Does Technology Really Make a Difference?

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Cheryl Lemke, Ed Coughlin, and Daren Reifsneider of the Metiri Group, which serves the education community through services that empower educators and education institutions, conducted an important study to examine research on the effect of educational technology on student learning.

Commissioned by CISCO Systems, *Technology in Schools: What the Research Says*, updates a similar review of research done in 2006 and looks at descriptive, co-relational, quasi-experimental, and experimental studies that met the authors' criteria for quality. Does technology actually have an effect on teaching and learning? The authors take a look at a wide variety of technologies that are currently in use by educators:

- Interactive whiteboards
- Classroom response systems ("clickers")
- Video games
- Simulations
- Modeling
- Augmented reality (AR)
- Virtual worlds
- Mobile devices
- Calculators
- 1:1 ratio of computers to students
- Virtual learning
- Data visualization/analysis tools
- Computer assisted instruction (CAI)
- Educational television

For each of these technologies, the authors look at studies that relate to basic skills, higher level thinking, ICT, collaboration/participatory learning, and engagement in learning. In the authors' words:

Overall, across all uses in all content areas, technology does provide a small, but significant, increase in learning when implemented with fidelity and accompanied by appropriate pedagogical shifts. While this is generally encouraging, the real value lies in the identification of those technology interventions that get significant positive results that warrant investment.

The reasons cited for the slow rate of integration of technology in schools vary considerably over time and locale. For many educators, the lack of access to reliable, up-to-date technology is a major barrier to effective use. In schools with sufficient access (e.g., 1:1 environments, schools with laptops on carts, schools with low student-to-computer ratios), the barriers to effective use are lack of: vision; access to research; leadership; teacher proficiency in integrating technology in learning; professional development; innovative school culture; and/or resources. Gains in learning can be accomplished in a variety of classroom configurations. (p. 42)

Over and over throughout the report, the research points to the central idea that *how* the technology is used predicts its effect. For example, if an interactive whiteboard is used by the teacher the same way the chalkboard was used to illustrate a lecture, then there is no difference. If technology is used for its entertainment value or to use up available time, no value can be expected.

The best technologies are those that promote higher level thinking, imagination, creativity, and engagement. Augmented reality and data visualization/analysis tools get higher marks.

IMPLICATIONS FOR TEACHER-LIBRARIANS:

- Build your knowledge of a wide variety of technologies and how their unique features can be used to enhance both teaching and learning.

- However, rather than present a constant stream of tools to the faculty that tends to overwhelm with too much and too many, concentrate on the type of learning students need to exhibit and be able to demonstrate one or several tools that will do that exotically better than traditional teaching techniques. Play the role of a doctor. One does not begin with various drugs or machines. Rather, one begins with a diagnosis of a learning challenge or problem and then prescribes a treatment that will cure, improve, or at least, do no harm to the patient.

Many of the technology gurus of the field dazzle us at conferences with the latest tools and their characteristics and possibilities. We wander through exhibits looking at this device or that software package, each designed to make a major difference. We come away overwhelmed with too many choices. That compares to any doctor who approaches practice trying to memorize the specific characteristics of 10,000 different drugs.

How do we cope in a world of too many choices, whether in

Technology in Schools:

What the Research Says

Providing devices, hooking them up, and turning them on has never automatically made a difference in the lives of our students. Neither has linking into Google and flooding learners with information automatically made their products better. Adults charged with technology responsibilities do not automatically make a difference. Fear and reluctance to change predict certain mediocrity. I say, smash whatever roadblocks that exist in favor of increased teaching and learning. Teacher-librarians can either lead from the front or the middle. Some need to get out of the way. The stakes are too high and the opportunities too exciting to sit on one's hands.

REFERENCE

Lemke, C., Coughlin, E., & Reifsneider, D. Technology in schools: What the research says–A 2009 update. Culver City, CA: Commissioned by CISCO. Retrieved October 30, 2009 from http://tinyurl.com/yfcyor8.

the world of a Google search with its overload or the increasing array of technologies when suddenly we have cell phones, iTouchs, Netbooks, Ipods, and 500 of the latest Web 2.0 tools at our disposal?

Start with a learning problem. For example, students are not making progress on writing although their teachers assign writing exercises regularly. You comb the literature and find that success is being achieved by prescribing collaborative writing using free tools available 24/7 and on almost any device. Google Docs, Zoho, or a simple wiki seem good candidates. You meet in conference with a teacher and several of her students who test the various possibilities. One is recommended and tested by the entire class. Based on a significant difference, this class fans out to the entire school and in a matter of days collaborative writing is taught by them to the entire school. Careful monitoring and assessment is done regularly to test whether writing has actually improved and by what percentage of the students. If the progress is not sufficient or sustainable, the process begins again.

Perhaps some signs of success and a few recommendations will help:

• The tool has introduced significant efficiency in various learning tasks enabling learning more in less time.

• Engagement and motivation increase

beyond the spike in interest that happens with "new technology".

• Both students and teachers take advantage of the technology's characteristics to deepen understanding of complex ideas, issues, phenomenon, or other major ideas.

• 21st century skills are enhanced by the features of the tech tools. Learners make progress in learning how to learn.

• A higher percentage of learners succeed with the tech tools than was experienced in a non-techie environment.

• Various assistive devices bring success to a wide variety of learners who face physical, developmental, language, or personal problems.

• Data about successes is collected and disseminated to interested audiences. Technologies not producing sufficient results are either re-learned by teachers to change the methods of use or are discarded.

• Successes with smaller groups of students spur expenditures, support, professional development, and staffing increases.

• Apparent failure in a trial should be compared with the descriptive and professional literature and the research. Perhaps misuse or under utilization or some other critical factor needs to be addressed rather than the abandonment of the idea, tool, or device.

• Ask the learners regularly for advice. Listen.