Integrating Technology— Implications for Staff Development

How can teachers learn to integrate technology into their curriculum in ways that enhance learning? In this column, we'll look at two models for technology integration and learning new instructional strategies.

The CEO Forum on Learning and Technology[1] has been developing assessments for the past three years. Their STaR Chart assessment for 2000 defines four levels of school technology integration: early tech, developing tech, advanced tech, and target tech.[2] Let's examine each level.

Early Tech

At the early tech level, teachers use technology "as a supplement rather than an integral part of the curriculum."[3] For example, they may allow students who finish their work early to spend some time using educational CDs at the back of the classroom. Students may also get to visit the computer lab for 30-45 minutes a week, although the instruction is rarely connected to what goes on in the classroom. It is usually limited to basic skills reinforcement.

Developing Tech

At this level, "teachers use technology to streamline administrative functions, to communicate, and for presentations." The teacher uses Microsoft PowerPoint or Corel Presentations for lectures; a word-processing program to create worksheets and newsletters; an E-mail program to communicate with family, friends, and colleagues; and a computer grading program to prepare report cards. Students use the computer for research, communication, and presentations three to four times a week. The learning is structured and teacher-directed, offering little opportunity for student choice. At this level, 50 percent or more of students employ digital content. However, levels of integration may vary within a school, with one teacher encouraging and requiring the use of technology, while another teacher down the hall rarely uses the computer.

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Figure 1

ACOT Level	Description of Teacher and Student Behavior	Staff Development Hours	STaR Chart
Entry	Teachers do not use technology much; the equipment sits with the dust cover on most of the time. Students occasionally use the technology.	0 hours, 0 experience	
Adoption	Teachers use a few applications to automate existing tasks, such as gradebooks and word processing, but make no changes in teaching methods. Students expand use, no change in learning.	30 hours, 3 months	Early Tech
Adaptation	Teachers' methods of presenting information begin to incorporate technology such as PowerPoint. Students' work on the computer is accepted and encouraged.	30-50 hours, 3+ months	Developing Tech
Appropriation	Learning begins to change, and teachers use new methods of preparing and presenting information. The classroom arrangement is different from traditional layout. The nature of student work changes to collaborative and project-based learning.	51-70 hours, 2 years	Advanced Tech
Innovation	Teachers develop new ways of using technology to enhance the quality of the learning. Students create their own learning and use their creativity to research and explain information.	71+ hours, 2-5 years	Target Tech

Advanced Tech

At the advanced tech level, teachers use technology "for research, lesson planning, multimedia and graphical presentations, and simulations." They use E-mail and word processing "to communicate with parents, peers, and experts." The teacher facilitates student research and problem solving, and students use technology "to analyze data, to collaborate and to correspond with experts and peers." The technology is used "daily, but activities are separated by grade, discipline, and classes." At this level, 75

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percent or more of students employ digital content, and technology is regularly integrated into the curriculum.

Target Tech

At this level, "digital content changes the teaching and learning process, allowing for greater levels of inquiry, analysis, interest, collaboration, creativity and content production." Students research and create content to instruct others,[4] as well as collaborate with other schools to analyze data and solve problems.[5] The teacher serves as a guide, asking questions and facilitating the thinking process. The learning is student-centered, with pupils making choices about research topics and methods of presentation. Technology is "seamlessly integrated throughout all classes and subjects on a daily basis," wherever appropriate to enhance learning. At this level, 100 percent of students use digital content across all subjects and disciplines.

Implications for Technology Staff Development

What would it take to reach the advanced tech and target tech levels of technology integration in our schools? First, we must understand the time requirements for staff development. The chart on page 21 was adapted by Jeannette Cates from the Apple Computers of Tomorrow (ACOT) research.[6] I have added the STaR Chart levels of technology integration.

Notice how much time it takes for teachers to move from one level to another. Short workshops once or twice a year or a single required educational-technology course will not significantly advance teachers' integration of technology. Training should integrate a learning cycle of theory, demonstration, practice, feedback, and coaching,[7] as well as time to reflect on the implementation of new strategies. Planners must adapt the complexity of the training to teacher needs. Staff development should include strong connections "to student learning, hands-on technology use, a variety of learning experiences, and curriculum specific applications"[8] as well as technical, peer, and administrative support.[9]

Teachers need technology designed to help them progress to the next level of integration. Educators at the Entry and Adoption stages need training and lots of support to help them feel comfortable using technology. The training should combine how-to instruction with easy sample classroom projects for integrating technology in their curricula.[10] It should show how "new technologies can improve student performance" and use "technology-enhanced instructional units that are highly reliable, user friendly, and structured."[11]

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Teachers at the Adoption stage need help with classroom management and instructional strategies such as cooperative and problem-based learning. The training should model innovative, student-centered instruction that includes inquiry and problem solving. As Jamie McKenzie says: "If we want to see powerful uses of new technologies, we must devote far more attention to curriculum opportunities and teaching strategies."[12]

Teachers at the Appropriation and Innovation stages need time to plan with colleagues and to evaluate their success in incorporating technology into their teaching. They need mentoring opportunities and many flexible choices[13] for continuing-education credit, such as online collaboration on lessons, conferences, reading, and other non-traditional training.

The North American Division is now requiring technology training for teacher recertification, to ensure sustained professional development in this area. Teachers at all levels should choose training that meets their needs and will bring them to the next level of technology integration. Remember that change takes time, practice, reflection, and more practice.

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NOTES AND REFERENCES

1. The CEO Forum on Education and Technology was founded in the fall of 1996 to help ensure that America's schools effectively prepare all students to be contributing citizens and productive workers in the 21st century. For more information, visit http://www.ceoforum.org/.

2. You can find the STaR chart at http://www.ceoforum.org/. It is very helpful for assessing your school's use of technology.

3. These quotes are taken from the STaR chart. See ibid.

4. For example, visit the ThinkQuest project at http://www.thinkquest.org/.

5. For examples, visit the Project Center at http://www.eduplace.com/hmco/school/projects/ and the Global School House Project Page at http://www.gsn.org/project/.

6. The ACOT research reports can be found at http://www.apple.com/education/k12/leadership/acot/library.html/. Jeannette Cates' adaptation of the five stages can be found at http://www.techtamers.com/free_resources/educational_technology/stages.htm/.

7. Bruce Joyce and Beverly Showers, *Student Achievement Through Staff Development* (New York: Longman, Inc., 1988).

8. Jamie McKenzie, "Designing Staff Development for the Information Age," *From Now On* 1:4 (April 1991), http://www.fno.org/fnoapr91.html/.

9. Ginger Rodriguez and Randy Knuth, 2000. *Critical Issue: Providing Professional Development for Effective Technology Use.* http://www.ncrel.org/sdrs/areas/issues/methods/technlgy/te1000.htm/.

10. For example, Teacher Created Materials publishes many books with simple classroom projects using various software packages. On the Internet, teachers can begin by incorporating a simple routine into their schedule. Suggestions can be found at http://server.remc11.k12.mi.us/bcisd/classres/intelem.htm/. For an example of task-oriented simple-project-based instruction using Microsoft Office, see the Office in the Classroom handouts at http://www.remc11.k12.mi.us/bcisd/classres/handouts/.

11. Jamie McKenzie, "Beyond Technology: Making a Difference in Student Performance," *Electronic School* (March 2000), http://www.electronic-school.com/2000/03/0300f1.html/. See also Jerry Bennett, "National Educational Technology Standards: Raising the Bar by Degrees," *Multimedia Schools* (May/June 2000), http://www.infotoday.com/MMSchools/may00/bennett.htm/.

12. McKenzie, ibid.

13. "Ideally, teachers should be allowed to select from a menu of courses that describes the kinds of activities included in each. This process of selection increases the likelihood of a good match between learner and course" (McKenzie, 1991, p. 21).

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