TECHNOLOGY IMPLEMENTATION: LESSONS FROM DISTRICT LEADERS

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Concerns about technology use in schools are endemic. While there is a growing literature puzzling over technology use, very little of it considers the problem from a systemic district-wide perspective. In this paper, I describe my personal journey as a district administrator to assist schools in more effectively integrating technology use throughout the system. The journey begins with a doctoral dissertation that addressed three questions: 1) What school conditions explain differences in how a technology-based source of curriculum information influenced teachers' individual and collective learning? 2) How important do teachers perceive the in-service training they received in assessing technology-based sources of information? 3) To what extent do technology-based sources compare with conventional sources of information in fostering teachers' individual and collective learning? A framework combining organizational learning and knowledge utilization concepts provided the perspective through which these questions were addressed.

Staff at five schools in a Canadian School District, Northumberland-Clarington, provided interview data for this study. The School District gave 25 teachers 1.5 days of in-service training in the access and use of the District's electronic networking, including e-mail, a conferencing system, Internet, and a curriculum resource database which was installed on their network. In addition to the 25 pilot project teachers, questionnaires were sent to 320 teachers of Grades 7, 8 and 9 across the province who only had access to the same information in print format. The results of this study I describe only briefly. The dissertation, however, turned out to have major implications for my work as a district administrator. I have spent some time pointing out what these implications are. The thinking that was stimulated on my part, by considering these implications, has led to a number of spin-off projects related to technology in my district, which I describe as well.

Lessons from My Research and Practice

Results of my study and my direct follow-up with the teachers involved gave rise to many recommendations for practice. As a continuation of the research I've done since my study, and efforts to strengthen computer technology use in my district, there are at least six significant lessons to share about technology implementation that are described in the remainder of this paper.

1. Develop a vision for schools, shared by teachers, that explicitly includes technology use.

Districts must be concerned about clear and frequent communication of a consistent vision when expecting technology to become an integral part of the school day. Findings from my work indicate that district resources, both human and financial, have the greatest impact on what is learned by teachers individually or collectively. When district resources support a widely communicated and accepted vision, such as technology, then the impact is even greater.

> I think that we take a lot of what the vision of our school is from what the vision is of the School Board …they have placed a lot of emphasis on technology and the use of computers. So we're doing that…technology is a very important part of our school vision (Sharratt, p.55).

Leaders with knowledge of computer technology and clearly stated goals, who provide pressure and support for the use of technology in all aspects of school life, will have a greater influence on teachers' individual and collective learning.

> Visioning was part of my Principals' growth plan for the school…and we are now ready to start the conversation and firm up the vision…the committee has a vision in terms of technology, and we are engaging staff in visioning activities around it… (Sharratt, p.60).

Teachers indicated that it was inappropriate to expect computers to be used in classrooms and not, for example, for the taking of daily attendance, and the implementing of new curricula. Teachers said that such incongruities sent mixed

messages to teachers who are grappling with the use of technology. This study revealed the importance of modelling technology use at **all** levels. Teachers need to be able to see an ongoing need for, and benefit from, daily use of computer technology if it is to be not only a school goal but also embedded in practice throughout the system. Teachers talked about the need to cut down on lesson preparation time and the benefit of technology being a daily part of the thinking/learning process. This can only happen when "people truly share a vision [of technology use] throughout the organization and can articulate it at all levels: then they are connected, bound together by a common goal" (Senge, 1990, p. 214).

2. Encourage teachers to use technology within a school culture that promotes dialogue, shared values and risk-taking.

> There is good and bad culture influencing this school…you have to respond to whatever circumstances or situations are developing within classes, school and community. And it's an on-going, changing thing. You just try to nip problems in the bud, and figure out what's going to happen next, so that you can try to be one step ahead of it or get run over by it. But most of the culture is strictly centred on students, student needs. Those are the main things that drive our school (Sharratt, p.69).

A collaborative school culture has a definite effect on the conditions that promote or inhibit learning within an organization. I discovered that teachers learned most in an environment that facilitated the sharing of teaching practices and encouraged colleagues to support and help one another with the integration of technology and curricula.

> That's the one good thing about our Prinicipal, at staff meetings he encourages team teaching and focussing on 1 or 2 goals, such as computer technology, rather than trying to handle 15 different things (Sharratt, p. 86).

When such support occurred, teachers talked to other colleagues, and discovered new relationships with staff members who shared the same values (eg. time-saving preparation methods, and replacing out-dated textbooks with technology). In the future, this shared culture is likely to extend beyond the school and the district. Currently, there are electronic networking opportunities for teachers to access people and ideas in a wider professional community. This increases opportunities to find kindred spirits, make connections, and formulate ideas unconstrained by one's immediate physical location (Fullan, 1994). Technology is not only a product of a given culture, it also shapes the culture that creates it. Plans to integrate technology into the learning environment ought to recognize teachers' needs to freely dialogue, experiment, collaborate and be creative.

3. Encourage school staffs to alter school structures to reflect the use of technology across disciplines, divisions and school boundaries.

Changes in culture and structure come from the initiatives of individuals and from organizations analyzing how individuals or the system contribute to their own problems and to solving them. Too often, schools have grafted technological solutions onto antiquated structures and traditional approaches to learning (O'Neil, 1995). This draws to our attention the important difference between viewing technology implementation as "accommodation" (an add-on to the curricula) or as "assimilation" (integration into the daily curricula). This raises critical questions for administrators to consider. Teachers said that they needed the flexibility and encouragement to self-appraise and then to develop structures that would allow assimilation of technology into their working day. Some teachers suggested forming more non-graded and non subject-oriented classes of learners taught by teachers who were not presenters of information, but mentors who

guided students to take responsibility for their own learning. In that way, computer technology can be assimilated into the daily classroom work. This newly conceived structure and role of the teacher encourages student-centred instruction, co-operative learning, and stimulates increased teacher/student interaction (Mehlinger, 1996, p. 405).

Technology offers endless opportunities to create new structures that have the potential to integrate "communities of inquiry" involving elementary, secondary, college and university students, their teachers, researchers and interested parents when on-line discussions focus on inter-related disciplines as Morton points out.

> Computer systems in schools should be viewed as structured learning environments with complex and comprehensive capabilities to access and manipulate information. They should be seen as interactive learning extensions of the children themselves. (1996, p. 417)

This is quite different than using computer technology as an "add-on", allowing students to "do" computing, often only in "lab settings". Approached in this way, everything positive and creative about the technological environment is destroyed. Administrators must recognize the centrality of teachers in this change process, and, in particular, consider teachers' knowledge, experience and understanding of the teaching/learning process. "Change is only accepted by teachers when that change supports good teaching <u>as each teacher defines it</u> (Saye, pg. 233). This implies that the Principal's role is to uncover those individual definitions and set structures in place, such as: team teaching, shared decision-making, common planning time, and opportunities to learn from colleagues that support the assimilation of technology.

4. Give teachers the necessary time to learn and use technology in order to integrate it into teaching programs.

Senge (1990) noted that technology has the potential to become a powerful learning tool provided it's use is coupled with internships and learning by doing in innovative settings. School districts can make this possible by providing ongoing in-service training, making available portable computer equipment for teacher use, and by orchestrating a payroll deduction plan and tax benefits for hardware purchases. Initiatives such as these are likely to increase teachers' use of and commitment to computer technology.

In my research, teachers perceived leaders to be supportive when they provided emotional/material support. One teacher described the support this way:

> The Principal is good at relieving people for training…we've also set up times for expert teachers on staff, board personnel, community members and others to give training on professional activity days…so it [training] is pretty good here… (Sharratt, p. 63)

Ninety-two per cent of the participants in this study perceived the database in-service training they received to be essential to their learning. Seventy per cent of the teachers interviewed mentioned the value of the district's on-going professional development program. Sixty-three per cent valued their commitment to technology in providing in-service training and 54 per cent of the teachers commented on the importance of on-going technical **and** program integration assistance provided after the initial training from district consultants and in-school computer resource teachers was completed. It should be noted that teachers repeatedly said that lack of **time** in the school day and technical difficulties often interfered with the implementation of knowledge and skills acquired through the in-service training.

Initiatives such as training, individually and collectively, are likely to increase teachers' use of and commitment to technology. Learning organizations will be those

that find more meaningful ways for members to spend time; for example, exploring the endless possibilities of technology and curricula integration.

5. Search for and hire leaders who are able to build commitment to the full use of technology.

As schools move toward restructuring and retooling and as knowledge of technology uses increase, school leadership needs to become more inclusive, distributed, and based on a different form of power. The evolution of increased technology use will demand a focus on "post-transformational" forms of leadership, meaning leaders who are committed to the full use of technology.

Currently, many senior leaders lack the knowledge about technology necessary to make the important decisions with which they are faced. Networking with technologically knowledgeable decision-makers from other jurisdictions, and continuous professional development in technical and program integration skills are critical.

District administrative teams need ongoing in-service training to learn ways of supporting teacher-leaders as they weave together curricula and technology in classroom settings. Those in leadership roles need to find time to learn about technological integration possibilities and to engage in dialogue and reflection with teachers about the implications of what has been learned. Teachers said they learned to use technology most when the administration valued respect for colleagues, risk-taking and support for new ideas. They said that fear of change inhibited growth and acceptance of new ideas (Sharratt, p.96). The most frequently mentioned, meaningful leadership initiatives, in rank order, were:

1. Administrators' encouragement of staff's professional development;
2. Administrators' promotion of technology use;

3. Administrators' encouragement of co-operation/teamwork/consensus;

4. Administrators' articulation of school's vision/goals;

5. Administrators' inclusion of staff in decision-making that affects them

(Sharratt, p. 66).

No longer can districts afford to hire leaders who are technologically illiterate. The search must be for leaders with strong commitment to the examination of productive uses of technology both for managerial purposes and effective instruction.

> I mean the Principal ultimately makes it go or fail…when he saw the District support, he decided to go with technology and made the timetable work. Now we have every Grade 9 student taking a two week computer component at the beginning of every course, in addition to all the other computer work s/he would receive during the course (Sharratt, p.71).

6.Examine the positive effects of "teacher-leaders" on the technology/curriculum integration process.

Administrators encourage the use of technology by providing informal structures for teachers to meet and dialogue about their practices. Some teachers will respond productively to the challenges of technology use by sharing responsibility for leadership in decisions that impact upon them.

Teacher-leaders, within the school, are in a good position to promote individual and collective learning. Administrators who value participatory leadership can model it by teaching classes or arranging coverage in order for teacher-leaders to attend out-of-school activities or professional development sessions, then share their knowledge with staff upon their return.

Teachers in this study said that they learned most about technology from other staff members who were approachable, supportive, knowledgeable, accessible and creative problem-solvers. In reality, however, only 46 per cent of the teachers in the

study said that their in-school computer teacher was approachable. Leithwood and his colleagues (in press, 1995) promote leadership that moves away from control in order to build commitment and capacity. He argues that the key to organizational learning is structures that allow for staff interaction and participatory decision-making. Effective administrators, according to Leithwood et al. (in press, 1995), encourage consensus building, teacher-leadership and staff discussions that resolve local problems, using local intelligence, and result in local solutions.

> At this school, we probably have the best systems person/teacher in the District…she's very knowledgeable…she works hard, and most of what we do have in this school is thanks to her…she's skilled; she's good at fixing things, and if she doesn't know something, she'll get help as soon as possible (Sharratt, p.74).

Walking the Talk

Knowing the lessons that were learned from the research study and in my follow-up work with the teachers and staff in the study, it was time to put the learning into practice in my own jurisdiction. The practical application of the research centred around what was learned about the importance of strong district leadership, focused, continuous professional development, learning from the opportunity for ongoing dialogue, and teacher-leadership. Four initiatives, now underway in our area, were the first spin-offs from my research.

1. <u>NorthNET</u>

A team comprised of the Computer Resource teacher, a Principal and myself developed an Intranet that not only provides access to the Internet, but also encourages teachers' on-line dialogue and sharing through an electronic

conferencing system, using First Class Software from SoftArc. Teachers and schools pay a minimal administrative fee to join a variety of conferences, including a chat line (simultaneous on-line interaction), send and receive electronic messages to and from colleagues, and upload and download files such as Outcomes-Based Learning units, that they wish to share. Participants include trustees, school council members, administrators, teachers and consultants. All have received the opportunity to be trained in using NorthNET. Each conference has a moderator who keeps the conversations focused on learning and sharing through on-line discussions: an advantage to teachers in a geographically distant school district of 80,000 students! My role has been to encourage this innovative thinking, offer opportunities for administrators to discuss other creative possibilities and find the financial and human resources to support their ingenuity, within the district vision. This initiative has evolved into the YorkNET Newsgroup as an internet-based approach to communication and conferencing District-wide. Details at www.yrbe.edu.on.ca/~cecn/Tech/planning/planmod.html

2. Mentorship

We have focused on the importance of training as the research findings suggested, and as a result have spent two or more hours of every monthly administrator meeting with our group of approximately 50 Principals and Vice-Principals in year-long professional development sessions. These have focused on teaching the leadership and technical skills necessary to promote the integration of technology and curricula in the classroom, with specific reference to incorporating technology in each School Plan

for Continuous Improvement. Teachers, administrators, consultants, and support staff have been leaders for these hands-on sessions which have led to the development of a Scope and Sequence Continuum that identifies those technology skills that teachers and students need to acquire in order to improve their learning. As well, the sessions have caused a Principal and Computer Resource Teacher to develop a database that identifies "experts" among the administrator and teacher group who would be willing to teach others the necessary technology skills.

3. The Technology Fair

The third annual York Region District School Board - North Technology Fair brings together elementary and secondary school teachers, students, parents, and business partners in a celebration of their learning. A small organizing committee of the two area Computer Resource Teachers, school reps and I have encouraged Tech Fair partnerships between businesses and schools to demonstrate and celebrate teachers' and students' collective learning. For example, Laidlaw Transportation Company has provided all the busing for Multi-Handicapped students to attend and share their classroom use of the latest in technology to enhance their learning. Many other companies partner with our schools in ways that make learning relevant to teachers, students and the companies themselves. The event is scheduled during an evening and the following district Professional Development day to allow access to all educators, students, parents, business and community members across the region to attend. More information is available at our web site:

www.yrbe.edu.on.ca/~cecn/Tech/techfair/techfair98/welcome98.html

4. The Intensive Training Model

In order to develop staff skills in the use of computers for professional goals including classroom use with students, an intensive training model was established. Using the Scope and Sequence Skills Continuum, each school staff, wishing to be trained, identified training needed in a variety of skill areas: Operating computers, databases, spreadsheets, word processing authoring tools and internet use. The intent was to go beyond the basic training function to the design of relevant integrated activities for students. The training was also intended to focus on classroom teachers as opposed to the technology experts on staff.

Participating schools staffs received three training days, at the area office's mini-lab of 15 networked computers. The area office provided one supply teacher to the school who worked with the class on their technology skills, thus ensuring that the students as well as the teacher were involved in learning through technology. Schools used other resources to release a number of additional teachers so that a core group of educators would receive significant PD in particular applications. Schools involved during the first term received second and third term follow-up support. Schools not involved first term received the three day opportunity during the second and third terms with one additional follow-up supply day from the area office. There were many creative ways that schools found teacher release time, besides the permanent computer supply teacher offered by the area office. These included: district-generated curriculum days, in-school coverage by administrators, team-teaching, and area teacher professional development funds provided by the District. It is important to note that the supply

teacher and two Computer Resource Teachers came out of the area staffing allocation, showing a sincere commitment to technology training on the part of area administrators.

Format for the training was flexible and depended on the careful planning that occurred with the teachers involved, the Principal or Vice-Principal, the area Computer Resource Teacher (who led the training), and the computer supply teacher. They met at a pre-meeting after school to design the training and plan for the follow-up sessions, usually held back in their school. Teachers' trained were expected to share their learning with others in their divisions; however, some administrators made a commitment to have all staff members trained, and sometimes this included support staff and parent volunteers as well.

The model was evaluated at the end of each term. Feedback meetings were held as well as surveys from participating teachers collated. After each session, the intensive training model was fine-tuned. Teachers said they learned when:

- the intensive training was followed by time to work on their own, and finished with the Computer Resource Teacher (their training leader) came to their school for a follow-up session;
- there was a computer supply teacher in their classroom working with their students, often about technology;
- off-site training occurred because there were fewer interruptions;
- administrators participated;
- there was a balance of in-service during the day and after school.

Teachers said that in-school coverage didn't always work.

The program was exciting and received excellent ratings. In the first two months of training, 240 teachers were trained and over 300 workshop hours were provided in the

mini lab. By year's end, all 27area schools had teachers from Primary, Junior and Intermediate divisions involved in the training.

Teachers felt that they changed their practices and students learned as a result of their training. Much of the credit goes to the Computer Resource Teachers, who developed the model and diligently made it work, and to the area administrators' dedication to learning to use computer technology, often against huge hardware obstacles.

In addition to this in-school time for training, the Computer Resource Teachers had a "Professional Series" of workshops running daily after school for administrators, teachers and support staff. The stimulus for learning at these sessions was often learning about FileMaker Pro, a database program used in curriculum applications that has also been used to create the new government report card program. Teachers engaged in learning as a step in preparation for this initiative being introduced in the fall, 1998. The "pressure" of the electronic report card implementation and the "support" of the in-service training helped to create an authentic learning situation!

Conclusion

The future development of technology use in schools must be sensitive to the needs of teachers, individually and collectively, if it's educational merits are to be realized. The impact of technology on students' ability to achieve relies heavily on individual teachers' learning, on school staffs behaving as communities of learners, and on technology providing an environment for knowledge-building as well as knowledge-retrieving. Energies must focus on enabling teachers to use technology, effortlessly,

with knowledge, enthusiasm and commitment in order to improve the achievement of students.

Districts may have to radically reconsider their designs in order to learn effectively from technology. Kanter and her colleagues (1992, cited in Hargreaves, 1994) claim that technological change is hastening the evolution of an organizational model that defines its boundaries as fluid and permeable. Influences on the organization come through many pathways, rather than down a chain of command. Thus, in the new order, organizational action needs to be viewed in terms of the ability to change quickly, and depends on an infastructure in which projects rather than positions are central.

Bonds between members must be more meaningful and ongoing and less prescriptive and inflexible. As Hargreaves (1994) predicts, the postmodern organization will be characterized by networks, alliances, tasks and projects. Certainly our new work in York Region School District reflects all four of these features, allowing for the important role of administrator/teacher as change agent to emerge.

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