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District Email Use:

Investigating Factors that Determine Teacher Technology Use

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ABSTRACT

Many studies have been done on what factors enter in to a teacher's predisposition to, or eventual use of technology for teaching and learning. Other elements such as the type of projects attempted, support and leadership (site and district), and availability of hard- and software have been investigated, as well. The purpose of this action research project was to investigate if teachers' professional email use relates in some way to more complex use of technology in the classroom. The research was conducted in a K-8 school district with 15 elementary and 4 junior high schools. District email logs from last school year and this year, EdTech Profiles over the last three school years, teacher surveys collected from all nineteen schools, and individual teacher interviews provided the data. Results showed that professional email use has increased significantly over the last three years. Professional use of the Internet and productivity has also increased. Student use of technology in the classroom made slight advances. There did not, however, appear to be a connection between email use and these other practices. Results did, though, point to the need for increased, and more focused staff development in the use of technology for teaching and learning, more consistently available technical support, as well as continuous and purposeful increase in the purchase and availability of both hard- and software for teacher and student use.

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INTRODUCTION

General Problem Statement

In less than thirty years, school staffs have gone from never having set eyes on a "microcomputer" to puzzling out how to fund and outfit their sites with the most up-to-date technologies. Indeed, Friedman (2006) notes that the "flattening of the world" and the resultant global economy makes even more urgent our charge to prepare future citizens to situate themselves both cooperatively and competitively within the context of the radically different reality from that in which most of us grew up. Laptops have replaced inkwells as classroom necessities. Or have they? Although the corporate world has embraced the digital age, and allowed it to shape its productivity and information gathering in rather spectacular ways, the educational world has been less speedy in doing so. Why the decidedly slow growth of computer-use and other technological hardware inside most classrooms? Scholars have focused on a wide range of possibilities from leadership to training to infrastructure.

Foreshadowed Problems

I am neither an administrator nor a technician. I do not control the purse strings of my district or have the technical knowledge to adequately investigate infrastructure issues. I am, however, a teacher. And I am one whose current, specially assigned responsibility it is to provide support to every classroom teacher in the area of monitoring and assessing the academic progress of our district's 13,000 students. I am positioned uniquely to observe and interact with more than 600 K-8 educators, and it is this that has helped to shape the questions I asked before beginning this project and throughout it. The research that I investigated most thoroughly, then, focused specifically on teacher characteristics as they predict or affect technology use with students. In other words, it was a look at answers to the question, *do educators who choose to use technology in their classrooms for teaching and learning—and do so effectively—have certain personal attributes in common? And if so, what are those attributes?* As school districts

and sites seek to determine the smartest use of limited funds, it is incumbent on administrators and/or leadership teams to be purposeful and goal-oriented about their expenditures with regard to technology. Wishful thinking will not turn schools into efficient and innovative technological centers of powerful learning. Could what I glean from observing and questioning my own peers guide my own work with them, and possibly be helpful to decision-makers in our district with regard to future technology planning and spending?

The literature shows that there are specific deterrents or encouragements that hinder or help educators to become users and teachers of technology. Teacher background--age, gender, curricular area taught, length of time in the profession, educational background and technology experience—has been studied at length. Although important, it is notable that only the last of these factors could be directly impacted by intervention. The beliefs that teachers hold about their work (philosophy, perception of the teacher's role, and perception of the student's role) are elements that could be responsive to professional development. Additionally researched have been components of a teacher's disposition (for example, willingness to seek support, open-mindedness/tendency toward risk-taking, and work ethic), which, although perhaps not so much influenced by formal training, as fostered in an environment of trust and professional expectation, are also potentially responsive to outside influences. The understanding of how teacher background, teacher beliefs and pedagogy, and teacher disposition impact effective computer use in classrooms could help to provide a direction in which to focus professional energies for those who wish to lead effective schools that can serve all learners.

Significance of Proposed Study

Having recently moved from a classroom teaching position to a special assignment at the district where I provide assessment support, materials and information for all teachers, I have had the need to expand my communication from a site level to a district-wide scope. Email seemed the most efficient and reasonable way to contact 650+ teachers, but I began wondering last year,

whether all the teachers were actually reading their email. From there, I speculated whether those who did, also happened to be more inclined to use their computers for other professional purposes as well. If it were so, then getting more teachers to read their email might increase the number of instructional technology-using educators in our district! Intrigued, I sought out literature that might substantiate such an idea. I could find no research discussing the connection between email use and use or proficiency with other technologies. My original purpose, then, was to determine whether--or how--the use of professional email related to teachers' use of other instructional technologies.

This study took place over a 6-week period in a K-8 school district consisting of fifteen elementary schools and four junior highs. The district serves just under 13,000 students; over 50% of whom are English learners, and 79% are eligible for Free and Reduced Lunch. There are approximately 650 full-time classroom and support teachers, as well as another 75 part-time teacher tutors. From school years spanning 1996 through 2006, creatively sought-and-won grant monies funded the valiant efforts of a technology TOSA (Teacher on Special Assignment) to train interested teachers and heighten awareness of technology needs in our schools. The district has received either formula or competitive funding since 2003 for many of its schools through California's Enhancing Education Through Technology Grant program. There remains, however, a wide disparity among classrooms and teachers with regard to the use of technology for teaching and learning. At present, the bulk of technology expense falls upon the sites, which have the responsibility and control over the funding sources that could reliably be used for such needs. This, however, means that diverse leadership priorities (and subsequent goals) determine how much actually is used for technology. A great variation exists from school to school, as a result.

LITERATURE REVIEW

Research was reviewed that addressed teaching and technology use in elementary through university classrooms. Other studies have investigated factors that were not directly related to the teacher, such as the type and scope of technology projects attempted, environmental issues such as site and district support and leadership, as well as availability of technology. However, what is covered in this review will only address those issues that could directly be related to the Teacher/Practitioner. After all, in the words of Zhao, Pugh, Sheldon, and Byers (2002): "Factors associated with the innovator, *the teacher* (italics mine), in our study, appeared to play a more significant role than the other domains. That is, when the teacher was strong, the projects seemed to have a better chance to succeed…" (p. 507) Specific study on any relationship between professional electronic mail use and powerful teaching with technology was not to be found, however.

For the purposes of this review, *Teacher Background* consists of characteristics such as curricular area taught, teacher age, years of teaching, teacher training and technological experience (Reichstetter, 2000; McDermott & Murray; 2000; Becker, 1994, 2000; Pierson, 2000, 2001). These attributes have all been looked at as possible predictors of the likelihood of a teacher also being a technology user. Such specifics as historically established perceptions of classroom function (Cuban, 2001; Dwyer, 1991), and pedagogical practices (Becker, 2000), could best be categorized as *Teaching Beliefs*. Traits such as teacher work ethic, openness to change (Vannata & Fordham, 2004; Marcinkiewitz, 1994), and willingness and ability to seek (as well as to find) assistance (Zhao, et al., 2002) could be put under the umbrella of *Teacher Disposition*. All three of these factors-- background, beliefs, and disposition--describe the individual teacher, or practitioner.

Teacher Background

Teaching Experience

Does how long a teacher has been in the classroom predict whether he or she will use computers in a powerful way? In a national survey study of 517 third grade through high school teachers, Becker (1994) found that exemplary technology users had been teaching their subject areas about three years longer than their less computer-active colleagues. In addition, most members of the former group were found to have been using computers in their instruction for about a year longer than those teachers in the latter group. An interesting exception at the time of the 1989 survey was that English teachers who used technology in their instruction were more likely to be the most newly-arrived to their subject area, and to have gained their technological know-how through self-instruction (as opposed to professional training). It was conjectured that this might have been due to the fact that computer use in English classrooms began more recently than in other curricular areas, and that training support for such use had been slower in coming.

Pierson looked qualitatively at frequency and quality of technology use as it related to pedagogical expertise (as in Becker's "exemplary teaching"). The most active and effective users of technology, were those teachers who had both expertise in technology as well as teaching skills and content knowledge. In other words, effective technology integration is not just turning on a computer in a classroom, but using it purposefully and skillfully. (2000, 2001)

Technological Experience

Related too, to teaching experience, is learning experience: teachers who use technology have had a greater degree of technological training. In a study of middle school teachers, Reichstetter (2000) found that the most frequent overall users of computers in their classrooms were both the youngest and most recently entering (and, therefore, trained) members of the teaching staff. (The second highest users were the oldest teachers, but not the ones who had

been in the classroom the longest). This would seem to support Becker's idea that there is a positive relationship between training opportunities and heightened computer use, although whether the use of technology or the teaching itself in the Reichstetter classrooms was "exemplary" was not addressed. Indeed, Vannatta and Fordham's look at 177 Ohio teachers (mostly elementary) noted that the number of hours of technology training was one of the three most accurate predictors of classroom technology use. McDermott and Murray (2000) found insufficient preservice and inservice training opportunities prevented elementary teachers from feeling comfortable with, and effectively integrating technology into their classroom practices. Hardy noted that, although preservice teachers had been instructed in technology fundamentals, and were comfortable using such skills, very few of them had been prepared to *teach with technology* (2003). It would stand to reason that the quality of training is crucial to the end result.

Zhao, et al. (2002) found that knowledge of a particular type of technology or application—although essential to its effective use—was not the only knowledge necessary. What was termed knowledge of "enabling conditions for a technology" (p. 489) referred to the understanding of the wider range of environmental requirements necessary for successful learning through technology to take place. This referred both to the user's awareness of technological infrastructures and the social or staffing supports needed. Without this awareness and ability, even the most enthusiastic of technology teachers will be at the mercy of an intranet that doesn't support a certain application, peripherals that don't adapt to the classroom computer, or a coworker who won't follow through on a collaborative technology commitment. In the case study by Wilson , Hamilton, Teslow, and Cyr, (1993) of then, brand-new Peakview Elementary School, the onsite availability of training as well as support by a technology resource person was seen as key to the growth of both teachers and students in their comfort levels and technology use (pp. 106,107).

Educational background

Riel and Becker (2000), in a nationwide study of 4000 teachers, found that those teachers who "came from more selective schools, maintained higher grade point averages, and were more likely to have graduate degrees than the rest of the teachers in the sample" (p. 15) were the teachers who were also the most likely to be responsible for exemplary technology use in their classrooms. These teachers were also more likely to have pursued educational credits of all types beyond their degrees, as well as having participated in twice the professional development opportunities as their less capable colleagues. Whether this additional education resulted in more effective teaching, or is just indicative of the fact that these teachers were more interested in acquiring occupationally relevant knowledge, the fact remains that exemplary technology users/teachers are more highly educated.

Teacher Philosophy and Pedagogy (Beliefs)

In 2001, Cuban looked at the use of computers in two "high tech" high schools in an attempt to determine why there were such discrepancies between the relatively high availability of technology in classrooms and its effective use. What the findings seemed to indicate was that teachers (and school systems) who had entrenched ideas of what education looked like—and accordingly, what a teacher's role was—would not have their practices noticeably changed by the presence of something even so powerful as today's technology. "Teachers would adapt innovations to the contours of the self-contained classroom. New technologies will, paradoxically, sustain old practices" (p. 8).

Many researchers have found that activities in classrooms where technology is used in an integrated and powerful way are student-centered, rather than more traditionally teacher-centered. (Reichstetter, 2000; Pierson, 2000). Computers are used to enhance curricular coverage and actually play a part in determining how a class is physically and temporally

organized. They are a means through which student learning is facilitated, as opposed to being direct transmitters of knowledge (Dwyer, et al., 1991; Becker, 2000).

Becker (1994) found that exemplary teachers facilitated the student use of computers to do significant tasks rather than drills or skills mastery; in other words, they were found in classrooms or schools where the computers were being used for "consequential work" as opposed to "busy work". Examples were given of yearbook production, actual writing (rather than just practicing word processing), and other occupational preparation (p. 6).

Educators who had a constructivist approach to creating the learning environment in their classrooms seemed more able to embrace the innate opportunities that computers gave both them and their students to ask questions, investigate openly, solve problems and construct meanings.

How a teacher sees him/herself with regard to the greater educational community also is a strong predictor of whether he/she will be an exemplary user of technology. Riel and Becker (2000) found that those educators they termed "Teacher Leaders" had significantly more professional conversations and contacts with other teachers at their sites than those they termed "Private Practice" teachers. Teacher Leaders had more professional contact with educators from other schools and were involved in significantly more formal and informal professional mentoring opportunities. These teachers with high levels of collaborative professional engagement were up to five times as likely to assign weekly computer work to their students as Private Practice teachers were (p. 23).

Teacher Disposition

Perhaps the most intriguing aspects of educators as effective technology users are to be found in the study of "teacher disposition". Practitioners who are both apt to use computers in their teaching, and are expert in doing so, seem to have some very specific characteristics in common.

Willingness and/or Ability to Seek Support

"…[B]oth teachers felt comfortable asking questions of each other, no matter how simplistic they may seem." (McDermott & Murray, 2000, p. 46). "…[The] best tool for combating the learning curve is peer support from faculty colleagues." (Hughes, 2002, p. 8). From the primary elementary school classrooms of McDermott and Murray, to Hughes' university halls, faculty members who want to embrace technology have found that one of the most powerful ways to learn it is from their peers. Teachers need formal training, and access to working technology, yes; but the presence of non-threatening collegial assistance and "cheerleading" (Hughes) also was crucial to overcoming the initial challenges of learning a battery of new skills.

Zhao, et al. (2002) noted that effective technology users were "socially savvy" about getting assistance for themselves and knew how best to move forward with their technology learning or projects. Thus, they made sure they knew the assistance infrastructure and were forthcoming about seeking aid through these avenues. They also had knowledge of their staff/district cultures and used this awareness of those peers who would support (or might hinder) their efforts accordingly.

Work Ethic

Hughes' acknowledgement of the "steep learning curve" (2002) initially involved with establishing technology as a meaningful and useful part of one's teaching means that a fair amount of time and effort is necessary to master it. In Marcinkiewicz's 1994 study of 170 teachers in four elementary schools, he found that simply having computers in classrooms did not assure their use. The computers that did get used were done so by teachers who had expended their own time and effort on learning how. Becker (1994) noted that expert computer-using teachers not only used them more at school than their non-expert peers, but also at home. Vannata and Fordham found that time a teacher's working beyond his or her contractual work

week was one of the three greatest predictors of overall classroom computer use among 177 surveyed K-12 teachers from Ohio (2004).

Open-mindedness/Willingness to Take Risks

> Because technology is a dynamic innovation, learning to use it as a personal or instructional tool requires a willingness to make mistakes and learn from them and an ability to take risks—this study's definition of the variable, openness to change. As a result, a teacher who approaches technology professional development with an attitude that is open to change and is committed to spending time outside of training to further explore technology may be more likely to use technology in the classroom than one who attends training with ambivalence and a lack of time. (Vannata & Fordham, 2004, p. 261)

In the aforementioned study, the number one predictor for meaningful classroom technology use was a teacher's openmindedness. McDermott and Murray (2000) noted that such a mindset predisposes an educator to being open to what research says about allowing students to construct their own meanings via self-choice, exploratory freedom, and independent problem-solving opportunities. (p.46)

In a study of 78 preservice and practicing teachers enrolled in university science and special education classes, Iding (2002) investigated aspects of teacher openness to, and comfort level in using software, the Internet, and computers in general. One finding, for example was that teachers beliefs regarding internet safety, as well as its accuracy for purposes of research, impact whether they will embrace its use for instructional purposes.

Marcinkiewicz (1994) used the term "innovativeness" to describe a crucial influence on those who chose to practice and and learn how to improve their instruction via technology. Again, teachers who are intrinsically motivated to take risks in order to learn something new are the ones most likely to be effective computer-using teachers.

Conclusion

Research findings suggest, then, that a classroom where technology is being used in a powerful way likely has a teacher at its helm with some specific and definable characteristics. The effective technology-using teacher is more highly trained to use computers and is more highly educated generally. S/he has a greater awareness and knowledge of the environmental conditions needed to sustain such learning. The effective technology-using teacher most often holds constructivist views and helps students to use computers as powerful tools to further learning in curricular areas, rather than as an end to themselves. And, finally, the effective technology-using teacher is proactive about seeking and finding assistance, has a well-developed work ethic, and is willing to take risks.

Equitable access for all students to potentially one of the most powerful teaching and learning tools in the profession cannot happen until the obstructions to that access are identified and then tackled. Teachers can be conduits for, or barriers to, incredible possibilities for students.

> Our society does not simply need teachers who know how to use computers. We need exemplary teachers who know how to effectively use all the tools at their disposal for the learning benefit of students. True integration can only be understood as the intersection of multiple types of teacher knowledge and, therefore, is likely as rare as expertise. Educational leaders would be well served to look beyond mere technology purchases and focus efforts instead on creating environments that are conducive to continued growth in pedagogy as well as in technology use. (Pierson, 2001, p. 10)

The three areas, then, of background/training, pedagogy/philosophy, and disposition, are ones that bear further scrutiny and reflection. Additional study of these areas could build upon Hughes' work (2002) to determine, for example, whether there is a specific format or vehicle for

professional development and training that garners better results than others. It could work to ascertain whether the constructivist ideology which Becker (1994, 2000) and Zhao, et al. (2002) noted in their research gives birth to effective technology use, or whether it is the use of powerful technology that encourages the development of a constructivist stance and practice. Perhaps the most difficult factor to influence is that of teacher disposition. Further study in the areas that Vannata and Fordham (2004) and McDermott and Murray (2000) investigated must be done to determine whether mentoring or other environmental influences can impact the personal mindset of an educator. Policy makers, stakeholders, and leaders whose domains lie anywhere within preservice training, staff development, mentoring, or hiring would do well to ask themselves whether they are doing their parts to staff our diverse classrooms with teachers who have the preparation, teaching beliefs, and personal mindsets to do the job of bringing our varied learners into the 21st century prepared to be the problem solvers and innovative thinkers for which this world has such a crucial need. It is with this background in mind that I embarked on my own action research journey.

METHODOLOGY

Data Collection, Procedures and Materials

Email usage data was obtained from three separate and unrelated sources. This provided triangulation of results. From the 351 respondents, I also contacted 10 teachers as potential interview subjects. From those respondents who elected to include their names on their surveys, I attempted to choose teachers who indicated a variety of comfort levels with technology, from seven different school sites, across all grade levels. Eight of the ten were able to participate within the necessary time frame.

Data and Results

The first source was my own email logs. I was able to track 3 pieces of electronic mail that I had sent to all teachers. Because last year was the first year I came to this position, I did not have access to such data prior to 2006, and was unable to obtain similar data for earlier years. These mailings were sent early in the prior school year, late in the prior school year, and early in this school year. I noted what percentage of mail had been opened within one school day, within a school week, and within a school month. Any that had been opened after a month's time had elapsed or not opened at all were put in a final category.

Email Access Rate Over Time Based on District Use Logs

	Opened within 1 Day	Opened within 1 Week	Opened within 1 Month	Opened after 1 month or not opened
Sent 10/2006	38%	14%	11%	37%
Sent 4/2007	62%	12%	5%	21%
Sent 8/2007	76%	7%	5%	12%

The second source were comparative EdTech Profile reports from 2005, 2006, and 2007. This effort by the California Department of Education tracks the technology use of every teacher, every school and every district in the state, and makes the results available to district

administrators. I was able to gain access to such reports from our district's current technology TOSA (Teacher on Special Assignment). The results are based on the electronic surveys that each teacher is required to take on a yearly basis. Notably, they show a slightly higher rate of frequency of the use of email for professional purposes than my log findings indicated. Possibly this is because it relied on teachers' recollections of their own practices, rather than electronically gathered use data. In the comparison of all three instruments, the EdTechProfile results appear slightly lower than either of the other two, because the measurement increment differed, and I included only email opened within 1 and 4 days (as the next choice was within one week and one month).

Email Use Rate from 2005 through 2007 Based on EdTechProfile Survey Results

	Opened Daily	*Opened 2-4 Days per Week*	*Opened Between 1x a Week & Monthly*	*Less than Monthly*
July, 2005	*24%*	*29%*	*18%*	*12%*
July, 2006	*34%*	*17%*	*20%*	*10%*
July, 2007	*53%*	*17%*	*12%*	*7%*

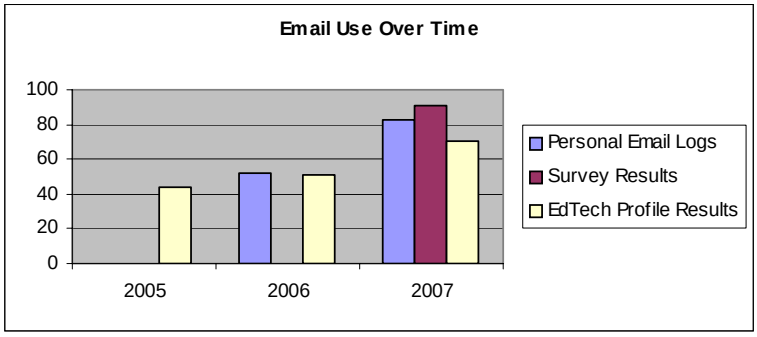
The third source was another survey. This was a Likert Scale paper/pencil survey that I hand-delivered to each of the 19 school sites. In each teacher mailbox, I placed a note of explanation; an assurance of confidentiality (and anonymity, should they have desired it) and request that they complete it; the 30-item survey itself (see Appendix A); and a small chocolate "treat" as incentive to do so. I passed out surveys to 660 very busy and beleaguered teachers, and received back 352; a greater than 53% rate of return, for which I was grateful (and—frankly—surprised). In order to include the greatest range of technology users possible, I deliberately chose to use a paper/pencil survey, as opposed one that teachers could access online, or take with a scantron. I reasoned that a teacher with less comfort or experience with technology might be more apt to finish one on paper, than one that required him/her to access it online. Each of the surveys had usable data, although some individual responses were

invalidated because respondents did not clearly choose one answer over the others in the forced choice survey, or did not make a choice at all. The results showed a high degree of daily email use for professional purposes.

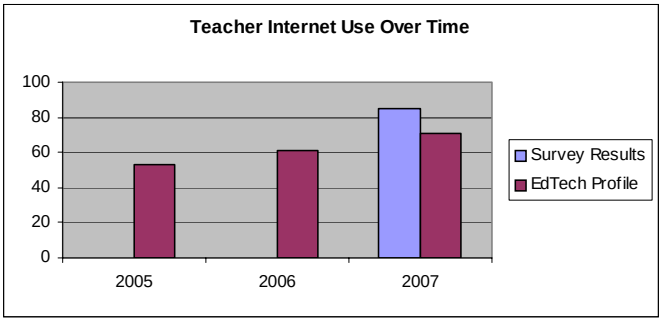
Email Use Rates for Current Year Based on District-wide Survey

Opened Once per Day	Opened Once per Week	Opened Once per Month	Opened Rarely or Never
72%	19%	3%	6%

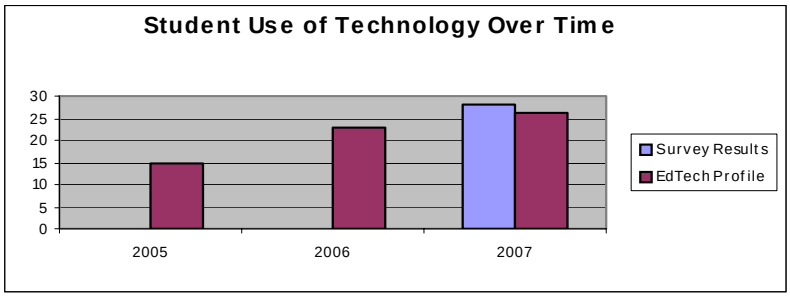
Again, these show a higher rate than those I determined through my actual logs of opened email, but they do show a similar picture of regular, daily email use by district teachers. Below are the results of the three instruments in one table.

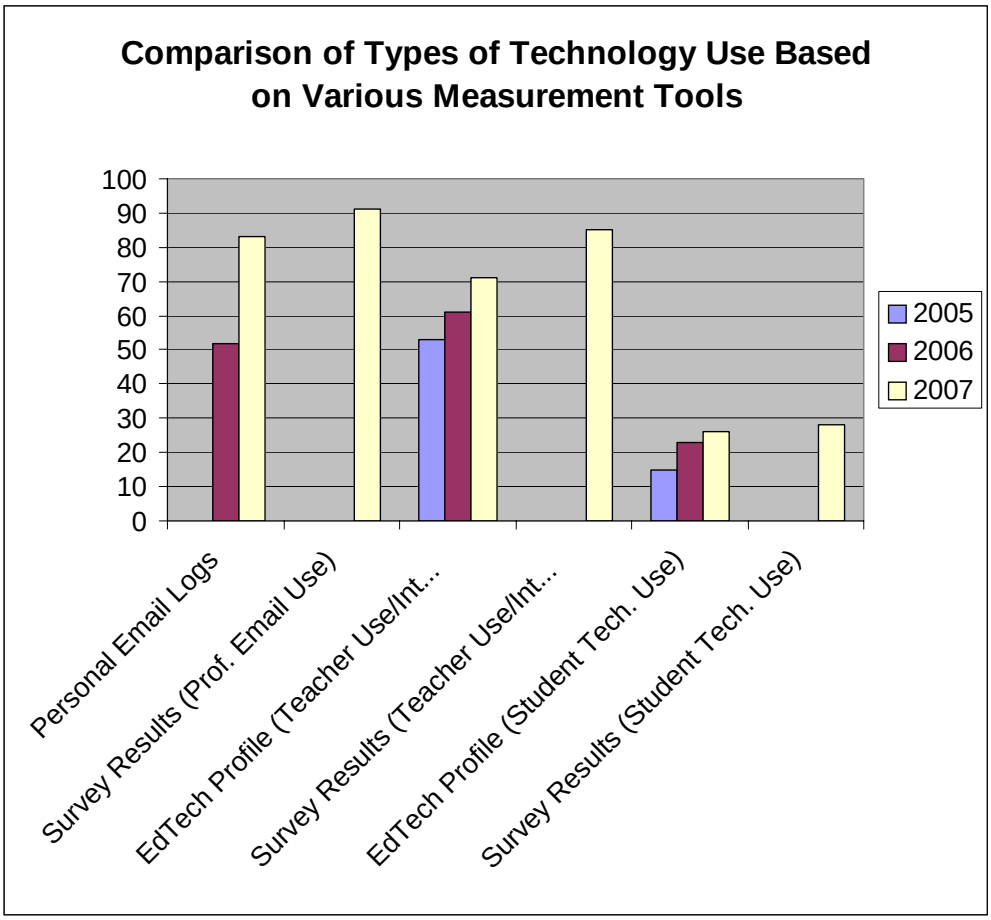


Email use has definitely increased over time. The EdTechProfile and my district survey also painted a picture of increasing teacher use of the Internet for professional purposes.



On a much smaller scale, student use of technology to create products or solve problems has been on the increase, as well.

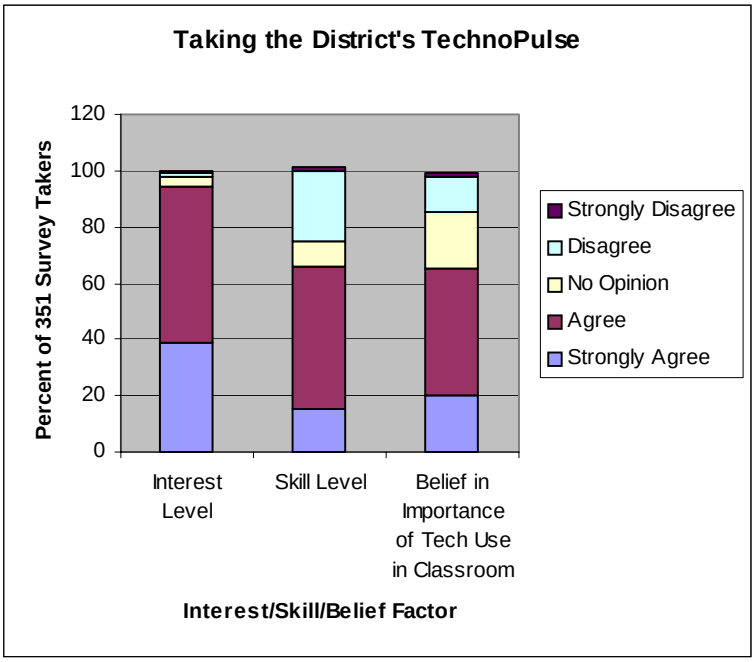




Data Analysis

Although overall statistics show that all use is increasing, a look at individual surveys does not show any direct relationship between email and the other technology use. Indeed, some teachers who report in my district survey not opening their email at all, also report regular professional use of productivity tools and the Internet. Others, who claim to open their email daily--or even several times a day--note no regular use of other types of applications for teaching and learning.

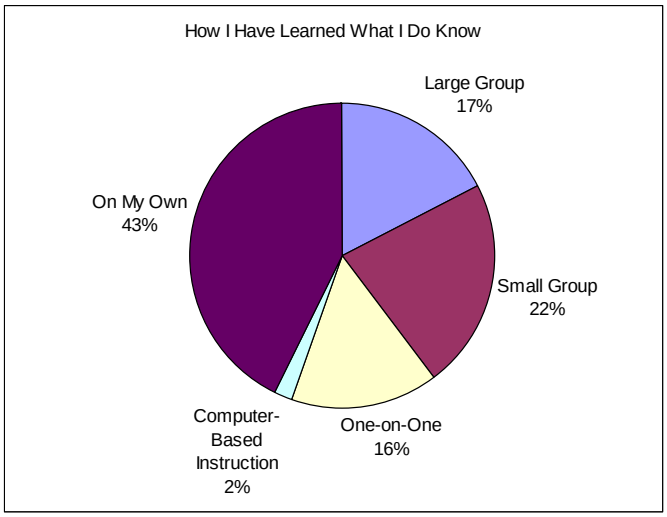
The most important learning in this project was not in finding that email use does not appear to have a direct relationship to other technology use. It was in seeing the ongoing and sizable gap between teacher use of technology and student use. It was in hearing from teachers of all grade levels, and of all ages and degrees of classroom experience, that--by and large--they admit to a high degree of interest in the subject of teaching and learning with technology. And most agree that technology for teaching and learning is crucial at all grade levels. That said, less of them believe strongly in their own abilities to move forward in this regard

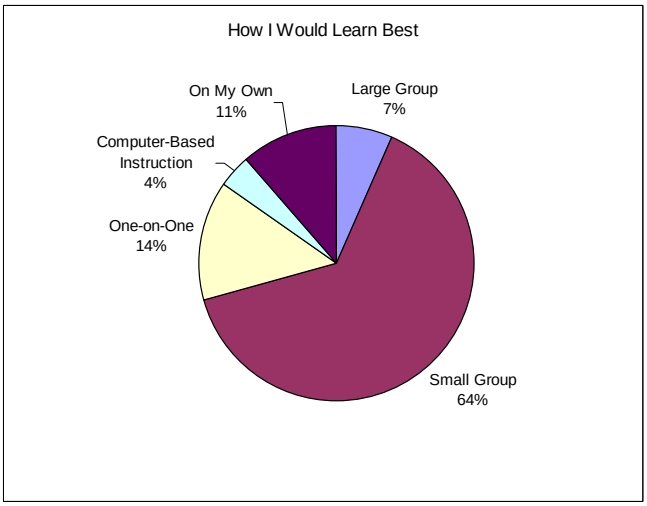


Additionally, the belief that they will be fully supported by knowledgeable and available help at their sites, or at a district level, should perhaps be able to be more strongly held than it is

currently. Fewer than 30% of teachers (with already extraordinarily full plates of requirements and responsibilities) have the highest degree of confidence in their ability to have application questions answered or hardware repaired. It would follow that there is a diminished chance in the other 70% of taking the risks that Vannata & Fordham note are crucial to becoming powerful instructional technology users (2004), or using valuable time that Becker (2004) regards as imperative to successful classroom technology use.

Also, information about teacher preference with regard to staff development brings to light a discrepancy between how they have learned what they currently know about technology, and how they see themselves as most successfully learning in the future.





Finally, the eight interviews that I conducted with teachers put faces to the numbers and added a sense of urgency to all the findings. I was privileged to speak with teachers of Kindergarten to eighth grade. They ranged in time spent in the classroom from eight to thirty-one years; and in levels of experience from a relative neophyte to one with an M.A. in instructional technology. Each of the eight conveyed a commitment to their work and students. And fully eight out of eight stressed the importance of *training or staff development, equipment that works consistently*, and *instructional as well as technical support* to ensure both student and teacher learning. And all of them, plus many other teachers with whom I have had informal

conversations, or who commented at the end of their surveys, maintain that they cannot move forward without sufficient and working technology that is regularly accessible to all students.

In addition, "…teachers would have to change their teaching strategies to match the needs of the students…" noted V. A third grade teacher who bemoaned her own current insecurity with the use of technology to teach her students, she acknowledged the need for the pedagogical shift that Reichstetter (2000) and Pierson (2000) both note are crucial to powerful technology use. M., who used to teach English learners from 1st through 6th grades, but moved to a fourth grade classroom at a less well-equipped site, mourned her current lack of access to technology. Technology, she noted, helped her then-students by offering "…yet another layer in the language acquisition process. They could hear, see, and write about all types of topics…" A., a fifth grade teacher uses his LCD projector, document camera, and laptop multiple times each day: "It impacts them daily," he said with conviction. J., a junior high art teacher echoes Marcinkiewicz (1994) when she maintains a predisposition to success and doing the work to make it so is important. "[Teachers] need to be on board, understand how [technology] works, see how it can make life easier for them, and want the changes in order for it to work for the school," she says.

IMPLICATIONS FOR TEACHING AND RESEARCH

Limitations of the Study

In compiling and studying the results of the district surveys, I realized that the instrument itself could have been more concise and yet have covered more topics. In the end, it was not particularly helpful to ask teachers how long they had been following certain practices, or which computers they used most. What I found out--after the fact—that I was really more interested in, was why they themselves believed their email habits had increased, and why their students continued to make relatively little use of technology.

I can only conjecture that the email use was related to some site administrators using more electronic means of communication—which forced the issue for teachers. In addition, the beginning of this year heralded a district first. Up until this year, all technology expenditures have been site responsibilities. A state windfall brought about a district administrative decision to provide laptops to all classroom teachers, with the expectation that they would eventually be using them for electronic record-keeping such as attendance, grades and report cards. This certainly must have had an impact on email-checking, but my survey did not ask.

I can equally only guess as to the reasons for small numbers of students who are regularly and often making use of technology for teaching and learning. I believe it to be the lack of sufficient computers and peripherals, and an infrastructure that cannot support such equipment effectively at every school site. This idea is supported by much of the extra teacher commentary on the surveys, the entirety of which is included in Appendix D. I also think that teacher awareness of technology's potential is still not where it must be for a "grassroots movement" to engender change at a district level. Those sites that have had past E.E.T.T. involvement, typically have teachers who use technology more consistently and in more powerful ways; presumably because they have greater access to equipment and have had more training. These

teachers impact their colleagues by example, and, as a result, more site funds are encumbered on behalf of technology spending. This, however, was not captured in my survey.

Conclusions

What *was* communicated strongly was teacher acknowledgement of the importance of using technology to support content learning across grade levels. What also came out was that not enough students are using technology in constructivist ways, and we need to be more active as a district in finding out exactly why this is. I suspect that it is specifically tied to a lack of sufficient equipment and software, and insufficient, inconvenient, or irrelevant professional development. Too, we now know that a great many more teachers check their email within a week's time of it being sent than ever before, which opens up greater possibilities for effective communication across the district, and within the community, and possibly, eventually with our students' families.

Implications for Future Work

I hope that these findings will be of interest to our technology TOSA (Teacher on Special Assignment) and Information Systems Administrator. Plans for how to "beef up" our staff development, and what could be the best vehicle(s) for these offerings might be further informed. Decisions about future hardware, infrastructure and staffing expenditures might be able to use it as a jumping-off place for discussion and consideration. The fact that over half of our district's busy teachers—across all grade levels—took it upon themselves to fill out and return their surveys lends a greater sense of urgency to the practices, beliefs and attitudes they disclose. Historically, this is not an effort that so many would make voluntarily, with no more compensation than a mini Snickers bar!

Further Research

The survey results pointed to the need for additional work to be done investigating both teacher needs and practices. For example, more respondents indicated that they learned best in a small group. Would such learning most optimally take place at individual school sites, or at the district level? And how best to combat a critical substitute shortage, which has severely impacted many staff development efforts in every curricular area? A very small percentage of teachers feel comfortable using online learning as a vehicle for professional development. Although distance learning would seem a good answer to the substitute shortage, would the general teacher populace avail itself of such learning?

Although it has always been the policy and practice for sites to control the spending with regard to technology, teachers are definitely of the opinion that the district should be providing more in the way of hardware, software and training. This is problematic, as, at present, the needed monies are not available for such spending. How best should this be communicated to teachers, or should the practice be changed; thus taking the choice out of the hands of site leadership?

Is there a way to capitalize on the increasing use of email district-wide? Could professional electronic communication (email; but also message boards and blogs) be used for collaboration across site (and even district) boundaries? If our teachers begin to realize the power of technology to "melt (both physical and chronological) walls", would they be more likely to use such means with their students?

It seems necessary that a broader pedagogical shift will need to happen for real change to occur. Investigating which of the district's teachers have a more constructivist bent, and whether they use instructional technology more often, would allow us more insight as to how best to encourage such practice. A related question would be whether belief in this student-centered approach must come first, or whether having adequate access to technology could engender it.

Further research of specific school sites and their attitudes and practices with regard to technology might help shape further decisions. For example, do sites where select teachers participated in the E.E.T.T. grant have a greater degree of awareness and more advanced technology practice among all teachers; even non-participants? How much does the attitude of the site administrator and/or leadership team impact practices?

More questions than answers have arisen as a result of this particular action research journey, and the professional conversation certainly has many options with regard to future focused topics or direction!

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APPENDIX A

District Survey

(enlarged & distributed on 8.5x14 double-sided sheet)

Name **(optional):** _____ Gender**: M F** Grade level (& subject, if applicable)**:** _____

Please circle the choice that **most closely fits** your answer. Do not mark a space between two choices, or mark more than one answer.

1) Age:

29 & younger	***30-39***	***40-49***	***50-59***	***60 & over***

2) Number of years as an educator:

0-5 years	***6-10 years***	***11-15 years***	***16-20 years***	***21 years or longer***

---

3) I consider myself interested in the use of technology for teaching and learning

strongly agree	***agree***	***no opinion***	***disagree***	***strongly disagree***

4) I consider myself skilled in the use of technology for teaching and learning

strongly agree	***agree***	***no opinion***	***disagree***	***strongly disagree***

5) Powerful technology use at my grade level strongly and uniquely impacts student learning

strongly agree	***agree***	***no opinion***	***disagree***	***strongly disagree***

---

6) I use email for professional purposes (collegial and parent communication, other professional correspondence), or to check my email box

once per day	***once per week***	***once per month***	***rarely or never***	***no access***

7) **This has been my practice**

since the beginning of this school year	***since the 2006-2007 school year***	***since the 2005-2006 school year***	***at least since the 2004-2005 school year***	***not my practice***

---

8) **I use the internet for my own professional purposes**

once per day	***once per week***	***once per month***	***rarely or never***	***no access***

9) **This has been my practice**

since the beginning of this school year	***since the 2006-2007 school year***	***since the 2005-2006 school year***	***at least since the 2004-2005 school year***	***not my practice***

---

10) I use the internet for informational or demonstration purposes for my students

once per day	***once per week***	***once per month***	***rarely or never***	***no access***

11) This has been my practice

since the beginning of this school year	***since the 2006-2007 school year***	***since the 2005-2006 school year***	***at least since the 2004-2005 school year***	***not my practice***

---

12) **My students use the Internet for research**

once per day	***once per week***	***once per month***	***rarely or never***	***no access***

13) **This has been my practice**

since the beginning of this school year	***since the 2006-2007 school year***	***since the 2005-2006 school year***	***at least since the 2004-2005 school year***	***not my practice***

---

14) **I use productivity or instructional applications (for example, Microsoft Word, Excel, Powerpoint, commercial software, publishers' software) for my own professional purposes**

once per day	***once per week***	***once per month***	***rarely or never***	***no access***

15) **This has been my practice**

since the beginning of this school year	***since the 2006-2007 school year***	***since the 2005-2006 school year***	***at least since the 2004-2005 school year***	***not my practice***

---

16) **My students use productivity and instructional applications to create their own products**

once per day	***once per week***	***once per month***	***rarely or never***	***no access***

17) **This has been my practice**

since the beginning of this school year	***since the 2006-2007 school year***	***since the 2005-2006 school year***	***at least since the 2004-2005 school year***	***not my practice***

---

18) **The computer I most often use for professional purposes is:**

the laptop I received this year	***another laptop***	***classroom desktop computer***	***school or lab desktop computer***	***rarely or never use computer at school***

19) **This has been my practice**

since the beginning of this school year	***since the 2006-2007 school year***	***since the 2005-2006 school year***	***at least since the 2004-2005 school year***	***not my practice***

---

20) **The computer I most often use for demonstration purposes with my students is:**

the laptop I received this year	***another laptop***	***classroom desktop computer***	***school or lab desktop computer***	***rarely or never use computer at school***

21) **This has been my practice**

since the beginning of this school year	***since the 2006-2007 school year***	***since the 2005-2006 school year***	***at least since the 2004-2005 school year***	***not my practice***

---

22) **The computer(s) my students most often use**

stationary classroom lab, or classroom desktop computer	***mobile computer lab***	***school lab desktop computers***	***library desktop computers***	***rarely or never use computers at school***

23) **This has been my practice**

since the beginning of this school year	***since the 2006-2007 school year***	***since the 2005-2006 school year***	***at least since the 2004-2005 school year***	***not my practice***

---

24) **At my site, the most recent significant expenditures (of which I am aware) in the area of technology happened**

This current school year	***2006-2007***	***2005-2006***	***2004-2005***	***Not aware of any site expenditures***

25) ***There is someone at my site I can approach with technology questions***

yes	***sometimes***	***no***	***I <u>am</u> that person***	***I don't know whom I can approach***

26) **I am satisfied with the site level and availability of expertise**

always	***mostly***	***sometimes***	***rarely***	***not at all***

---

27) **I know how to seek help with technology (both hardware & application) questions at a district level**

always	***mostly***	***sometimes***	***rarely***	***not at all***

28) **I am satisfied with the district level of availability and/or expertise**

always	***mostly***	***sometimes***	***rarely***	***not at all***

---

29) **I have learned most of what I know about technology**

in a large group setting (more than 10 people)	***in a small group setting (9 people or less)***	***in a one-on-one setting***	***via computer-based instruction***	***on my own***

30) **The best way I could learn about using technology for teaching and learning would be**

in a large group setting (more than 10 people)	***in a small group setting (9 people or less)***	***in a one-on-one setting***	***via computer-based instruction***	***on my own***

Other comments:

APPENDIX B
District Survey District-wide Raw Data

Results of 361 surveys were tallied. Although I did compile "Length of time of practice", "computer most often used", and "site expenditure" results, I did not include them here, as I believe the questions themselves were faulty, or unclear and the data they generated were inconsistent Also, discrepancies in numbers are a result of respondents having made multiply choices, or indicated no choice at all. The only variation on this is in #29 and #30, where I did decide (after the fact) to note multiple choices in order to provide the widest range of possibilities for staff development decision-making.

1) Age:

29 & younger 42 (12%)	*30-39 103 (29%)*	*40-49 83 (24%)*	*50-59 94 (27%)*	*60 & over 13 (4%)*

2) Number of years as an educator:

0-5 years 67 (19)	*6-10 years 96 (27%)*	*11-15 years 77 (22%)*	*16-20 years 51 (15%)*	*21 years or longer 65 (19%))*

---

3) I consider myself interested in the use of technology for teaching and learning

strongly agree 138 (39%)	*Agree 194 (55%)*	*no opinion 13 (4%)*	*disagree 3 (1%)*	*strongly disagree 2 (1%)*

4) I consider myself skilled in the use of technology for teaching and learning

strongly agree 51 (15%)	*Agree 178 (51%)*	*no opinion 32 (9%)*	*Disagree 86 (25%)*	*strongly disagree 4 (1%)*

5) Powerful technology use at my grade level strongly and uniquely impacts student learning

strongly agree 70 (20%)	*Agree 158 (45%)*	*no opinion 69 (20%)*	*Disagree 45 (13%)*	*strongly disagree 2 (1%)*

---

6) I use email for professional purposes (collegial and parent communication, other professional correspondence), or to check my email box

once per day 252 (72%)	*once per week 65 (19%)*	*once per month 11 (3%)*	*rarely or never 21 (6%)*	*no access*

7) **This has been my practice** ***results not included***

since the beginning of this school year	*since the 2006-2007 school year*	*since the 2005-2006 school year*	*at least since the 2004-2005 school year*	*not my practice*

8) **I use the internet for my own professional purposes**

once per day 185 (53%)	*once per week 111 (32%)*	*once per month 31 (9%)*	*rarely or never 19 (5%)*	*no access 1 (.3 %)*

9) **This has been my practice** ***results not included***

since the beginning of this school year	*since the 2006-2007 school year*	*since the 2005-2006 school year*	*at least since the 2004-2005 school year*	*not my practice*

---

10) I use the internet for informational or demonstration purposes for my students

once per day 30 (9%)	*once per week 142 (40%)*	*once per month 60 (17%)*	*rarely or never 97 (17%)*	*no access 15 (4%)*

11) This has been my practice ***results not included***

since the beginning of this school year	*since the 2006-2007 school year*	*since the 2005-2006 school year*	*at least since the 2004-2005 school year*	*not my practice*

---

12) **My students use the Internet for research**

once per day 3 (1%)	*once per week 52 (15%)*	*once per month 58 (16%)*	*rarely or never 203 (58%)*	*no access 29 (8%)*

13) **This has been my practice** ***results not included***

since the beginning of this school year	*since the 2006-2007 school year*	*since the 2005-2006 school year*	*at least since the 2004-2005 school year*	*not my practice*

---

14) **I use productivity or instructional applications (for example, Microsoft Word, Excel, Powerpoint, commercial software, publishers' software) for my own professional purposes**

once per day 166 (47%)	*once per week 116 (33%)*	*once per month 33 (9%)*	*rarely or never 16 (5%)*	*no access 2 (1%)*

15) **This has been my practice** ***results not included***

since the beginning of this school year	*since the 2006-2007 school year*	*since the 2005-2006 school year*	*at least since the 2004-2005 school year*	*not my practice*

16) My students use productivity and instructional applications to create their own products

once per day 3 (1%)	*once per week 38 (11%)*	*once per month 63 (18%)*	*rarely or never 198 (56%)*	*no access 40 (11%)*

17) **This has been my practice** ***results not included***

since the beginning of this school year	*since the 2006-2007 school year*	*since the 2005-2006 school year*	*at least since the 2004-2005 school year*	*not my practice*

---

18) The computer I most often use for professional purposes is: ***results not included***

the laptop I received this year	*another laptop*	*classroom desktop computer*	*school or lab desktop computer*	*rarely or never use computer at school*

19) **This has been my practice** ***results not included***

since the beginning of this school year	*since the 2006-2007 school year*	*since the 2005-2006 school year*	*at least since the 2004-2005 school year*	*not my practice*

---

20) The computer I most often use for demonstration purposes with my students is: ***results not included***

the laptop I received this year	*another laptop*	*classroom desktop computer*	*school or lab desktop computer*	*rarely or never use computer at school*

21) **This has been my practice** ***results not included***

since the beginning of this school year	*since the 2006-2007 school year*	*since the 2005-2006 school year*	*at least since the 2004-2005 school year*	*not my practice*

---

22) The computer(s) my students most often use ***results not included***

stationary classroom lab, or classroom desktop computer	*mobile computer lab*	*school lab desktop computers*	*library desktop computers*	*rarely or never use computers at school*

23) **This has been my practice** ***results not included***

since the beginning of this school year	*since the 2006-2007 school year*	*since the 2005-2006 school year*	*at least since the 2004-2005 school year*	*not my practice*

---

24) At my site, the most recent significant expenditures (of which I am aware) in the area of technology happened ***results not included***

This current school year	*2006-2007*	*2005-2006*	*2004-2005*	*Not aware of any site expenditures*

25) ***There is someone at my site I can approach with technology questions***

Yes 247 (70%)	*Sometimes 74 (21%)*	*No 1 (.3%)*	*I am that person 10 (3%)*	*I don't know whom I can approach 9 (3%)*

26) I am satisfied with the site level and availability of expertise

Always 96 (27%)	*Mostly 159 (45%)*	*Sometimes 61 (17%)*	*Rarely 19 (5%)*	*not at all 1 (.3%)*

---

27) I know how to seek help with technology (both hardware & application) questions at a district level

Always 116 (33%)	*Mostly 142 (40%)*	*Sometimes 73 (21%)*	*Rarely 14 (4%)*	*not at all 1 (.3%)*

28) I am satisfied with the district level of availability and/or expertise

Always 74 (18%)	*Mostly 153 (44%)*	*Sometimes 84 (24%)*	*Rarely 18 (5%)*	*not at all 8 (2%)*

---

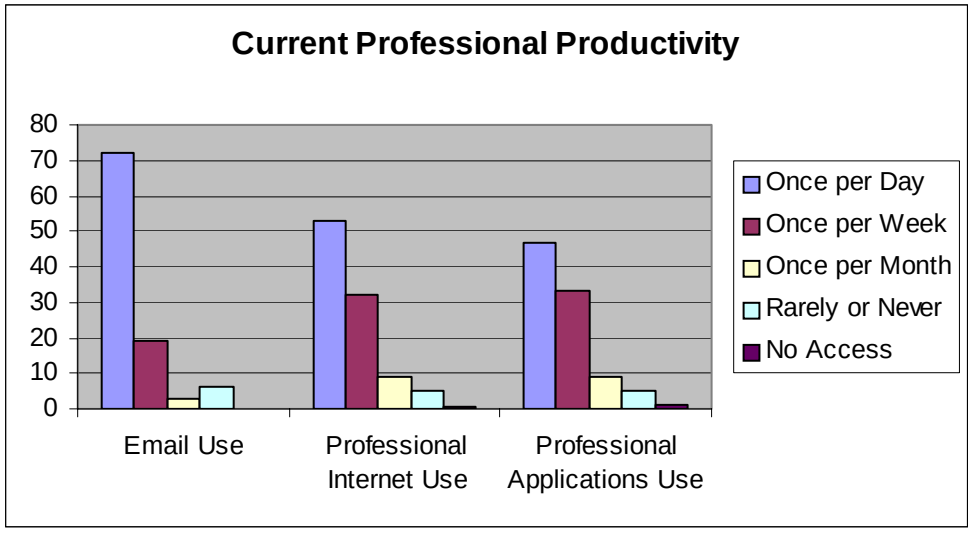
29) I have learned most of what I know about technology

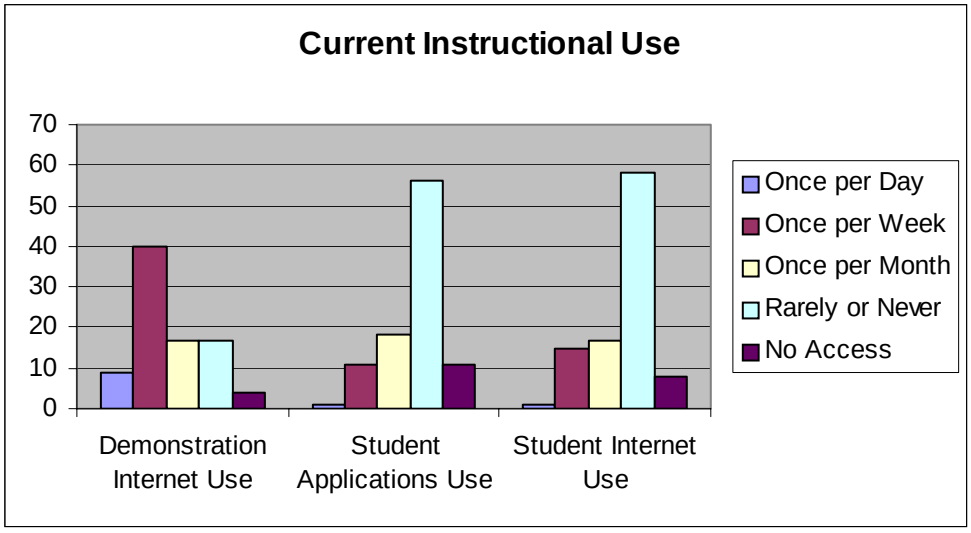
in a large group setting (more than 10 people) 62 (18%)	*in a small group setting (9 people or less) 79 (23%)*	*in a one-on-one setting 55 (16%)*	*via computer-based instruction 7 (2%)*	*on my own 156 (44%)*

30) The best way I could learn about using technology for teaching and learning would be

in a large group setting (more than 10 people) 24 (7%)	*in a small group setting (9 people or less) 235 (67%)*	*in a one-on-one setting 52 (15%)*	*via computer-based instruction 13 (4%)*	*on my own 41 (12%)*

APPENDIX C
Teacher Responses to Key Elements in Survey





APPENDIX D
Additional Survey Commentary

Classroom computers are old and inadequate. New laptops – still not working correctly. Time between requesting repairs and getting resolution on 2 computers in class and laptop = 1 month and still waiting. Rotating computer techs that visit our school is ridiculous [sic]! They never know what is going on. (6th grade)

The new TOSA is not very available or assessable [sic]. Wants to do everything by e-mail, not well-known by many teachers. (5th grade)

Please consider a computer lab for _____School [only school in district with no lab]. (2nd grade)

We would do this [provide opportunities for students to create products with technology] if we had a lab or more computers. (2nd grade)

Apart from my laptop, I only have one outdated computer in my classroom. I have no functional printer. (6th grade)

I love my laptop and think it is a wonderful resource for me to use to improve my teaching. I <u>want</u> to be trained on the _____Portal [extensive county technology resource]. (2nd grade)

I know we have spent money on technology but it is often not compatible with old equipment, programs, or printers. We do not have tables, etc. in our rooms that make using technology quick. This year I am not connected to the server at our school yet. Our new computer tech is doing a good job of keeping the lab operational but that is only available 30 minutes a week. We need better updating procedures on the status of work orders (3rd grade)

Tech phone is often busy…Yes! I need tech classes, but I am often busy when they are offered. (2nd grade)

<u>Time</u> to teach the Internet process is scarce. Availability of computers is difficult as a teaching tool to use in the lab. We can't work one-on-one. Wish we had a big computer to <u>show</u> them (like the district office [a SMART board]). (no grade level specified)

My classroom computers have been useless since the beginning of this year. This really hampers my use of computers for instruction, etc. I hope this will be fixed <u>SOON!</u> (5th grade)

Lots of problems each year with the district server/school servers—esp. at the beginning of the year. Need more techs—the ones we have are wonderful. Need Lumens [document camera] and projectors in every class—district <u>sponsored.</u> (5th grade).

I answered "sometimes" to #28 [satisfaction with district level of availability and/or expertise] because as our district incorporates more technology into the classroom there will need to be more than just two or three people available for help at the district level (8th grade)

I would really like to know how to use computer programs for teaching lessons, but I have <u>no</u> idea how to approach it or set it up. (3rd grade).

I feel very knowledgeable in the area of technology in the classroom. However, I feel I don't have the appropriate tools to use technology efficiently and affectively [sic] in my classroom. I have a great new laptop that can only move 2 feet from the wall and isn't compatible to my printer. Each time I need to print I have to transfer the files to the server or flash drive and then print from my ancient desktop computer. The desktop computer is so old that several of the new programs I use can't run on it therefore I can't print in my classroom. I have to print at home and bring it in. I am also very frustrated because I can't use the LCD projector in my classroom because there are no electrical outlets near the cneter of the room to project onto the screen. The extension cords are a safety hazard and my site has not felt it a priority to buy cord covers even though I have requested them for 2 years. I have asked for my screen to be moved to try and accommodate the constraints of the "cords" and was told them had to remain in a uniform location in every classroom. I would like to implement technology in my classroom and am very frustrated that I either don't have compatible tools or an administration that will not find creative ways (ie…move the screen) to try and fix problems. (1st grade)

We still don't have enough computers in the lab to accommodate the largest classes. (6th grade)

More inservices on Integrade Pro or eDart [electronic report card] to help w/ standards-based report cards. (5th grade)

I have been very fortunate to be using a projector with my new laptop in class. I hope at some point we will be able to have a workshop on presenting and using it with curriculum. The ideas and the activities are endless. (5th/6th combo)

I participated in EETT last year [at another site]. This year only 2 of the 3 computers in my class work properly. I would love to have a Lumens [document camera] for all the Powerpoints we made last year (4th grade).

I would like training in <u>Excel</u>. Could you please notify the computer department that we need classes offered to <u>Teachers soon!</u> (no grade specified)

I am frustrated with the lack of help with technical questions and just help in general. We are <u>expected</u> to use technology with little or no training. Example is report cards, but left on printing and input with no help and little training. (Kindergarten)

The district makes large assumptions that tech. is adequate and working. Much of the "hardware" needs updating. Many teachers' wireless does not work/not connected. Repair process is <u>very</u> slow. The perception is that they fix [the district office], not classrooms. (3rd/4th combo)
I have my Masters degree with Education and an emphasis of technology in the classroom. I try to do one project a year in Art using the portable computers. I am now designing lessons on PowerPoint for students. (junior high)

I am a CTAP Level 3 educator. (junior high)

I should have received a laptop because I am a full-time music teacher. _____Junior High should have provided it as that is my home school…[assistant principal] said he requested one for me, but was told that they were working on it. Is one going to be available? (junior high)

My son helps me a lot! (grade not specified)

I would like some general familiarization with Kdg. Applications and "cool" productions, internet use, portal use in a small to medium sized group (9-12) who are primary level teachers—K, 1, 2 because of their unique needs compared to middle and upper grade students. (Kindergarten)

I don't have the technology in my classroom that I had at my old school! (6th grade)

I would love to use the Internet more, but it's very difficult to do without a [LCD projector] Primary grades are perfect for that kind of technology, but it's not available to us. ☹(2nd grade)

_____ (computer lab tech) is a great help! (6th grade)

Too many students, not enough time (junior high)

I have 1 functioning (sometimes) computer in my room (other than my laptop). I would love 2 or 3 more. ☺(grade not specified)

It seems all we ever do is take technology surveys. Are there ever decisions actually made based on this data? (junior high)

We have very knowledgeable teachers at our site who help teachers like me! (3rd grade)

I have my own computer at home to [input scores into web-based reporting system] and do report cards successfully. (2nd/3rd combo)

Please allow me more access to inof on what is goin on so I can help more! I wish we still had SAIL [previous technology mentoring program of which this teacher was a part](junior high)

I teach oral reading the 1st semester and writing skills to EL 1-3's the 2nd semester. There's no time left over to work on computers too. I leave that the the Eng. Teachers or Exploratory Teachers teaching technology. (junior high)

I switched grade leels this year so I used computers more with upper grades. (1st)

Instead of faculty mtgs., we should be given inservices in our computer lab monthly on uses for the laptop. These should be offered more often also at the [district office] >>Technology Training. (2nd grade)

We need United Streaming services—California Streaming is not adequate (4th-6th grades)

The E.E.T.T. grant changed the way I teach! I use PowerPoint every day. I want to learn how to save student work in their own personal place. Thanks. (junior high)

Hands on learning helps! ☺(Kindergarten)

[Computer lab tech] has saved me on more than one occasion! (junior high)

I have not received a laptop this year. I've been told I should be getting one. (Kindergarten)

Ideally, I'd like to see a full-time certificated teacher who is a tech expert in each school computer lab who would teach tech skills to students/teachers. (4th grade)

I would like 2 or more classroom computers no older than 10 years. 3-6 get a disproportionately large amount of money and computers/technology than does K-3. (K-3rd grade)

I am very happy with all updated technology at our school, but I really need more computers for the students to use, as we produce the newspaper in a journalism class. ☺ (junior high)

I think it would be very helpful to have a technology training at our school site…several of us have the same questions which could be answered at one time. The new technology "set ups" [laptop, LCD projector, document camera] are great this year. ☺ (2nd grade)

Technology takes time, until you get to know it, then it saves time. It's putting in the initial time that is the challenge. (junior high)

APPENDIX E

Teacher Interview Questions

What grade level (and subject) do you teach, and how long have you been teaching? Has all of your teaching taken place at one school/one district? What do you like best about teaching?

In a perfect world, would there be a time and place for technology use within every classroom, regardless of grade? If not, could you explain your reasons? If so, could you describe what it would look like?

Is your belief about whether or not technology impacts student learning strongly and uniquely at your grade level more tied to an overall view of technology, the age of children you teach, or the resources you have (or don't have) available to you?

Can you think of a specific time where technology has had a positive effect on you, or your students? If so, what were the key elements to this success?

Can you think of a specific time where technology had a negative effect on you, or your students? If so, what were the key influencing factors?

What practices would need to be in place for a classroom, school or district to make use of technology in a powerful way for teaching and learning?

Describe a time when you made the best strides in learning; either *about* technology, or *through the use of* technology.

Anything else you want to say?