MEETING THE NEEDS OF DIVERSE LEARNERS

Most of the students were recent immigrants, but their experiences were diverse. Building on the important personal stories of the students, each wrote of his or her arrival in the United States. The class created a slide show using KidPix, a program that allows users to create original artwork or use stamps included in the program. Students designed their slides to include information about their home countries and about themselves. They used writing skills to plan oral presentations to record onto their slides; some made notes, some a list, and still others wrote paragraphs introducing themselves. This was a learning experience for several students, as they found that they needed more planning and practice to feel confident when they spoke. The technology permitted students to revise the artwork and the recordings at any time, and many students returned to revise pictures and rerecord the audio portion. Students often listened while other students were editing the audio; within a short time students' spoken English fluency improved noticeably. The focus was on the writing process and the success of each student. It is a sign of motivation that children had to find time between other activities to work on this project with the one computer in the classroom.

(Summarized from Duling, 1999, pp. 251-252)

PHOTO BY DENISE JARRETT-WEEKS

With increasing diversity in classrooms, educators are striving to meet the learning needs of students from widely varied cultural and linguistic backgrounds. As the above example illustrates, technology can be a powerful tool to engage all learners.

Before exploring how technology can serve students with specific needs, let's review what we know about best practices for serving diverse learners. The research literature strongly makes the case that all learners are diverse in many respects (Garcia, 2000).

To meet the challenges of educational reform, the major national subject-matter organizations have developed guiding principles based on the belief that "educational experiences are more authentic and of greater value when the curricula reflect real life, which is multifaceted" (National Council of Teachers of English, 1995). They recommend that interdisciplinary curricula for pre-kindergarten through fourth grade should:

- Foster a learning community, and respect a diversity of thought and culture; students should learn through a variety of learning strategies, learning experiences, and perspectives
- Provide a variety of opportunities for interaction and collaboration among diverse learners—for example, discussion, investigation, drama, and telecommunications
- Teach students to use a wide variety of sources, including primary sources, oral communication, direct observation, and experimentation; the use of multiple sources accommodates various learning styles, interests, and abilities
- Use multiple symbol systems—such as those used in language, mathematics, music, and art—as tools to learn and present knowledge
- Use wide-ranging assessments to evaluate both the processes and outcomes of student learning; formal and informal assessments can include observation, portfolios, and performance assessments

These approaches outline effective ways to engage young learners. They have the potential to reach all students in the classroom, including those who may not succeed in less inclusive or more traditional settings.

"Educational experiences are more authentic and of greater value when the curricula reflect real life, which is multifaceted."

Technology can be a powerful tool to use along with these recommendations. Computers, software, tape recorders, and cameras can contribute to a variety of opportunities and collaboration among students, including those at a distance who may communicate through e-mail and Web pages. The Internet provides classroom access to primary source material and other resources previously unavailable to most researchers; tape recorders and video cameras enhance the possibilities of recording oral histories and oral source material. Computers and cameras offer additional ways to record and assess student achievement.

Indeed, teachers are finding that technology can support and enhance effective classroom strategies to build language and literacy skills for students with a variety of needs, including English language learners, struggling readers, and students who would benefit from more varied assessments of their learning.

English Language Learners

Hands-on, experiential learning is recognized as a strategy that enhances understanding for ELL students, and technology offers a wealth of experiences to engage these language learners. Immersing students in experiential activities encourages true learning, and is particularly effective with children learning English as a second language. Technology can be incorporated into hands-on activities (such as those involving math manipulatives, science experiments, or social studies skits) that allow students to use both their bodies and their minds for learning. Experiential learning also provides opportunities for students to work collaboratively and many opportunities to practice oral speaking, strategies

that support the success of students who are learning English. (Costantino, St. Charles, Tepper, & Baird, 1999; Duling, 1999)

To participate in the classroom dialogue in a meaningful way, students need to share common experiences, such as being part of classroom activities that are used as the base for further learning. To support English language learners, classrooms and schools must provide many avenues for exploring, learning, and practicing reading, writing, speaking, and listening. Technology offers special promise for ELL students because it allows them to learn at their own pace in a nonthreatening environment, gives students flexibility and choice, and empowers them to make learning decisions and to be successful.

Duling (1999) describes an elementary teacher who uses cartoon strips to engage students who are beginning English language learners:

> [The teacher] selects wordless cartoon strips that students can easily understand by looking at the pictures. She first asks students to describe the picture or story orally. Telling the story becomes a rehearsal for writing as children then write their story or explanation. They can choose to either type their words on the computer or to dictate the story. Using the computer removes difficulties or discomfort with forming the letters and allows them to focus on the meaning of the text. As the students become more skilled at describing the cartoons they are offered more complex cartoon strips (paraphrased from Duling, 1999, pp. 250–251).

The appeal of the wordless pictures, combined with technology to support the process of creating written language, motivates learners as they work with new language skills. The complexity of the pictures increases as students' language skills develop, encouraging further development. This

PHOTO BY DENISE JARRETT-WEEKS

same strategy can be used effectively with beginning or reluctant writers as well, and can be further personalized by having children draw pictures for others to use as the basis of the story.

Supporting literacy and language skills in the first language provides a base for successful literacy development in the second language (Snow, Burns, & Griffin, 1998). Many English language learners have experience with immigration, either personally or through hearing family stories. Interviewing parents or relatives about their immigration fits into the social studies curriculum and enhances literacy. Children frequently conduct the interviews in their first or native language, and later translate them into English. Because they understand and have a connection with the content there is a motivation and desire to make sense of the language. Technologies that support this activity include tape recorders or video cameras to record interviews, and word processors for students to use as they transcribe the interviews and translate them into English.

PHOTO BY DENISE JARRETT-WEEKS

A learning experience that engages students in the study of their own community or culture creates a bond between students and families, generating a wealth of known information for students to read and write about, and to use in other content areas. (See sidebar on Project FRESA, Page 23.) In valuing personal experiences and the community, such projects also affirm the students' sense of self and the value of their culture. The use of technology adds to the motivation and interest, as well as to the quality of the final product.

LEARNING THE VALUE OF PLACE

Two teachers from Mar Vista Elementary School in Oxnard, California, created a cross-curricular project to help students understand the relationship between their own lives and the strawberry crops that surround and sustain the local community. Project FRESA is the collaboration developed by fifth-grade teacher Michelle Singer and third-grade teacher Amada Irma H. Pérez. Most of their students are immigrants from Mexico who speak English and Spanish. Both teachers are also bilingual.

To understand the importance of strawberries to local farmworker families, the environment, and the economy, students conducted family interviews, did research via the Internet, collected historical and geographical information, and used technology to share their findings with their school, their homes, and the global community. The interdisciplinary nature of the project meant that lessons crossed boundaries of language arts, math, and geography, and technology was used in a variety of ways. Also central to the project was the teaching of critical thinking and education to combat racism. Giving students the opportunity and language skills to voice their daily reality was a goal throughout Project FRESA.

The project offered students many avenues to develop their language skills while investigating complex topics that affect their own lives. The project Web site highlights language arts activities that reach students of diverse backgrounds and learning styles, including:

- Accessing students' prior knowledge about strawberries through brainstorming and making charts to share "what we know, what we want to know, what we learned"
- Having students interview family and community members
- Making oral presentations of their findings
- Conducting research through encyclopedias, newspapers, and magazines
- Doing quick writes on experiences related to the farmworker occupation and to the geographical area
- Writing journals
- Creating art and poetry
- Engaging in ongoing dialogue
- Posing a problem, leading to action

Students used tape recorders for interviews; still cameras, digital cameras, and video recorders for documentation; the Internet for research; word processing software for writing; spreadsheets to create graphs of information; and scanners to convert artwork and photographs to digital images. The use of technology was a central part of Project FRESA, but not the focus of the project. Each classroom had only one computer. With creativity, vision, planning, and dedication to exploring new ways of looking at and using technology in the classroom, all students received equal access to the technology.

The project allowed students to use both their English and Spanish skills to read, write, speak, and listen. Teachers Singer and Pérez point out:

> Students can communicate in one language with their parents, analyze and present information gained in another. Language is used for a purpose while developing vocabulary, grammar, research, and technology skills. All students have equal access and opportunities to actively participate in the project no matter the language, ability, age, or fluency level.

To see the Project FRESA Web site, go to:
http://equity4.clmer.csulb.edu/netshare/cti/%20FOR%20PSRTEC%20WEBSITE/Amada%20and%20Michelle/

Struggling Readers

Students who struggle with reading dread being called on to read aloud. They often appear disengaged from the learning process and experience low self-esteem, poor attendance, and discipline problems (Hasselbring, Goin, Taylor, Bottge, & Daley, 1997; Pinkard, 1999). A common but misguided response to struggling students is to reteach the same low-level skills in the same manner, keeping the focus on basic level skills in the belief that a fixed set of sequential skills need to be mastered in order to read (Duling, 1999). A child thus gets more of the same, frequently at the expense of other activities that would lead to improvement, such as concept building, reading, writing, and doing.

> Technology supports the learning and the rich experiences by offering options for students—especially important for those who fear failure.

Lower-order skills are less likely to hold students' attention, motivate them to learn, or enable them to transfer lessons learned across subjects. As a result, lower-level remedial activities rarely result in improvement in overall performance (Anderson et al., 1984; Garcia, 2000).

The use of technology for drill-and-practice activities does not improve these poor results. As Clements points out: "The effectiveness of computer learning depends critically on the quality of the software, the amount of time children work with the software, and the way in which they use it" (1994, p. 33). The most promising uses of computers are not as "teaching machines" and have nothing to do with programmed learning or drill-and-practice programs (Clements et al., 1993). A better approach is to engage students in activities that capture their interest and use these experiences as the basis for speaking, writing, and reading activities. (For more information on the selection of software, see "Considering Technology," beginning on Page 29).

Because reading and writing are more effectively taught in combination, word processing applications may be useful for improving reading skills (National Reading Panel, 2000a). Research also consistently notes the motivational benefits of technology. Seeing text on the screen encourages students to read their own and others' writing as they work at the computer, and the amount of time children choose to read and have opportunities to read strongly correlates with reading proficiency.

Teachers can build on student interest awakened by engaging activities to offer high-interest reading materials at a variety of levels. Picture books are a good source of high-quality literature suitable for a range of reading abilities. (See Picture Books sidebar, Page 25.)

PICTURE BOOKS

Picture books are sometimes overlooked as a valuable resource for encouraging children to enjoy reading and writing. While children above the primary grades sometimes consider themselves "too old" for picture books, teachers will find it easy to convince them otherwise. Most children have favorite books from their earlier years; introduce them to a few beautifully illustrated books written for upper elementary—and older—students with broader interests and larger vocabularies, and most kids are hooked.

When picture books are integrated into a classroom library, struggling readers are not stigmatized by reading them. Everyone is encouraged to enjoy the illustrations and text that is often rich with metaphor and poetic language. In a world increasingly moving toward oral language, pictures, sounds, diagrams, and videos, high-quality picture books can be effectively used with older readers. As one teacher explained:

I fill the classrooms with children's literature and picture books, those that contain the richest language and the finest illustrations. I collect children's picture books. The students know I value them because the room is filled with them. If they are mixed with all the other genres, there is no mistaking children's books as baby books. Good children's literature is for everyone, not just for young children (Benedict & Carlisle, 1992).

In *Beyond Words: Picture Books for Older Readers and Writers* (Benedict & Carlisle, 1992), teachers of older elementary, middle school, and high school students offer a wide variety of uses for both fiction and nonfiction picture books to:

- Examine genres, including historical fiction, legends, folk tales, fantasy, and poetry
- Complement a unit on science or history
- Study a variety of writing styles
- Teach reference and research skills to intermediate students
- Use as models in writing class

As models for writing, picture books are approachable for young authors. For children who love to draw, making their own artwork—with paints or crayons or created on the computer—draws them into the project, and the words follow. For those students who are intimidated by the thought of writing a lengthy piece, picture books require only a small number of words per page, and yet the child can write an entire book. Technology supports the learning and the rich experiences by offering options for students—especially important for those who fear failure—and by adding the advantages and polish of word processing; (digital or digitized photos may also be added).

Writing a picture book is also a good project to consider in collaboration with older or younger students. Dictating stories to accompany pictures allows prewriters to practice the language of storytelling, while older students take pride and receive satisfaction from using their technical and word-processing skills to accomplish an important task. When completed, the stories can be printed individually, or collected and compiled into a book for use in the classroom or the library.

Alternative Assessment

A fourth-grade teacher undertook the first multimedia project she had ever tackled with her class. Students researched an animal, and were to develop a report using software that allowed them to create links between different topics in addition to the linear flow of a written report. When students linked related topics in ways demonstrating their understanding, the teacher better understood what they had learned. As the fourth-graders showed their multimedia projects to small groups of first-graders in their "buddy" class, conversations with the younger children also revealed the depth of student knowledge. The project made the teacher a convert to looking at multiple ways to assess student learning.

The students researched the animal reports using a mix of print and software materials, a blend of research sources that is becoming common. Because students were able to construct, link, and demonstrate what they had learned in multiple ways, due to the nonlinear possibilities of multimedia technology, the teacher was able to observe the depth of their understanding.

The National Reading Panel writes that many children may benefit from the addition of multimedia instruction to a conventional curriculum (National Reading Panel, 2000b). Multimedia applications offer a wide variety of ways for students to demonstrate what they have learned, providing teachers with alternative means of assessment. Consider this description of a second-grade classroom:

PHOTO BY DENISE JARRETT-WEEKS

Second-graders at a rural school create electronic portfolios. The teacher created a template in HyperStudio, a multimedia program, then students linked several samples of their work through the year. Students created electronic slide shows of their study of the planets and of Mexico, and recorded their voices onto the slides. The electronic portfolios also include periodic audio recordings of reading samples. Children and parents can readily hear the growth in reading ability from month to month, and children love to listen to how they sounded when they were younger.

A portfolio reflects a child's individuality, encourages the child to evaluate his or her own work, and supports a child's chances for success. Technology provides wonderful tools for developing formative assessments, valuable feedback that provides opportunities for children to revise and improve the quality of their work.

PHOTO BY MOUNT BURNS

Many teachers use portfolios to collect children's artifacts, pictures, narratives, and taped reading and speaking samples to document development and growth over time (Hutinger, 1996; Liang & Johnson, 1999).

Because children are best able to show learning in ways that express their individuality, many students benefit from multiple ways of looking at and assessing learning. For some, it provides a way they can succeed when they otherwise may not. Children with special needs or who learn in nontraditional ways may not always clearly demonstrate their achievement using paper-and-pencil methods of assessment. Portfolios are practical, useful planning and reporting tools, and portfolio assessment offers many benefits. It increases the teacher's awareness of how children learn; links activities, learning, and assessment interactively; guides and supports curriculum planning; and assists in communication with parents (Hutinger, 1996).

Other uses of technology also provide alternative ways of looking at student learning. For example, there are many ways for students to demonstrate reading comprehension. One is to create a database of the books they have read. The database can serve as an assessment tool to document that a student has read the book, and can also help to generate interest in books (Kahn, 2000).

A teacher may choose to create a template for younger students, with the class helping to decide what information to include; older students appreciate the flexibility and room for individual variation of selecting which additional fields (sections of the database) they want to add.

Through summaries and their comments on the book, students demonstrate comprehension, and show their understanding of different genres and purposes for writing. As the classroom described below demonstrates, creating and adding to the database is motivating for students:

A Northwest teacher uses an integrated program supported by the district (AppleWorks) to have students create their own databases. The class first discusses which fields (database sections) must be included. The list typically reflects those with authentic purpose, mirroring other reviews students may be familiar with—summary, ratings, author, title, and copyright information—and may also include other fields that individual students choose to add. The discussion of which fields the class agrees must be included is valuable, as students think through the purpose of the project and the information a reader would expect to find.

Students add books throughout the year, and printouts are sent home quarterly to parents. Book entries reflect their growth in reading skill, comprehension, number and variety of books read, and writing skills as the year progresses. Students are happy to talk about their favorite books and what makes them special. In addition, students are eager to show the database during student/parent/teacher conferences.