THE CBT CRAFTSMAN

Instructional Gain By The Numbers

The old line, "you pay for what you get" applies to training, too. So if students learn a lot, it's worth paying more for their training. But how much is "a lot?" That depends on who the students are and what they're learning.

Jesse M. Heines

A number of sessions at *Data Training's* recent Computer-Based Training Conference focused on cost justification. Just how much it costs to develop the proverbial "hour of CBT" is a subject of wide-ranging debate, but most agree that this cost is clearly greater than that to

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develop an hour of less technologically sophisticated training. Assessing cost, however, is only one aspect of filling in the terms of your company's favorite "bang-for-the-buck" formula. As Donald Cook pointed out in his session, there seems to be a distinct lack of attention to assessing the other aspect—instructional gain. If we can show a significant increase in "bang," we may be able to justify a commensurate increase in "buck."

Instructional gain can be assessed in a number of ways, but all such assessments must include indications of the complexity of the subject matter and the experience of the student. You may be able to show a huge pretest/post-test gain when you teach a simple but previously unknown concept or skill to an experienced audience. But such a gain may be less valuable to your company than the small but statistically significant gain when you teach a complex concept or skill to an inexperienced audience. For example, teaching executives advanced word processing skills may have less effect on the quality of your company's written communications than teaching word processing operators basic grammar and editing skills.

Any measure of instructional gain must therefore be qualified by an indicator of the sophistication of the training. Note that

CBT is not the only form of sophisticated training. Indeed, some CBT is very unsophisticated. By sophisticated training I mean training that is planned to meet explicit objectives, organized into a hierarchy of prerequisite skills, structured to present material in a variety of formats, and designed to be responsive to the needs of individual students.

To help gauge the sophistication of training required, I propose the Training Sophistication Quotient or TSQ, an indicator computed by dividing a measure of the complexity of the subject matter by a measure of the experience of the student:

$$TSQ = \frac{\text{Complexity of Subject Matter}}{\text{Experience of Student}}$$

With one glance at this formula, you probably realize that as the complexity of the subject matter increases, the TSQ increases as well. It may take a second look, however, to realize that as the experience of the student increases, the TSQ decreases. To put it in less mathematical terms, the formula not only indicates that complex subjects require sophisticated training methods, but also that simple subjects require sophisticated training methods when students are inexperienced.

The accompanying table makes the implications of these statements easier to

understand. It also highlights the premise that little or no worthwhile training may take place if the student is inexperienced and the subject matter is complex; the subject is too hard for the student. Conversely, little or no worthwhile training may take place if the student is experienced and the subject matter is simple; the student will simply be bored.

The value of the TSQ becomes even greater when you consider today's predominant trends in data training. First, the subject matter in most of today's courses is becoming increasingly difficult. Word processing courses used to teach little more than the concept of an electronic typewriter; they now include the concepts of data storage (e.g. on-line mailing lists), list processing (personalization of form letters), machine communications (electronic mail), and basic bookkeeping (spreadsheets). At the same time, today's students are arriving at our doorstep with little or no experience in related subject matter. Where on-line editing was once the domain of software engineers, it is now done by data entry personnel right out of school. This latter trend is of course due, in part, to increasing specialization in technical fields, but the result is still a less experienced student population.

When doing cost-justification analyses, then, Donald Cook entreats us to combine our assessments of instructional cost with assessments of instructional gain. When analyzing instructional gain, the TSQ highlights the need to extend our considerations of subject matter complexity with considerations of student experience. The relatively high cost of CBT and other sophisticated training methods might be justified in many courses where relatively small instructional gains are made, provided that the courseware is appropriate for very inexperienced students. This is especially true in courses that prepare underprivileged students to enter complex high-tech training programs, where such cost justification has long been the backbone of affirmative action. □

		Inexperienced	Average	Experienced
Complexity of Subject Matter	Complex	Subject Too Hard for Student	High TSQ	Medium TSQ
	Average	High TSQ	Medium TSQ	Low TSQ
	Simple	Medium TSQ	Low TSQ	Subject Too Easy for Student
		Inexperienced	Average	Experienced
			Experience of Student	

As the complexity of subject matter increases, so does the Training Sophistication Quotient, but as the student's experience increases, the TSQ decreases. In less mathematical terms, the formula not only indicates that complex subjects require sophisticated training methods, but also that simple subjects require sophisticated training methods if students are inexperienced.