Chapter XII
The Complexities of Measuring Technological Literacy

Marcie J. Bober
San Diego State University, USA

ABSTRACT

Evaluating the impact of technology infusion is fraught with challenges. In this chapter, the author argues that the variance in evaluation rigor and quality about which so many complain depicts definitional confusion about technological literacy—the central premise underlying nearly all technology initiatives. She offers strategies for improving how we operationalize technological literacy as a construct—in part by drawing on the best of the many standards systems proffered by well-respected professional associations and educational agencies. She closes the discussion with a brief examination of other evaluative complications that exacerbate measurement/assessment—to wit, the criticality of engaging stakeholders; timely evaluator selection; and robust, up-front evaluation design and planning,

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Schools committed to technology infusion—those that actively develop infrastructure, acquire hardware and software, and provide professional development—generally seek *sponsors* to fund their efforts (e.g., federal, state, or local governments; private foundations, often tied to large corporations). Evaluating the im-pact of these often large-scale, multi-year initiatives is fraught with challenges (Ertmer, 2003; Rockman, 2004). One confounding factor is the pilot or demonstration nature of so many programs and projects—a *fluid* condition that breeds idiosyncrasies that thwart comparative analysis and rigorous measurement. Two federally funded initiatives—*Technology Innovative Challenge Grants* (TICG, launched in 1995) and *Preparing Tomorrow's Teach-*

ers to Use Technology (PT3, launched in 1999)—aptly demonstrate this situation. As their Web sites detail,[1] many projects—especially those awarded in each initiative's later years—were led by consortia with members whose level/nature of involvement, commitment, and backgrounds varied dramatically. Some projects were fairly localized; others, however, featured a broad stakeholder/constituency base. Though overarching goals and outcomes were fairly common across projects, enabling and terminal objectives tended to be tailored/particularized to institutions and the oversight state agencies and/or professional associations with which they were affiliated. As important is that few projects were static, either administratively or procedurally. Turnover in personnel was the norm rather than the exception, as were changes in project scope and direction (Ertmer, 2003; Johnston & Toms Barker, 2002).

Despite fluidity and other complexities just described—factors that clearly affect how project assessment unfolds—evaluators have long been interested in educational technology and its potential to positively affect instructional processes. Robust assessment of technology integration/infusion (including use and access, professional growth, and influence on academic and other performance indicators) dates back to the Apple Classrooms of Tomorrow (ACOT) project[2] where—over a 13-year period (1985-1998)—researchers studied how the "routine use of technology by teachers and students [in seven classrooms, representing a cross-section of primary and secondary schools] might change teaching and learning."

The past decade, in particular, has been witness to a virtual flood of evaluative research on technology—conference sessions, technical reports, white/position papers, journal articles, and texts—both at the K-12 and university levels. Unfortunately, not all investigations have

been methodologically stellar; few, in fact, have attempted to replicate or even extend the processes that ACOT meticulously advocated and modeled.[3] By 1998, staff at the Office of Educational Research and Improvement (OERI)[4] were sufficiently concerned about evaluation quality *and* accuracy to fund invitation-only institutes (offered at the University of Michigan in 1999 and 2000) where evaluators assessing grants associated with such prominent federal initiatives as TICG, Star Schools[5] and PT3 could share ideas and experiences (best practices, lessons learned) and build a repository of evaluation tools for colleagues to adopt or adapt. OERI also sponsored publication of a *how-to guidebook* for the "nonevaluator" (generally, a building-level resource teacher or technology coordinator) and a *sourcebook*[6] whose contributors focused on:

- the theoretical constructs associated with measuring growth, impact, or change in specific areas (e.g., learner outcomes in the cognitive or affective domains; pedagogical changes among teachers, technology integration);
- current evaluative practices in each of these several areas;, and
- different (but promising) measurement approaches.

Linda Roberts (2004, pp. viii-x), Director of the Office of Educational Technology[7] during the Clinton Administration, elaborates on specific OERI concerns. She details an array of measurement shortcomings that include evaluator inexperience or naïveté *as well as* a tendency among evaluators to target only a few classrooms or schools, explore short- rather than long-term effects, narrowly focus on individual experiences that cannot easily be generalized to other groups or settings, omit critical details about students' actual technology-sup-

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