



Overview of Technology Integration in Schools

The introduction of computers and other electronic technologies to the curriculum represents major change for teachers, learners, and principals. As research over many years has shown, the school is a primary unit of change in the educational system and the school principal is the key change agent. The following sections explore facets of the integration of technology in the curriculum from the school level standpoint, and address the ways in which school principals can assess the state of integration.

What is Technology Integration?

A recent survey of a sample of school principals in one state attempted to determine the extent of technology integration in the curriculum. However, evidence of a common meaning of the term among respondents was lacking. The variety of interpretations is exemplified by the following responses, which were cited as examples of integration:

- use of an integrated learning system in a subject
- allowing, encouraging, or requiring students to use word processing and presentation software in reports and displays
- requiring papers to be done on a word processor
- using presentation software and projection technology for teacher presentations
- using computers for on-line testing and analysis of test results

For example, requiring students to use word processors and presentation software can increase their literacy and technology skills, but they are only a part of technology integration. While internet access to remote information sources can assist students in enriching their projects, it alone is only one step toward integration. Teaching students to use electronic presentation tools can be a powerful aid to improving students' communication skills; yet is partial integration. Although useful in instruction in certain ways, each application **alone** is not the full definition of integration, and the use of one does not mean that technology integration has fully occurred.

Technology integration is occurring if:

- teachers are trained in a full range of technology uses and in the determination of their appropriate roles and applications
- teachers and students routinely turn to technology when needed
- teachers and students are empowered and supported in carrying out those choices

Under these conditions, the potential of digital technologies to improve teaching and learning is likely to be realized.

In an overview of the status of the integration of instructional technology in public education, Earle writes: "Integrating technology is not about technology – it is primarily about content and effective instructional practices. Technology involves the tools with which we deliver content and implement practices in better ways. Its focus must be on curriculum and learning. Integration is defined not by the amount or type of technology used, but by how and why it is used." (Rodney Earle, 2002)

Conditions for Classroom Integration of Technology

The conditions necessary in a school to support the integration of technology are addressed in this web site in five component areas:

- Physical facilities, capacity and conditions
- Curricular connections
- Teacher actions and characteristics
- Student activities
- Support

To assist a school principal in determining the extent to which integration is occurring on a school-wide basis, the following sections provide indicators in each of the areas and the data collection required to assess them.

Physical Facilities, Capacity and Conditions

- Computers, multimedia equipment and telecommunications stations are available at the places where teaching and learning activities will occur: classrooms, library/media center, computer labs or other large group places, and for use outside the school building.
- Scheduling of facilities and devices as necessary is easy and quick
- There is flexibility in relocation and multiple use of hardware to address learning opportunities.
- The ratio of students to devices is small enough to support simultaneous use by a high percentage of students.
- Access for students with disabilities is addressed through special software, hardware, and other accommodations.
- Software, databases, and materials are available in every content area to address the curricular needs appropriately.
- A process and criteria exist for selection of classroom hardware and software.

Data to Collect

1. Types of hardware on hand: computers, handheld devices, cameras, Internet service, telecom connections, one-way and two-way interactive video
2. Numbers of each type available
3. Locations of the various technologies
4. Software list, number of copies, locations
5. Types of and access to technical support

Curricular Connections

- Analysis of curriculum areas has taken place to identify applications of technology appropriate to achieving the goals and objectives.
- A set of minimum expectations has been developed for achievement of technology skills for students at various waypoints in their progress from PK to grade 12.
- Guidelines identify the places in the curricular areas where instruction and practice in the technical skill expectations will occur.
- A general philosophy or framework is in place among faculty that guides expectations for the independence of students in various ways, including the degree of student independence in deciding how and when to use technology in their learning activities.
- There is a process in place for continual monitoring of curricular alignment of technology

Data to Collect

1. Number of curriculum areas represented
2. Number of activities or units involving technology
3. Number of goals having technology applications identified
4. Relevance of activities
5. Skill categories and proficiency levels in technology identified
6. Skill expectations by age or grade, related to what subjects
7. Grade and curricular areas identified as responsible for introduction and primary instruction in each technology

Teacher Actions and Characteristics

- Teachers use technology in several ways, and such use is observable daily.
- Teachers routinely choose the technologies appropriate to their activity and need.
- Teachers are using online access to information resources from within the school and from home or other outside settings.
- Promising or successful practices are often shared between and among teachers.
- Teachers participate in the process of developing the guidelines for technology standards in curriculum areas.
- Teachers follow the guidelines for technology use in the curriculum.
- Teachers involve students in identifying a range of ways technology may be used to accomplish curricular objectives.
- Teachers expect and encourage independence of students in choosing and using technologies appropriate to their tasks.
- Teachers design assignments for students based on assumptions of technology use.

Data to Collect

1. Record of training and other preparation for each teacher
2. Evidence of planning, including with students, for technology use
3. Observations of actual use of technology in teaching
4. Examples of instructional strategies employing technology
5. Examples of matching teaching style to the use of technology
6. Mechanisms in place for mutual assistance and sharing of practices
7. Level of sharing of successful practices

Student Activities

- Students are involved in planning for their uses of technology in the curriculum.
- Students use technology in several ways, and such use is observable daily.
- Students routinely and independently choose the technologies appropriate to their activity and need.
- The ways in which technology is used represent an improvement over previous methods of carrying out learning activities, or represent a learning activity which could not previously be done.
- Students exhibit increasing knowledge and skill in the use of different technologies over a year or several years.
- A large percentage of students are using technology in a wide range of applications simultaneously.
- In student activities, both individual uses of technology and group activities supported by technology are evident.
- In student activities with technology, both uses required of all and uses chosen by students are evident.
- Students are using online access to information resources from within the school and from home or other outside settings.

Data to Collect

1. Frequency of student participation in planning for uses of technology
2. Degree of student independence
3. Variety of uses
4. Connection to curricular goals and objectives
5. Duality of goals - Learning tech skills as well as content
6. Number of different types of use happening simultaneously
7. Number of different types of software being used simultaneously
8. Frequency of use of technology per student in a day or week
9. Number of types of technology and applications each student uses
10. Types of students involved

Support

- Staff development opportunities to improve skills in technology integration are available for all teachers relevant to subject areas.
- Mechanisms for the sharing of promising classroom practices in technology among staff are available and their use is encouraged.
- A mentoring plan is in place in which teachers expert in the use of technology are available and encouraged to provide assistance to other teachers.
- Technical staff are available to operate, maintain and manage networks, computer stations, Internet connections, videoconferencing linkages, and software contracts.
- Technical staff are available to offer technical assistance to teachers.
- Teachers are provided with planning time to address technology integration.
- An instructional materials budget is available to teachers and/or subject area groups for software acquisitions during the school year.

Data to Collect

1. Number of staff development activities occurred in a year.
2. Amount of time each staff member has been involved in staff development for technical skills and curricular applications.
3. Number of promising practices shared in a year.
4. Number of staff who have shared practices in a year.
5. Amount of time each staff member has spent in staff development in a year.

Bibliography

Byrom, Elizabeth, and Bingham, Margaret. "Factors Influencing the Effective Use of Technology for Teaching and Learning". Second Edition, 2001, SEIRTEC, Durham, NC, 24 pages. <http://www.seirtec.org/publications/lessons.pdf>

Dirr, Dr. Peter J. "Classroom Observation Protocols: Potential Tools for Measuring the Impact of Technology in the Classroom". Policy and Planning Series #104, 2003, ATEC, Alexandria, VA, 26 pages. <http://www.the-atec.org/lib-pub.asp>

Earle, Rodney S. "The Integration of Instructional Technology into Public Education: Promises and Challenges". *Educational Technology Magazine*, Vol. 42, No. 1, Jan.-Feb. 2002, pgs. 5-13. <http://bookstoread.com/etp/earle.pdf>

McNabb, Mary L. EdD. "Technology Connections for School Improvement". 1999, North Central Regional Educational Laboratory, Oakbrook IL, 26 pages. <http://www.ncrtec.org/sitemap.htm>

McNabb, Mary et al. *Technology Connections for School Improvement*. 1999, NCREL, Oakbrook, IL. 145 pages. <http://www.ncrtec.org/sitemap.htm>

Resources for Assessment. ISTE National Educational Technology Standards Project, 2003. <http://www.iste.org/bookstore/>

Standards for Teachers, ISTE National Educational Technology Standards Project, 2000. <http://www.iste.org/bookstore/>

Standards for School Administrators, ISTE National Educational Technology Standards Project, Nov. 2001. <http://www.iste.org/bookstore/>

"Statewide Plan for Technology in Idaho", Draft May 11, 2003, pages 7-8.

Sun, Jeff, et al. *Planning Into Practice*. SEIRTEC, Durham, N.C., 2000, 273 pgs. <http://www.seirtec.org/P2P.html>