

Chapter 11

Engaged Learning

OVERVIEW

The growth of the Connected Learning Community in your school or district is a building block of a new model for student learning. This model, engaged learning, represents a fundamental change in the way learning takes place in the classroom. This chapter looks at the components of the engaged learning model and at ways in which the integration of technology into curricula supports engaged learning.

Reinventing Today's Classrooms

Recent advances in technology have shifted classroom learning from a passive mode to a new engaged model in which students are doers as well as thinkers. The engaged learning model is based on the simple belief that students of all ages learn better when they are active participants in what they are studying. Being actively engaged in the learning process means students are making their own decisions, thinking critically, and learning within contexts that are meaningful to them. When students are presented with authentic, challenging, and multidisciplinary tasks and allowed to explore a subject from their own particular point of view, they grasp the subject matter better.

Today's computer and telecommunications technologies are powerful tools that can be used to support engaged learning. In fact, the very nature of Connected Learning Communities provides constant opportunities for active participation in learning. Specifically, they provide opportunities for:

- Authentic, project-based, investigative learning
- Access to global information resources
- Increased interaction among students, teachers, and the global information community
- Transformations in the roles of students and teachers

Characteristics of engaged learning¹

Students are self-regulated learners who define learning goals that are meaningful to them and understand how specific activities relate to those goals.

The teacher is a facilitator in learning.

Learning tasks are authentic, challenging, and multidisciplinary.

Students participate in interactive modes of instruction.

Students learn through exploration.

Students work collaboratively.

Students are grouped heterogeneously.

Assessments are based on students' performances of real tasks.

The Engaged Learning Classroom

Teachers in engaged learning classrooms serve as facilitators of learning. Rather than spending the entire class dictating notes on the subject of the day, they help students explore with the aid of a variety of teaching tools.

For example, a history teacher may use multimedia software to instruct a group (large or small) for a brief lesson and then spend most of the period circulating among the students, guiding them in their work at various learning stations. While some of that work will include practicing what the teacher has taught, students will apply and extend what they have learned through collaboration or individual work. Engaged in a guided exploration of the subject area, they investigate and gather information through primary sources, online experts, and the Internet. Computers, textbooks, hands-on activities, and a variety of other resources are used every day, with instructional software and computer simulations used to re-create real-world problems and scenarios, and more traditional educational software providing drill and practice.

The engaged learning classroom is a stimulating multidimensional learning environment in which technology adds variety of presentation and a greater depth and breadth to satisfy individual curiosities.

Using Technology to Create an Engaged Learning Environment

For more information about the engaged learning model, see "Meaningful Engaged Learning" at <http://www.ncrel.org/sdrs/engaged.htm>.

The improvement of teaching and learning is the single most important goal of your school or district's technology program. As you design and implement the program, it's important to avoid the temptation of delving into the depths of the tools available. Remember that the whole point of introducing technology into your school or district is to create more effective learning environments, not to make every student an expert on networking!

A study by the Software Publishers Association found that the school environments that used technology effectively to enhance learning had the following characteristics:²

- A high degree of district-level involvement
- A high degree of leadership from a school-level computer coordinator
- Extensive teacher training in the integration of technology and curriculum
- Collaborative work among the computer-using teachers
- Software acquisition funds available for teachers
- Ongoing opportunities for students to engage in self-directed learning experiences and cooperative learning activities

Those characteristics are all key elements for creating an engaged learning environment. The findings of this study provide a basis for ensuring that users get the most out of your school or district's technology investment.

Technology Integration

Integration of technology throughout all areas of the curriculum is a critical component of engaged learning. It is also vital to the success of your technology program. An integrated curriculum has the following characteristics:

- Focuses on basic skills, content, and higher-level thinking skills
- Is student-centered
- Provides connections among the various curricular disciplines
- Captures, motivates, and challenges learners
- Encourages active participation in relevant real-life experiences
- Accommodates a variety of learning styles and intelligences
- Offers opportunities for small group and individualized instruction
- Incorporates technology as an integral part of learning
- Encourages lifelong learning
- Incorporates authentic assessment

Challenges for teachers. Teachers must receive sufficient training to help them effectively plan and execute projects that integrate technology across the subject areas. This teaching model requires them to rethink and reshape their curricula. For many, learning to integrate technology and curricula means mastering a series of challenges, including:

- *Learning how to use a variety of technology applications.* Given the wide variety of software packages that can be integrated, it is time-consuming and difficult for teachers to learn about the potential power of each technology application.
- *Designing technology-enhanced curricula to meet students' needs.* Teachers must become curriculum developers and learn how to select applications that will be most effective in meeting their teaching goals.

For examples of online lesson plans, see <http://www.microsoft.com/education/tutorial/classroom/default.asp>.

- *Using and adapting online curricula.* Teachers must become familiar with online lesson plans and adapt those lessons for their students.
- *Expanding their knowledge of their subject areas.* Teachers must expand their own subject-area knowledge base so that they don't limit students' experiences and exploration.
- *Taking on the new roles of curriculum designer and coach.* Teachers must shift from a knowledge-transmission role to inquiry-based teaching.

Guiding questions for curriculum and technology integration. To begin the process of integrating technology and curriculum, the following questions should be addressed:

- Which software applications are appropriate for integration into the curriculum?
- What are the best ways to employ technology to enhance curricular content and concepts?
- How can technology be used to help support an inquiry-oriented curriculum model?
- How can technology be used to promote student collaboration?

Overcoming the Challenges. Although adapting to new ways of developing and delivering a curriculum may present challenges, most teachers feel the rewards of teaching and learning through integrated curricula are worth the extra effort. The following are a few suggestions that will help ease the process: For a guide to using Microsoft products in the classroom, see "In and Out of the Classroom" at <http://www.microsoft.com/education/tutorial/classroom/default.asp>.

- *Integrated software packages.* A suite of software products that work and look alike enables teachers to learn the applications faster—minimizing training and support—and helps them use the applications synergistically.
- *Familiarity with software applications and online resources.* Teachers need to be able to suggest the appropriate tools for students to use at different points in their inquiry process. Learning the software is not enough; teachers need to be able to use it in various formats such as for presentation purposes, as part of student assessment, and so on. Also, teachers should become familiar with the vast array of online curriculum resources that can support learning objectives.
- *Use of different inquiry-oriented curriculum models.* Integration of technology and curriculum can be accomplished by
 - Integrating a particularly exciting technology application into existing curricula.
 - Constructing a curriculum around a theme or topic, using a variety of technology applications.

For more tips on curriculum integration, see "Bringing It All Together" at <http://www.microsoft.com/education/instruction/articles/netmtgTaft.asp>.

- Accessing a complete and comprehensive multimedia curriculum online.
- For more information on how to employ the Internet to support curricula, see "The Internet as Curriculum" at <http://fromnowon.org/jan97/curriculum.html>.

- *Flexibility in the use of technology applications and online resources.* Teachers cannot and should not expect to have a total grasp of the content related to every topic. Instead they should feel they can learn alongside their students. Teachers need to learn how to connect to relevant resources, how to organize student groups, how to guide students in asking probing questions, and how to give students the tools to store, retrieve, manipulate, and analyze information.

Using the Web as Curriculum

It seems that every year teachers are asked to take on more responsibilities and to try new ways of reaching students. Given the burden of everyday classroom and administrative functions, they may well ask, "How will I ever find the time to learn and integrate these new technology skills with my curriculum to improve student learning?"

The answer can be found on the information superhighway. Access to the vast resources of the World Wide Web opens up a world of opportunity. Today, the Internet provides an array of classroom lessons, student projects, supplemental information resources, and guides to new teaching strategies. The Web has become a veritable warehouse of lesson plans.

Like any learning tool, the Web has both great potential and limitations. There is so much information on the Web, teachers and students must learn to be highly selective and highly proficient at finding selected information. Having a warehouse full of valuable goods is of little value if you don't know where things are shelved or how to determine what is a useful item and what is not. To use the Internet as an effective resource for teaching, teachers will have to:

- Learn to evaluate good Web sites on the bases of selectivity, reliability, quality, organization, questions, instructions, and sequences of activities.
- Set measurable learning objectives, and use online activities that support the attainment of those objectives.
- View curricula as an adventure.
- Use Web lessons that focus on problem-solving skills and that require hunting for and gathering

information.

- Look for curricula that pose major questions.
 - Expose students to worthwhile topics that will motivate them to learn.
 - Teach students the research process.
 - Teach students how to "surf" the Internet, scan material, and screen out the irrelevant.
 - Challenge students to develop their own insights while reading and critiquing resources on the Internet.
- For examples of curricula links, see Bellingham (Washington) Public Schools Web site at <http://www.bham.wednet.edu>.
- Develop curriculum pages on the school Web site that list and annotate good sources and provide suggested activities.
 - Provide links on the school Web pages to other resources (see the Web sites that follow, for example).

Online Resources

The following resources may be of use to both teachers and students in creating and participating in engaged learning experiences.

Organizations

National Council for Geographic Education

<http://www.oneonta.edu/~baumanpr/ncge/rstf.htm>

National Geographic Society

<http://www.nationalgeographic.com/main.html>

United Nations International Children's Emergency Fund (UNICEF), Voices of Youth

<http://www.unicef.org/voy/>

Education agencies

Office of Educational Research and Improvement (OERI)

<http://www.ed.gov/offices/OERI/>

U.S. Department of Education

<http://www.ed.gov/>

Commercial sources

Microsoft

<http://www.microsoft.com/education/>

Television

CNN Newsroom and Worldview

<http://www.cnn.com/>

Public Broadcasting System Teacher Connex

<http://www.pbs.org/learn/tconnex/>

Search engines

Alta Vista

<http://www.altavista.digital.com/>

Web Crawler

<http://www.webcrawler.com/>

Yahoo

<http://www.yahoo.com/>

Online lesson plans

Access Excellence Activities Exchange

<http://www.gene.com/ae/AE/AEC/AEF/>

Classroom Connect

<http://www.classroom.net/>

Columbia Education Center's Mini Lessons

<http://www.col-ed.org/cur/>

Encarta Online/Encarta Lesson Collection

<http://www.encarta.msn.com/schoolhouse/lessons/default.asp>

Global SchoolNet Foundation

<http://www.gsn.org/>

McREL—Internet Connections/Lesson Plans and Activities/Language Arts

<http://www.mcrel.org/connect/index.html>

Microsoft K-12 Connection, Classroom Corner

<http://www.microsoft.com/education/mctn/corner/default.asp>

Microsoft in K-12 Education Classroom Resources

<http://www.microsoft.com/education/schools/default.asp>

NASA Spacelink—Instructional Materials

<http://spacelink.nasa.gov/Instructional.Materials/.index.html>

Organization for Community Network Academy Curriculum Exchange

<http://www.ofcn.org/cyber.serv/academy/ace/>

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http://www.ed.gov/prog_info/Labs/Profiles/

Chapter 12

Ensuring Equitable Access to Educational Technology

OVERVIEW

The Connected Learning Community offers one of the most powerful means available for breaching the barriers of class, race, income, and physical disability. For students to realize the benefits of education technology, however, teachers, administrators, and policymakers must ensure that all students have adequate and equal access to the technology. This chapter presents two strategies for ensuring that access: appropriate technology funding and professional development for teachers.

The Vision

Throughout *Technology Roadmap*, we have shown you how the Connected Learning Community harnesses the power of technology to transform the education experiences of students, teachers, and administrators into exciting, engaging, and productive ones. In the schools and districts highlighted, the Connected Learning Community *is* a reality. In those schools, students are using the Internet to access information and talk to people around the country and the world. They are learning about science and math by conducting online experiments with scientists and mathematicians and using productivity and multimedia software to sort, analyze, and present their findings. They are communicating and collaborating with peers whose backgrounds and environments may be radically different from their own, and traveling online to far-off lands to learn about other cultures as well as exploring the richness of their own. Finally, they are creating their own Web sites and sharing their work and creativity with their peers, their parents, the community, and the world at large.

The Challenges

Unfortunately, the vast majority of American schools have yet to fully realize this vision. Many schools lack the funds to buy new multimedia computers, create a network infrastructure, upgrade software and hardware, and train teachers to use technology to support meaningful learning. Without appropriate funding, schools cannot effectively implement technology programs that support engaged learning experiences or allow teachers to fully assist special needs students in overcoming barriers to learning. Consequently, these basic inequities in school funding lead to vast inequities in access to education technology.

Equitable opportunity is about having access not only to technologies, but to the *effective use* of technologies; here the key is teacher training. Technology-savvy teachers are able to provide their students with meaningful, engaged learning experiences and opportunities to interact with a wealth of resources, materials, and data sets. They use technologies such as the Internet, distance learning, CD-ROMs, and video to help students achieve challenging educational standards. In the absence of adequate, high-quality professional development, teachers cannot provide students with those opportunities.

Because today's technology *has* the potential to equalize the educational opportunities of all children regardless of their class, race, gender, socioeconomic status, or individual limitations, it is of paramount importance that your school or district's technology plan ensure your students equitable access to technology and its effective use.

The Power of Unlimited Access

For more information on Fairfax County School District's special needs program, see "Integrated Technology Services Dedicated to Special Needs" at

<http://www.microsoft.com/education/instruction/articles/fairfax.asp>.

Technology has the ability to free learning from physical constraints. Even the most geographically isolated school, when online, can tap into the same universe of information available to other schools.

And with the help of communications devices and adaptive hardware, students with limited mobility, vision, or hearing can communicate and collaborate with others. The Fairfax County School District in Alexandria, Virginia, for example, uses technology in its Special Needs Vocational Program to maximize the potential of students with varying degrees of special needs. Teachers match students with appropriate software and hardware training based on individual needs, and a mentoring program enables the students to put their skills to work in the local business community.

Guiding Questions

Merely setting up computers and networks is not enough to ensure students and teachers equitable access to the full benefits of technology. You have to develop policies and procedures that provide everyone with equal opportunities to reap the rewards of your technology systems. You can begin thinking about this issue by asking the following questions:

- How can technology resources be distributed among schools and/or classrooms to ensure equitable access?
- How will budget and funding constraints affect equitable access and use?
- How can professional development activities enhance access to and ease of use of technology by teachers and students?
- How can we address the special needs of students with disabilities and students whose first language is not English?

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Strategies

Ensuring equitable allocation of resources. The most important factor in ensuring equity in the division of technology resources is, of course, having the appropriate level of funding for your technology program. The following is a list of strategies you should consider:

- Seek outside funding for the acquisition of technology.
- Enlist community support.
- Develop a scalable system that will grow with new technologies, as new funding becomes available.
- Set policies that ensure all classrooms have the same level of resources.
- Lobby policymakers at the local, state, and federal levels to develop policies that ensure universal and equal access.

Ensuring physical access to and availability of technology. In addition to equitable sharing of technology resources, teachers and students must have equitable and convenient physical access to the technology. Again, an appropriate level of technology funding is the most important factor in ensuring access. Your technology plan should provide the following:

- A district-wide network to connect school sites, classrooms, and homes
- Access to school networks from within and outside the school
- Convenient physical access to computers and printers in schools
- Electronic mail, bulletin boards, and Internet access
- Appropriate access to extensive information resources for all staff and students
- High priority to integrating technology across all subject areas so that all students have access in all classes
- Opportunities for students and staff to use school-owned equipment at home or to have access to equipment during non-school hours
- Opportunities for students and teachers to access school information resources electronically during non-school hours

Ensuring equitable access to effective technology use. The best way to ensure equitable access to the effective use of technology is to provide comprehensive, ongoing professional development opportunities for all teachers and staff. Teachers and staff must have knowledge of and experience with a vast range of education technology equipment and its applications, and they must learn strategies for using it effectively in the classroom. The following is a list of professional development steps your technology plan should address:

- Develop training models based on helping teachers identify the most efficient use of technology in

ways that support learning goals.

- Provide teachers with hands-on practice with technology tools.
- Provide teachers with ongoing technical support.
- Establish objectives for teacher training that address the development of skills in integration of technology and curriculum.
- Provide personnel to train teachers, administrators, and staff in the use, management, and maintenance of the schoolwide network.
- Integrate technology into district curricula, classroom instruction, and staff development activities.
- Use multimedia presentations to model the integration of technology in the curriculum.
- Develop a long-term technology-training plan.
- Create a flexible cycle of training to accommodate employees' schedules and work calendars.
- Provide a site-based network of support.
- Reward and recognize staff who demonstrate the effective use of technology in their classrooms.
- Help reluctant teachers move from technology refusal to technology acceptance.

Ensuring equitable access to special needs students. Technology can help redress inequities traditionally suffered by special needs students. Students with learning disabilities may reap the greatest benefits from technology; however, they may require special programs and equipment. Your technology plan must also ensure that the technology program does not widen the gap between high- and low-achieving students.

The plan should provide for the following:

- Development and/or purchase of special technology-based products and programs for special needs students
- Programs for individualized learning that are adjustable to different styles
- Resources for students whose first language is not English so that they can master the capabilities of technologies

Remember, equitable access to technologies and their effective use can be achieved only through ongoing commitment to teacher training and appropriate levels of funding. Ensuring access should be a goal of your school or district's technology plan—and achieving it, one of the indicators of your program's success.