology fairs, where all stakeholders could share learning, ask questions, and brainstorm future projects. School webpages, technology newsletters, on-line topical discussion boards should be implemented to keep open lines of communication flowing among all stakeholders. Parent views and wishes should be sought and acknowledged as vision statements and technology action plans are established school-wide and in individual classrooms.

Personnel who plan professional development opportunities for teachers may be overcome with what appears as the "futility" of providing technology training. A lack of consensus concerning what teachers need and want also makes planning professional development in technology challenging … especially when teachers admit that they do not know enough to make informed decisions or requests regarding training. The entire question of what teachers "want" versus what they "need" seems critical to any discussion of professional development planning.

As in the case with this particular school, professional development in technology appears secondary to the more primary problem of the type of instruction present in most classrooms. Professional development in computer and technology use that focuses on "button pushing" for the teachers in this study will not solve the problems outlined by the stakeholders. Teachers may know which buttons to push, although that type of direct, isolated training rarely results in long-term use, but will still not be able to effectively integrate technology into teaching and learning. Administrators in this case need to focus on classroom instructional practices that support students' constructing knowledge, rely less on traditional methods and materials, align instruction and assessment, provide more opportunities for higher-level thinking and problem solving, and encourage innovations in teaching and learning – technology-based or otherwise. Teacher attitudes must also be considered as their *needs* and *wants* are addressed by administrators. The expertise that teachers bring with them needs to be respected, and exemplary classroom and instructional implementations should be recognized.

The teachers in this study expressed their needs and wants, namely more computers, more time, more support, more help, more training, and a computer lab to provide basic computer instruction for students.   Many teachers also indicated that they are "waiting." Someone must make the first move to break the present stalemate. Principals, the supervisor of instruction, and the technology coordinator must

(1) recognize that a problem exists between present instructional practices and a constructive model of instruction more conducive to the integration of technology and other innovations in teaching and learning;

(2) hear and respond to teachers' wants and needs;

(3) investigate successful models of technology integration at other elementary schools;

(4) work with other teachers and parents to develop a collaborative vision of the future of technology use at this school;

(5) plan innovative and responsive professional development for teachers;

(6) plan measures that promote open communication among and between all stakeholders;

(7) model the use of technology by developing informative webpages, using email to communicate, taking and sharing digital photographs, etc.

(8) devise incentive plans (i.e., mini-grants, release time) and strategies for recognizing and crediting exemplary uses of technology in the classroom;

(9) structure future professional development that is responsive to teachers' requests of one-on-one training, short sessions limited to one topic, and multiple sessions that require teachers to use the skills presented; and

(10) make concerted efforts to provide teachers and students with up-to-date technology that facilitates instructional practices, curricular needs, and student needs.

6.1 Drawing the Picture: Reality

The waiting game: Teachers say they will use technology when they get more computers and more training (undefined). The technology coordinator will support more funding for technology when he sees teachers using what they have. Principals view the situation as "have many, need more," but not as "can't use what we have." No one is providing a model for what teachers need – examples of how to use technology to *teach* … this is different from just *how* to use technology. The supervisor of instruction says not many requests for technology professional development … no focus of what is "most" needed … not well attended when offered. Teachers say they don't know what to ask for and are frustrated because someone doesn't provide "it." Strong negative comments from parents which seem to view this as a "school" problem … when in reality principals are very supportive … teachers don't complain about non-support from principals, in fact compliment the support from all administrators. Why don't parents see administrative support? What are parents looking for from administrators? Is it that they don't see classroom use and integration and blame administration? How hard can principals push teachers without the training that teachers need?   What do the supervisor of instruction and technology coordinator need to be able to move the process of technology integration along? Everyone is waiting … including students.

6.2 Drawing the Picture: Vision

The stakeholders in this study have all boarded the "train" for technology in education, but without an engineer to steer and a course charted directly to a destination, they will never leave the station. The answers needed to get the train on track are as elusive as the questions themselves.

> Likewise, encouragement of technology use in the classroom is not about technology, it is about learning content and how our students should function as literate citizens in a technological society.   An overwhelming number of stakeholders reported in this study gave voice to the glories of technology in education … but the voices faded in the air and that is where it ended. Some of the voices were angry, some frustrated, some passionately optimistic, some realistic, and some confused by the question, but they all wanted and needed to be heard. Given the many barriers that exist to reaching the level of technology expertise that teachers need, the type of pedagogy that needs to be in place for effective technology integration into the curriculum, and the attitudes from all stakeholders that overshadow any changes to the status quo, the possibility of technology being accepted as a viable tool for teaching and learning seems unfeasible.

The vision of technology use at this school and at many other schools involves making some judgment calls. The arguments for and against the use of technology in education contain two primary dimensions, each with its own pitfalls and promises:

1. Is there enough *learning* value in the use of technology in education to justify the enormous efforts, monies, and educational reforms that it would take to make technology integration a reality in *all* U. S. classrooms?
2. Are schools responsible for preparing technologically literate students who can function successfully and competitively in an increasingly technology-based society?

This researcher contends that if the answer to either of these queries is "yes," then the question of *if* we have to change the status quo is a moot point. Only those who really believe in the values of technology in education, and are willing to support those beliefs with *changes* in practices and attitudes, will affect success in this arena. Technology does not represent the type of fleeting movement or pendulum swing that we are accustomed to in education. Technology is not waiting until schools are ready.   If this study had been built around a hypothesis, it might have been "Teachers are the stumbling blocks in integrating technology in education." This study soundly disproved that hypothesis … the problems are much more comprehensive, more complicated, and more entrenched in societal and historical issues than can simply be accredited to teachers (Cuban, 2001).

Based on this research, valuing technology is not enough, assigning blame is not enough, and random attempts on the part of all stakeholders are not enough to reach the goal or "get the train on the track." With a school full of computers, software, teachers who say they believe in the value of technology, administrators who say they value the use of technology, and parents who profess to want their children to receive the best in technology training, it is very much like sitting on that parked train … all dressed up and no place to go.

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