Technology-Assisted Adult Learning

This three-year research alliance could be a model for other business-education ventures.

By CAROL A. CARRIER

Partnerships between business and education have a long history. The founding of Cornell University in 1865 was one of the earliest joint ventures linking business and academe. Recently, the *Journal of Instruction Design* described a study by O.W. Cummings outlining the major types of cooperation between business and educators: faculty consultancy, training program development and delivery, training program evaluation, and support of research. The partnership featured in this article spans several of these categories.

The Alliance for Research and Development in Applied Learning Technology, now in its third year, is a partnership between the University of Minnesota and the Wilson Learning Corporation to promote cooperation in research, training, and development. A major objective for colleges of education at institutions like the University of Minnesota is to produce basic research on teaching and learning. Businesses like Wilson Learning seek to apply what is discovered from such research to the problems of adult learners in work settings. Wilson Learning saw that these two organizations had much in common and that together they might address the issues of learning in a way that would be more powerful than their independent efforts.

Questions, issues, and problems

Among the questions that the Alliance believed should be addressed were the following:

- Can "learning how to learn" be taught?
- How do adults learn?
- How can technology be used to deal effectively with large numbers of learners?
- How do you identify critical learning or cognitive styles and adapt instruction to these?

In general the problems that concern the Alliance center around the "learning crisis" individuals and organizations face because of the rapid growth and decay of information and the needs created by certain demographics.

Of the many factors contributing to this learning crisis is the sheer proliferation of new information. In a recent television interview on CBS's "Sunday Morning," Daniel J. Boorstin, head librarian of the Library of Congress, illustrated the impact of our information environment by putting it in the context of another age. Essentially he said that a person in the sixteenth century processed no more information in a lifetime than the equivalent of the information in a single copy of the *New York Times*!

Estimates for the so-called half-life of an engineer's education illustrates this point dramatically. Simply stated, two years after new engineers leave engineering school, one-half of the information they learned there has become obsolete. The rapid increase in volume and subsequent decay of information touches all professions.

Compounding the problem is a population factor with no historical precedent. According to the last census, the U.S. population exceeds 200 million. That part of the population born in the years 1945 to 1959—the heart of the postwar baby boom—is now in the 28- to 42-year-old age range. In actual numbers this represents more than 80 million people, or 40 percent of the total population.

Add to that startling statistic another fact: In *USA Today*, Ronald Kutscher of the Bureau of Labor Statistics stated that a large proportion of those in the 27- to 32-year-old range will change occupations three to four times in their working lives. His prediction is not hard to accept when you consider how growing technologies, changes in the natural resource base, and the influx of new information can change whole economies and industries almost overnight.

Escalating change is reaching crisis proportions, and it is not a crisis of information as much as one of learning. This crisis touches everyone involved in the learning business—from actual to traditional educational institutions. In the past the typical response to change was to create a course or curriculum to transmit new information to the learner, but that solution is no longer adequate. The changing nature of information and the number of people needing access to it require a shift in focus from the information to the learning process itself.

Components of the Alliance

The Alliance for Research and Development in Applied Learning Technology formally began with the signing of an agreement between Wilson Learning Corporation—which donated $1 million to be delivered in 10 installments across 10 years—and the University of Minnesota. This document outlined the general nature of their partnership. The Alliance's specific structure evolved as representatives from the two organizations began working together to define its components.

The Alliance's primary goal is to foster research in technology-assisted adult learning. To advance achievement of this goal, the Alliance instituted four award programs supported by several dissemination activities.

- *Faculty research awards.* This program offers three faculty research awards at a maximum of $10,000 each per year. Consistent with the Alliance's main goal, the proposed research must involve adult learners and some aspect of technology-assisted learning. Faculty applicants must submit five-page proposals describing their research plans, including a section on how research results could relate to business. See the sidebar for two examples of Alliance-sponsored faculty projects.
- *Dissertation fellowships.* Each year three $5,000 dissertation awards are made to doctoral students who have passed their preliminary examinations and defined their dissertation research problems. Each applicant must submit a five-page proposal describing the proposed study and a letter of recommendation from a faculty advisor. Again, the awards are reserved for people whose research involves adult learning and technology.
- *Doctoral fellowships.* Each year two

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Research Project Examples

The following are two examples of Alliance-funded research projects.

Research on distance delivery of instruction and training

In her research-in-progress, Jerry McClelland, University of Minnesota associate professor of vocational education, is exploring one approach to "distance education" for adult students: interactive television. She is interested particularly in studying the interactive process between the adult students and the teacher.

McClelland's first task is to establish a method to study that interaction. She plans to videotape a front view of each classroom, a view of the teacher, and a view of the signal received by the teacher and the learners at remote sites. Then the recorded behaviors of teachers and learners can be synchronized for analysis.

McClelland will examine the relationship between teacher and learner behavior and other variables. The framework for her research program is drawn from Dunkin and Biddle's model for the study of teaching. That model categorizes the following four classes of variables:

- *Presage variables* concern the characteristics of teachers and include teacher formative experiences, teacher education experiences, and teacher properties.
- *Context variables* concern conditions under which teachers teach and include such elements as student characteristics and the classroom environment.
- *Process variables* include what teachers and learners do and include teacher behavior, student behavior, and changes in either.
- *Product variables* concern teaching outcomes including immediate and long-term learner effects.

McClelland will study how telecommunications technologies affect each of these classes of variables. For instance, how will the lack of a live teacher in the room affect class discussion? As more organizations turn to telecommunications for training, answers to questions such as that will help them formulate more effective ways to harness the power of these emerging technologies.

Learning styles and feedback in computer-based instruction

Will adults with different learning styles react differently to opportunities to select feedback as they work through a computer-based lesson? This was the fundamental question that Greg Sales, an assistant professor at the University of Minnesota, addressed in his study.

Research on David Kolb's learning style instrument suggests that individuals have characteristic learning styles that may predict how they will react to events in instruction. For example, *accommodators* prefer hands-on experience with real problems. They do not like to engage in theorizing and become impatient if an instructor is too conceptual. *Convergers*, a second type of learner, enjoy the abstract conceptualization process and are less concerned with solutions to problems than how one arrives at the solutions. *Divergers*, in contrast to convergers, emphasize concrete experience and reflective observation. Divergers are usually imaginative and do well at coming up with alternative ideas and anticipating implications of those ideas. *Assimilators* blend preferences for abstract concepts and reflective observation. Their strength is in combining observations to form theoretical models.

Sales reasoned that these different kinds of learners might also behave in different ways when selecting feedback from a computer-based tutorial. He designed a lesson for teachers in which they were to learn how to identify different types of learning outcomes they would require from their students. The lesson provided instruction to help teachers differentiate among five learning outcomes: discrimination, concrete concepts, defined concepts, rule using, and problem solving.

Sales constructed practice items that required responses from the teachers. Once they responded some teachers in the study were allowed to choose which of four types of feedback they wanted: no feedback; knowledge of results, which tells you if you were right or wrong; knowledge of correct response, which tells you if you were right or wrong and shows you the correct answer; or elaborative feedback, which tells you if you were right or wrong and explains the reasoning process for the correct response.

A second group of teachers in the study were never allowed to choose the type of feedback they would receive. These "program control" teachers always received the fourth category of feedback, elaborative feedback. A third group of teachers, the "adaptive control" group, were allowed to choose the type of feedback they wanted as long as they didn't make too many consecutive mistakes on the practice items. If they made more than three errors in a row, their opportunity to choose was removed and they automatically received elaborative feedback.

Before they began work on the computer-based tutorial, Sales assessed teachers' learning styles. It turned out that, in the pool of 74 teachers available to the study, only two learning styles were represented in sufficient numbers: divergers and accommodators.

Sales found that when given an opportunity to select the type of feedback they wanted, most teachers, regardless of learning style, tended to select the most elaborative feedback available. This was an interesting finding because much of the research on giving learners opportunities to control their own path during instruction suggests that even adult learners choose "the path of least resistance" and fail to select as much instruction as they need. Sales argues that perhaps because his lesson was challenging to these teachers, they wanted all the help they could get!

The study results also hinted that adaptive strategies may not be best for some types of learners. Divergers in the treatment that took control away when they had made too many errors—the adaptive control group—performed worse than divergers in the other groups. True to their style, these learners apparently liked to do things their own way. Once they exerted control within the program, perhaps they found it demoralizing to have control rescinded. The same pattern did not occur for accommodators under the adaptive control treatment.

From the Sales study, we can see that the design of computer-based training materials should be sensitive to learners' individual differences. As technologies to be used with adult learners become more interactive, it is important to continue exploration of how to use learner control productively.

fellowships are awarded to doctoral students. Nationwide recruitment is carried out for top students who wish to study technology-assisted adult learning. These awards provide recipients with an $8,000 fellowship during their first year of study, a guaranteed graduate assistantship during the second year of study, and an opportunity to apply for an Alliance dissertation fellowship during their third year of study.

■ *Internal contracts.* This program awards contracts to University of Minnesota faculty for work on specific projects initiated by Wilson Learning Corporation. Wilson Learning staff identify a faculty member they believe would be able to contribute to one of their development or research projects. A Wilson representative and the faculty member discuss tasks the faculty member would be expected to complete and estimate the time needed to do so.

Once they reach an agreement, the faculty member approaches his or her department chair with a proposal. The proposal may recommend, for example, that Alliance funds buy the faculty member some release time during the year, be set aside to finance his or her travel, or be paid as salary during the summer when he or she is not working for the University. Once the department chair and faculty member reach agreement, the proposal is sent to the dean for approval. Finally, the proposal is submitted to the Alliance Review Committee. With the Committee's approval, money for the faculty member is transferred from the University Foundation to the department for disbursement as detailed in the approved proposal.

Many aspects of the contract program appeal to faculty members. First, it gives them an opportunity to work on interesting projects that use their expertise. In turn the projects enrich the professors' expertise and may offer them additional professional opportunities for writing and publishing. Second, through these contracts they establish valuable relationships that may lead to consulting opportunities later. Third, because these are internal contracts rather than outside consulting, the arrangement "counts" as obtaining research and development money, so it is recognized as valuable within the University's reward system. Fourth, the contract provides the faculty member immediate perks such as summer money, research assistance, release time, or travel funds.

Outcomes

An annual symposium at Wilson headquarters is the primary means for dissemination of research findings from Alliance-sponsored projects. Student and faculty research award recipients each team up with a Wilson staff member to prepare and present a summary of the background and design of their research, its findings, and its possible implications for business problems and products. Up to now audience members have been Wilson personnel and University faculty and graduate students. In the future, Wilson Learning clients also will be invited to attend.

The Alliance partners have learned many lessons about business-education partnerships. Both understand the commitment of time and money required to sustain their partnership. As the Alliance evolves, the partners expect to continue to refine the research agenda that reflects their joint interests.