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Preparing for an online future
High-tech instruction moves toward mainstream

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'The world has arrived at an age of cheap complex devices of great reliability; and something is bound to come of it.'

Vannevar Bush, 1945

These days, it seems nearly everyone is networked. The Internet, the World Wide Web, e-mail, and list serves have become part of daily vocabulary for many people. Just as individuals are finding uses for this technology in everyday life, so are more researchers and practitioners finding effective ways to use the Internet and the Web in educational settings.

Recognizing this, we want to look at why Strategic Instruction Model teachers should be concerned with online instruction. After all, we know that SIM's eight-stage instructional process of working closely and face-to-face with individuals and small groups of students works well. What can online instruction offer us and, more importantly, what can it offer our students beyond the proven effectiveness of our traditional methods of teaching?

A recent conference at the University of Kansas, "Creating Effective Online Instruction," introduced participants to four award-winning online courses:

- "CalculusQuest," William Bogley, Robby Robson, and Richard Schori, Oregon State University
- "Curriculum Development," Ed Meyen and Paul Tangen, University of Kansas
- "Integration of the Disciplines," Mark Merickel, Oregon State University
- "Murder on the Internet," Terri Nelson and Walter Oliver, California State University, San Bernardino

(See additional information about these courses on pages 2 and 3)

These courses, and the online instruction pioneers who developed them, offer us a glimpse of things to come in education and in SIM.

We are committed to incorporating the best practices of online instruction into SIM when those practices make sense. Already we know of one SIM Trainer who is teaching learning strategies to a student in another state using the Internet as the primary communications tool. Two projects developed by doctoral students at the Center for Research on Learning have explored the feasibility of adapting learning strategy instruction to a CD-ROM format. In addition, the Center recently received a grant to explore the feasibility of adapting our reading strategies to an online format.

We expect to see more such projects as the technology matures and our understanding of how to make the best use of it grows. Our experience with providing solid, effective instruction and helping students develop learning, organizational, teamwork, and social skills will be more vital than ever in a future in which visionaries foresee learners as self-motivated and able to share information, develop their own routines, and organize their time (Martin, 1999). We want to be prepared for and enthusiastic about the possibilities the future presents, not intimidated by the challenges.

What is online instruction?

Online instruction, multimedia

instruction, and educational multimedia are all similar terms used to refer to a young and still fairly undefined segment of the education field. One current definition, which fits nicely with the SIM philosophy, describes educational multimedia as programs whose primary purpose is to teach in an active and deliberate manner (Stansberry, 1998). The following examples give us an idea of the range of instruction included in this definition:

- An instructor develops a Web site to list class assignments so students always have access to this information. The Web site supplements traditional classroom activities.
- Students e-mail assignments to an instructor, who then e-mails detailed, personal evaluations of those assignments back to individual students.
- Students seeking to boost their reading skills use a CD-ROM that presents a passage for them to read, then tests their comprehension. The application gives students immediate feedback during the test.
- An instructor delivers an entire course through the World Wide Web—presenting audio and video lectures for students in diverse locations to download at their convenience, posting assignments, corresponding with students through e-mail, and encouraging discussions on a threaded discussion list set up just for the members of this class.

All of these examples have in common the use of the computer to deliver information. The field of online instruction is complex and evolving, but the following are some of the observations presented during the conference at KU:

- Online instruction is a new pedagogy. It offers improved access, active learning, and increased communication (Bogley)
- The nature of asynchronous communication, in which students and instructor need not be at the same place at the same time, allows students to set their own

CalculusQuest
http://iq.orst.edu/cq/cqlab

"CalculusQuest" is a Web-based course in differential calculus developed by Jon Dorbolo (principal investigator) with co-principal investigators William Bogley, Robby Robson, and John Sechrest of Oregon State University. The course, now revised and taught by Richard Schori, is the first course in a standard calculus sequence. The developers used a mountain climbing metaphor and wrote the course in the first person to help students feel as if they were interacting with a real person, rather than a computer. The course consists of 10 stages, each containing a lesson, practice activities, and graded activities. The graded activities allow for immediate feedback, collection of portfolios of student work, and communication activities. An online gradebook records student activities, allows the instructor to view student scores and portfolios, and tells students when assignments are supposed to be completed.

Curriculum Development
http://busboy.sped.ukans.edu/sped915/intro.html

"Curriculum Development" (offered to students as "Advanced Curriculum Development for Exceptional Children and Youth" and as "Curriculum Planning for Educational Settings") was developed by Ed Meyen and Paul Tangen at the University of Kansas. The course has been taught fully online since spring 1997. Its focus is on educational setting and reform, curriculum and design issues, and the curriculum and development process. The course uses streaming media and asynchronous teaching. It contains 16 lessons organized into three units, it requires a collaborative project, and it offers an optional orientation session. Among the supports the course offers to students are online syllabus, lesson schedule, roster, and text-based outline, glossary, and notes. A list serve provides a means of communication among students, and technical support is available to those who need it. Lectures are presented using streaming media. Each lesson begins with an advance organizer in which the instructor reviews the previous lesson and previews the coming lesson.

Integration of the Disciplines
http://www.orst.edu/instruct/ed555/home/555start.htm

"Integration of the Disciplines," developed by Mark Merickel of Oregon State University, is a graduate-level core course in the teacher licensure program. It integrates different aspects of teacher education, such as teaching theory and active research. It uses orienteering as a metaphor to maintain a sense of constancy throughout the course. The instructional strategies used in the course include inquiry-based learning, threaded activity and discussion, simulations, presentations, guided practice, problem solving, and reflective practice. The course provides multiple routes for students to reach their goals.

pace and instructors to tailor instruction to meet individual needs (Meyen)
· Online instruction can provide multiple pathways for students to get at the information they need and for instructors to deliver that information (Merickel)
· Effective online instruction promotes critical thinking skills and creativity (Oliver and Nelson)

Accessibility
Some of the greatest benefits of online instruction may be associated with accessibility. The learning strategies instruction now being conducted over the Internet, in which the teacher and the student live in different states hundreds of miles apart, is an example of how online methods can be used to provide instruction to more students in more locations. Students in rural areas and adult learners who work full time are among those who benefit from online instruction because physical presence in a classroom at a predetermined time is no longer required. Students learning in an online environment can download a lecture or contribute to a list serve discussion in the middle of the night, if that is the best time for them to participate in the class.

A related benefit of online instruction is that it allows both students and instructor to tailor the content of a course to meet individual learning needs. Students can create their own pathways through the information presented in a course and make connections in a way that interests them individually and that reflects the associative way in which the human mind operates (Bush, 1945), jumping from topic to related topic, exploring one in detail while skipping over another that seems less relevant. In this way, the student takes more ownership in the material and the learning process than he or she might in a traditional classroom.

Instructors can leverage the multimedia elements of online instruction to present the same content in a variety of formats, increasing the accessibility of the material for people with disabilities (Meyen, Lian, and Tangen, 1997). For example, information presented as text can be read by a computerized speech synthesizer for a person with visual difficulties.

Murder on the Internet
http://flan.csusb.edu/dept/VU_Info/MMClass.htm

"Murder on the Internet," developed by Walter Oliver and Terri Nelson, California State University at San Bernardino, is an intermediate-level language role-playing course. It is offered to French and Spanish students, who must collaborate to solve a murder mystery using e-mail and a list serve. A town map provided on a Web site offers additional information to students trying to solve the mystery. All communications in e-mail and on the list serves are carried out in French or Spanish. Students also must complete a number of grammar units that focus on structural elements that help them communicate effectively in the context of the mystery game. The instructors assign roles to each of the students and distribute background information periodically throughout the course. Students exchange e-mail and list serve messages with each other to learn more about the murder and about the other characters. Students must use critical thinking and analytical skills to piece together the information they learn during the exchange of messages. This information must be presented as a final project in which each student explains who he or she thinks is the murderer and why.

A combination audio/video presentation can be accessible to individuals who cannot hear as long as it includes synchronized descriptive text. (See the box on page 6 for more information about ensuring accessibility of Web content for people who have disabilities.)

The instructor also can take advantage of the multimedia and nonlinear characteristics of online instruction to address diverse learning styles (Bogley, Robson, and Schori, 1999; Negroponte, 1995). By packaging audio, video, text, graphics, and hands-on activities into a flexible presentation of content, instructors increase the channels through which individual students will be able to connect with the material in a manner that is meaningful to them.

Active learning
We know from our own research that for students to be successful, they must be active learners. Online instruction requires students to manipulate the information in some way. At its most elementary, online instruction requires students to click a button to move to the next screen. At its best, it fully engages every learner in the activity at all times, encouraging the use of critical thinking skills, analysis, and creativity, as Oliver and Nelson have discovered in "Murder on the Internet." In this way, online instruction can provide more authentic learning experiences for students. Oliver and Nelson (see box on page 3) found that students in their foreign language classes showed greater interest in learning the required material when they had a tangible reason for doing so—solving a mystery was more compelling for students than simply doing well on a test.

Tools for the future
One of the primary goals of SIM teachers is to equip students with the tools they need to be successful learners. Professionals in the multimedia industry see multimedia education as a method of accomplishing this goal (Garrand, 1997). Garrand writes that multimedia education "reflects current learning theory, which rejects the concept of empty heads waiting to be filled and replaces it with the goal of teaching students how to learn."

Communication
Online instruction, when implemented thoughtfully, with the students' needs as the primary concern, can increase communication between teacher and students and among students, as Schori has found in his Web-based calculus classes. Communication in online courses can be very personal (in the form of e-mail messages from the instructor to individual students, for example). This kind of attention can fulfill students' desire for direct validation of their efforts in class (Kilian, 1997) while alleviating some of the challenges faced by students who find many classroom settings too impersonal and thus difficult settings in which to learn. (Deshler and Berry, 1998).

The permanence of communication also can benefit both student and instructor. Readings, quizzes, announcements, and assignments posted on a Web page are available continuously (Meyen et al., 1997), for example, while the same information given orally in class is fleeting.

Along with the benefits of increased communication comes a potential increased burden for the instructor in an online setting. The time spent communicating with students can be extensive. Meyen found that he spent nearly 600 minutes per student throughout the duration of his Curriculum Development course.

Getting started

Taking SIM online
For her doctoral dissertation research, Paula Lancaster, a SIM Trainer who graduated from the University of Kansas in May, investigated the feasibility of adapting learning strategy instruction to CD-ROM. Along with her husband, Sean Lancaster, Paula developed a CD-ROM version of the *Self-Advocacy Strategy*. The CD features students as teachers and includes video, text, graphics, and audio elements. In addition to instructional sections, the CD provides inventory worksheets for reading skills, writing skills, math skills, study skills, social skills, and career and employment skills. After the student clicks through the worksheet options, the CD generates a summary of the student's strengths and weaknesses. The CD also includes a notes section and a dictionary in which words and phrases used throughout the program are defined.

For SIM teachers ready to explore in more detail this new instructional territory, information and advice about how best to accomplish your goals are available from the online instruction pioneers and multimedia professionals.

One of the first things to remember is that teaching online is not the same as teaching in a traditional classroom. Adapting traditional course material to be delivered online requires a great deal of thought, planning, and time. But much of what you already know about effective teaching can be applied to online instruction (Meyen et al., 1997). First and foremost, you must put the needs of your students first (Stansberry, 1998). Effective online instruction meets the needs of students. A very simple online application, without extensive bells and whistles, can be more effective than a slick multimedia presentation. In "Murder on the Internet," for example, most of the learning activities take place in e-mail form as students read and write messages designed to elicit information from others to enable them to solve the mystery. All of the presenters at the KU conference emphasized that technology must be used to support pedagogy. Using technology for its own sake is not an effective instructional process.

The ensure that you have a firm understanding of your students and a clear concept of what you want them to learn before you begin developing an online course, write a simple statement describing what the students will be able to do or what they will have learned as a result of your course (Horton, 1994). Supplement this with

Development Time
for Meyen's Curriculum Development course

	Hours per lesson	Total hours for course
Instructional Development	40	640
Technical Development	16	256
Total	**56**	**896**

Figure 1

specific goal statements before you begin to design the content (unit and lesson plans as well as interactive exercises) of the online course (Stansberry, 1998).

Several software programs are available to help instructors develop online courses. WebCT (www.webct.com), WBT System's TopClass Server (www.wbtsystems.com), and Web Course in a Box (www.madduck.com) are just a few of the many available. Using a Web search engine, such as AltaVista (www.altavista.com), Lycos (www.lycos.com), or Excite (www.excite.com), and the terms "online course development" will yield many resources. If you want to develop an online course, but don't feel qualified technologically, you may want to form a partnership with someone who is. Look for other instructors you may know who are developing online content. If your online plans are fairly simple (not a full course with complicated grade storage and feedback mechanisms), you may

be able to find students who are adept at using computers and who may enjoy the challenge of working with you.

The time you will invest in developing online materials can be significant. For a full online course, one estimate is that it takes 200 hours of development time to produce one hour of online instruction, compared to 60 hours of development time to produce an hour of traditional classroom instruction (Horton, 1994). Meyen found that his team spent nearly 900 hours developing the online Curriculum Development course (see figure 1).

Once your course is online, be prepared to evaluate its effectiveness and continue to modify it to meet the changing needs of your students. All of the successful pioneers in online instruction mentioned in this article continually evaluate and revise their courses. As technology advances make new features possible and as students come to the courses with more

Tip

When Ed Meyen was developing his Curriculum Development online course, he kept a daily journal of the process. During the evaluation phase of his project, the journal provided a significant amount of information about his experience that might have been lost without it. He uses the journal to share his experiences with others and to revise the development process for future online courses.

background knowledge of technology, the instructors tweak and sometimes completely overhaul their courses to make sure they continue to be relevant and effective for new students.

Small steps

Your first foray into online instruction need not be a full-blown course. Here are some suggestions for getting your feet wet in the online world:

- Develop a Web page for one of your classes listing all assignments and when they are due for a quarter or a semester.
- Set up a discussion list for one of your classes. Guide student use of the list by posing a new discussion question for them to address every couple of weeks.
- Develop a list of Web sites related to a topic you are about to cover in class. Share the list with your students.
- Have students work in groups to develop and share lists of Web sites related to a topic you have covered in class.
- Regularly visit Web sites such as LDOnline (www.ldonline.org) for ideas and inspiration to incorporate into your teaching repertoire.

Conclusion

The promise online instruction holds for improving access and for meeting the needs of students with diverse learning styles is exciting. The recurring themes of online instruction—active learning, communication, tools for the future—are an exact match for SIM principles and goals. These are the reasons, along with all the benefits we have yet to discover about multimedia, that we should

Accessibility

Ensuring that online instruction delivered over the World Wide Web is accessible to students who have disabilities is of particular concern. Even the most thoughtfully developed content is of little use if students cannot access the material. To remedy potential roadblocks for individuals with disabilities, the World Wide Web Consortium (W3C), an international industry consortium founded to develop protocols that ensure the Web works, has formed the Web Accessibility Initiative. The Initiative's Web Content Accessibility Guidelines and a related document, Techniques for Web Content Accessibility Guidelines, describe how to ensure that information delivered on the Web can be obtained by all users. The guidelines include such recommendations as providing text descriptions of graphics and video clips. For more information about the Web Content Accessibility Guidelines and the associated Techniques document, check out the following Web sites:

World Wide Web Consortium: www.w3.org
Guidelines: www.w3.org/TR/1999/WAI-WEBCONTENT-19990505/
Techniques: www.w3.org/TR/WAI-WEBCONTENT-TECHS/

be concerned with online instruction. As educators committed to improving the instruction of students with learning disabilities, we can contribute our knowledge of what effective instruction entails as we take an active role in developing this new way of delivering instruction. Because these changes are most surely coming, we have a responsibility to keep abreast of new technology, participate in the current research, develop our own online courses, and share our experiences with others who also are interested in learning more about this new pedagogy. By accepting this responsibility, we model our commitment to lifelong learning, which will only benefit our students.

References

Bogley, W., Robson, R., and Schori, R. (1999, May). CalculusQuest. Paper presented at Creating Effective Online Instruction conference, Lawrence, KS.

Bush, V. (1945). As we may think. The Atlantic Monthly, 176(1), 101-108.

Deshler, D.D., and Berry, G.C. (1998, Summer). The critical issue is how not where. Perspectives, 6-8.

Garrand, T. (1997). Writing for multimedia. Boston: Focal Press.

Horton, W. (1994). Designing and writing online documentation: Hypermedia for self-supporting products. New York: John Wiley & Sons, Inc.

Kilian, C. (1997). F2F: Why teach online. Educom Review, 32(4), 31-34

Martin, C. (1999) Net Future: The 7 cybertrends that will drive your business, create new wealth, and define your future. New York: McGraw-Hill.

Merickel, M. (1999, May). Integration of the Disciplines. Paper presented at Creating Effective Online Instruction conference, Lawrence, KS.

Meyen, E.L., Lian, C.H.T., and Tangen, P. (1997). Developing online instruction: One model. Focus on Autism and Other Developmental Disabilities, 12(3), 159-165.

Meyen, E.L., and Tangen, P. (1999, May). Curriculum Development. Paper presented at Creating Effective Online Instruction conference, Lawrence, KS.

Negroponte, N. (1995). Being digital. New York: Knopf.

Nelson, T., and Oliver, W. (1999, May). Murder on the Internet. Paper presented at Creating Effective Online Instruction conference, Lawrence, KS.

Stansberry, D. (1998). Labyrinths: The art of interactive writing and design. Belmont, CA: Integrated Media Group.

Additional resources

This list is not comprehensive. It should serve merely as a starting point for your own exploration of the resources available on the World Wide Web to support your instructional goals.

Asynchronous Learning Networks (www.aln.org)
A list and descriptions of more than 200 online courses

Council for Exceptional Children (www.cec.sped.org)
Information about the CEC's activities and events.

Division for Learning Disabilities (www.bgsu.edu/colleges/edhd/programs/DLD)
Information about DLD; includes a calendar of events.

The Global Schoolhouse (www.gsn.org)
A nonprofit corporation contributing to "the philosophy, design, culture, and content of Internet-based learning."

LD Online (www.ldonline.org)
"An interactive guide to learning disabilities for parents, teachers, and children." Includes articles and information about many LD-related topics.

Learning Disabilities Association of America (www.ldanatl.org)
Information, resources, and fact sheets related to LD.

National Center for Learning Disabilities (ncld.org)
LD-related reports and resources.

National Health Information Center (nhic-nt.health.org)
A health information referral service providing links to many organizations.

Technology in Education Consortiums (rtec.org)
A network of organizations established to help educators successfully integrate technology into classrooms.

- SCR*TEC: South Central Regional Technology in Education Consortium (www.scrtec.org)
- NETC: Northwest Educational Technology Consortium (www.netc.org)
- PSR*TEC: Pacific Southwest Regional Technology in Education Consortium (psrtec.clmer.csulb.edu)
- NCRTEC: North Central Regional Technology in Education Consortium (www.ncrtec.org)
- NetTech: Northeast Regional Technology in Education Consortium (www.nettech.org)
- SEIRTEC: Southeast and Islands Regional Technology in Education Consortium (www.seirtec.org)

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