

What Research Says:

Training Teachers for Using Technology

By Glenn A. Brand

Journal of Staff Development, Winter 1997 (Vol. 19, No. 1)

Increased access to information through new technologies, along with the need to prepare children to compete in an emerging information-based global economy, promises to fundamentally reshape school practice as we move into the next century (Harvey & Purnell, 1995; Jonasson, 1993). Despite increased access to computers and related technology for students and teachers, however, schools are experiencing difficulty in effectively integrating these technologies into existing curricula.

According to the U.S. Congress, Office of Technology Assessment (1995), the lack of teacher training is one of the greatest roadblocks to integrating technology into a school's curriculum. That same report revealed that most school districts spend less than 15 percent of their technology budgets on teacher training and development.

Such a figure makes it easy to understand Moursund's (1992) contention that current educational systems have done a miserable job empowering teachers to appropriately and effectively use computer-related technology in the classroom.

A review of the recent literature on professional development of teachers and educational technology provides insights into well-structured staff development programs on educational technology.

Time. Teachers must have substantial time if they are going to acquire and, in turn, transfer to the classroom the knowledge and skills necessary to effectively and completely infuse technology into their curricular areas (Boe, 1989; Hawkins & MacMillan, 1993; Kinnaman, 1990). However, Harvey and Purnell (1995) suggest there is overwhelming sentiment that schools have yet to create the kind of training and practice time teachers need in order to learn how to effectively integrate technology into the curriculum.

Although training and development time varies according to individuals, Guhlin (1996) states the time required is whatever satisfies a teacher's need for exploratory learning. That learning includes what the teacher needs to learn to effectively use the computer as both a personal and instructional tool.

When should such training be allocated? Shelton and Jones (1996) suggest that teachers need considerable training and development time outside the school day so they can concentrate on instruction and training objectives without having to deal with the normal school day demands. Therefore, training should be provided outside or away from the normal school day—for example, at a satellite location or in an area removed from regular

school activities. When this is not possible, training should be provided in smaller modules either before or after school.

Take into account varying needs. When designing staff development sessions on technology, individual differences must be addressed and individual strengths supplemented (Boe, 1989; Browne & Ritchie, 1991; Shelton & Jones, 1996).

Even when professional development opportunities for technology are available, personal anxiety associated with such opportunities results because teachers arrive at the learning environment with an immense range of abilities and specific developmental needs. As a result, classroom teachers should be involved from the beginning in planning the development sessions so they can be certain their specific needs will be addressed (Guhlin, 1996).

A training program that takes varying needs into account might (Pope, 1996, Shelton & Jones, 1996):

- Identify teachers' current interests and needs before the instructional session;
- Provide training geared to the identified needs of the target audience of teachers;
- Supplement participating teachers' strengths; and
- Promote diversified instructional strategies to fit the various learning styles.

Flexibility of professional development opportunities. Staff training programs designed for the technological development of teachers are effective when programming offers flexibility and is not based on a "one size fits all" philosophy.

Teacher training programs must not expect that all participants will leave with the knowledge and skills to facilitate the transfer of learning to their individual classrooms. Browne and Ritchie (1991), Harvey and Purnell (1995), and Stager (1995) state that, instead, effective staff development for technology requires flexible content and opportunities.

Flexibility can be provided by (Browne & Ritchie, 1991; Harvey & Purnell, 1995; Kinnaman, 1990; Pope, 1996; Stager, 1995):

- On-site programming which allows for flexible scheduling;
- Opportunities to complete the development sessions on the learner's own schedule and, if necessary, on their own time;
- Opportunities to participate in a combination of learning opportunities such as traditional workshops and in-class collaborations;

- Sessions built around smaller groups, and not limited to large group workshops and classes; and
- Instructional variety to teach knowledge and skills.

Provisional support. One of the most effective ways to align staff development with the district/school goals is to invest in someone with experience in both technology and curriculum (Kinnaman, 1990). Shelton and Jones (1996), Guhlin (1996), Stager (1995), Pearson (1994), Kinnaman (1990), and Persky (1990) all identify the virtues of having a full-time technology resource teacher in the school or district to bring technology into the basic fabric of the curriculum.

Having a technology resource teacher is especially beneficial for novice users, or those at the emerging stage of technological use and understanding.

Novice computer users are more likely to begin integrating technology into the curriculum when they have someone to whom they can turn for knowledge about computers as well as for emotional support and reassurance (Pearson, 1994; Persky, 1990). Whether this person is at the site or the district, just having someone in such a role can be a valuable asset in creating, implementing, and directing a global vision for integrating technology into schools.

In addition to these critical facets, such a coordinator can fulfill other functions as well. He or she can:

- Ensure that school/district objectives are met;
- Take on responsibility for aligning and organizing staff development;
- Support teachers both emotionally and technically;
- Work with a core group of teachers representing the district's subject areas and grades;
- Coordinate time for teachers to explore and learn the new technology; and
- Act as the essential link for empowering all teachers to effectively use technology and integrate it into the overall curriculum.

Collaborative development. The environment in which the effective technological development of teachers occurs is built around collaborative learning. Because teachers vary in their level of expertise at the time of their training, the context which surrounds their technological professional development must provide a non-threatening environment that is sensitive to the individual teacher's level of expertise and experience (Browne & Ritchie, 1991; Shelton & Jones, 1996).

As a result, Stager (1995), Browne and Ritchie (1991), and Persky (1990) suggest that collaborative problem solving and cooperative learning must undergird the approach to technology learning for teachers.

Although a number of collaborative learning approaches are available, peer coaching and modeling have been most effective in transforming workshop information to classroom application and practice (Browne & Ritchie, 1991; Kinnaman, 1990; Persky, 1990).

Peer coaching, usually established in a one-to-one tutoring situation, is effective because it does a better job of addressing the unique learning needs of individuals (Browne & Ritchie, 1991). Examples of such coaching include pairing a novice and experienced mentor teacher or grade-level and content-specific teachers.

Modeling enables teachers to observe expert performance. It helps teachers overcome the insecurity and fear of applying what they have learned in workshops. Teachers who learn with "trainers" who model good use of technology often are less fearful and more confident about using technology in their classrooms (Browne & Ritchie, 1991). When an expert teacher provides the instruction, the teacher-learners also have a benchmark for measuring their own progress.

Remuneration and teacher recognition. If teachers are to feel good about taking time from their schedules to acquire new computer skills, they must be provided incentives, remuneration, and recognition rather than road blocks (Kinnaman, 1990).

Studies in the business sector indicate that providing workers with highly developed technological training fails if the employees don't receive adequate incentives (Moursund, 1992). Guhlin (1996) and Stager (1995) have echoed this need in education to support and celebrate initiatives, in turn recognizing teachers who demonstrate effort and commitment to educational computing.

Although the means of such recognition could vary, possible incentives to facilitate teacher recognition include:

- Encouraging teachers to share their experiences through writing magazine articles, sharing at conferences, leading of workshops, or other means;
- Encouraging and financially supporting teachers to attend related conferences at the board's expense;
- Giving progressive teachers additional access to hardware and software;
- Allowing teachers opportunities to earn extra computers for their classroom;
- Providing copies of the software and manuals that teachers are trained on; and

- Instituting computer purchase assistance programs and summer and weekend loan programs (Guhlin, 1996; Kinnaman, 1990; Stager, 1995).

Sustained staff development. To help teachers properly complete the "learning cycle" of computer-related professional development, training must be ongoing and systematic (Kinnaman, 1990).

In a study examining what hinders or promotes successful integration of technology into the middle-school curriculum, Persky (1990) noted that using technology is not easy and that learning how to effectively use technology in the context of the classroom does not happen overnight. The need to allot time for continual learning is echoed in studies outside of education, which suggest that providing workers with high technology on the job ultimately fails if employees don't receive adequate training and continuing, on-the-job support (Moursund, 1992).

Further, this need for continuing support means teacher training must be ongoing and not limited to "one-shot" sessions (Hawkins & MacMillan, 1993; Kinnaman, 1990; Shelton & Jones, 1996). Harvey and Purnell (1995) stated that teachers want sustained staff development rather than short-term training and development programs in technology.

Link technology and educational objectives. The technological training must have an instructional focus that guides teachers to think first about their curriculum and then helps them address how to integrate technology into the curriculum (Guhlin, 1996; Persky, 1990).

Teacher training often isolates technology as a separate discipline and focuses on training for specific computer applications, such as word processing (Persky, 1990; Shelton & Jones, 1996). Focusing on this skill development, however, is problematic since it offers teachers little opportunity to transfer their learning into their classrooms (Shelton & Jones, 1996).

Modern staff development must do more than simply help teachers embrace technology; it must also anticipate the classroom change that will accompany its widespread use (Browne & Ritchie, 1991; Guhlin, 1996; Kinnaman, 1990; Persky, 1990; Stager, 1995). This notion of technology as separate and isolated needs to be significantly altered so that teachers understand how technology can support educational objectives (Boe, 1989).

If educators are going to be convinced to change their practice by integrating technology into their teaching, they must see the relevance of technology to what they do in the classroom (Browne & Ritchie, 1991; Shelton & Jones, 1996).

Intellectual and professional stimulation. The model of staff development for technology must put the teacher/learner at the center of the learning experience and provide a meaningful context for learning (Stager, 1995).

Teachers need instruction that engages them and forces them to reflect on the benefits and limitations of teaching with technology (Persky, 1990; Shelton & Jones, 1996). When teachers engage with others in ongoing reflection about what they have learned about the instructional use of technology, they are more likely to critically evaluate their own pedagogical practice and redesign their instruction.

Given the findings by Harvey and Purnell (1995) and Hawkins and MacMillan (1993), the need to provide meaningful contexts for effective teacher learning is not surprising. They found that teachers grew in their use of technology when there was substantial effort and personal interest in the training and when they were involved with programs that advanced them both intellectually and professionally. Ultimately, such stimulation will lead to the empowerment of teachers concerning their individual technological use and development.

Clear administrative message. If the technological development of teachers is to truly be effective, administrators must not simply pay lip service to the cause. They must take supportive action (Persky, 1990).

Preparing teachers for schooling in the emerging information-based society requires a new vision of teaching and associated expectations for staff development. Administrators must communicate this vision so all educators in the system understand it, and they must support teachers pursuing training in this area (Boe, 1989).

The administrative message must provide a clear, articulate philosophy regarding how the new technology will be used and how the culture of the school is likely to change. Stager (1995) states that this message must clarify the curricular content and traditions valued by the school as well as specify the outdated methodology and content that will be replaced as technology is introduced. This will illuminate for those skeptics the need to change and the need to get themselves "professionally developed."

School administrators can supplement the technological development of teachers by:

- Establishing flexible schedules so teachers can practice what they have learned (or to continue their learning);
- Encouraging and facilitating team teaching and peer coaching;
- Allowing teachers to visit each other's classrooms to observe technology integration; and
- Scheduling regular meetings among teachers using technology to plan and evaluate instruction (Persky, 1990).

Conclusions

Technology is being integrated into school curriculums in many schools across North America as a result of effective staff development. If technology is to be used by students, then teachers must possess the confidence, understanding, and skills to effectively incorporate technology into their teaching practices. This will only occur by providing adequate training and development of teachers.

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About the Author

Glenn A. Brand is a computer teacher with the Peel Board of Education, Fairwind Senior Public School, 5235 Fairwind Dr., Mississauga, Ontario, Canada, L5R 3L2, (905) 507-3877, fax (905) 507-3881, (e-mail: gbrand@oise.utoronto.ca).

[THIS WILL BE A BOXED ITEM, PLACED NEAR THE END OF THE ARTICLE.]

Consider this:

- What are the needs for staff development in technology in your school or district?
- How might the elements of effective staff development (see the box in this article) be applied in your school or district?

Elements of Effective Staff Development for the Technological Development of Teachers

A number of elements help define an effective staff development program for teachers focused around technological development. They include:

1. Provide sufficient learning time so teacher will learn to use computers effectively for personal and instructional uses.
2. Address individual teacher differences and supplement individual strengths, being sensitive to each teacher's expertise and experience.
3. Allow flexibility in programming and instructional learning opportunities.

4. Invest in individuals who are experienced in both technology and curriculum at either the school or district level.
5. Design instructional environments around collaborative problem solving and cooperative learning.
6. Support and celebrate a teacher's commitment to educational computing by providing incentives, remuneration, and recognition.
7. Provide training and related instruction that allows time for continued, ongoing learning, and on-the-job support.
8. Avoid isolating technology as a separate discipline. Provide an instructional focus that illustrates how technology can support educational objectives.
9. Design instruction and activities that engage teachers both intellectually and professionally.
10. Develop school administrators who encourage the technological development of teachers.