

From the Guest Editor's Desk

By Susan M. Frey



Welcome to the special issue on instructional design and technology (IDT). This is an exciting time for librarians. We are becoming increasingly involved in the systematic design of instruction as we serve diverse populations grappling with the glut

of information now offered online. Assembled here are a variety of papers written by librarians and educators working on interesting projects, offering practical advice on how to use technology to teach, supervise, manage, and inform. Also included are thoughtful pieces on the nature of the field. In this vein I'd like to briefly review what a few of the leading researchers have to say about defining the field by citing historic works reprinting in Ely, D., & Plomp, T (Eds.). (2001). *Classic Writings on Instructional Technology*, V 2. Englewood, CO: Libraries Unlimited. Unless otherwise noted, all works and quotations cited here come from this source.

Robert Heinich, in his influential 1984 journal article, *The Proper Study of Instructional Technology*, puts forth the provocative argument that although the field is allied with education, it should be thought of as a subset of technology because its roots are in a systems approach to solving educational problems. The word "systems" here is exemplified by the breaking down into discrete elements the process by which instructional media is created and evaluated. Heinich asserts that thinking of instructional technology as a branch of education gives the field a purely service, and therefore subordinate orientation (i.e. assisting teachers in the classroom) and imposes severe philosophical and conceptual limits on research and theory. In describing educators' historic reaction to educational technology he accuses teachers and administrators of what I would call a neo-Luddite response to technology.

Since, he claims, instructional technology has the potential to not just assist teachers but to replace them, it has gone the way of many technologies that politically and economically disrupt the status quo; it has been managed, restricted, and contained. Heinich uses examples from industry in which new technologies have caused fear of redundancy among the workforce to illustrate this point. To me, there is no better way of expressing the author's view than to reiterate his assertion: "If you build a better mousetrap, is it the mice who rush to buy it?" (22). Heinich's turning to industrial relations to help illustrate what he considers education's hold on educational technology reinforces the field's roots in the management sciences. That Heinich examines management issues at all demonstrates that educational technology is so much more than just the design and evaluation of educational media. It makes sense that if one is to design a better mousetrap, one must also consider the building, distribution, and marketing of it, if it is to be widely adopted and utilized. Educational technologists have traditionally looked to teachers as their client-base. To Heinich, this is a mistake. He believes that educational technology is more simpatico with management.

Besides fear of redundancy, what else could prompt teachers to relegate educational technology to the background? Heinich writes of the persistent "myth" in education — that the teacher must be intimately connected to the pupil in time and space — and that this closes teachers and administrators' openness to some educational delivery systems and to a variegated workforce (i.e. using paraprofessionals to take on some of the teacher's duties). Heinich once again looks to other fields for insight: "Both physicians and dentists long ago abandoned the notion that the individual in most frequent contact with a patient is in the best position to know what that patient needs" (20). I cannot help but relate Heinich's assertion to Dick & Carey's 1978 journal article, *The Systematic Design of Instruction: Origins of Systematically Designed*

Instruction. Specifically, to the distinction these authors make between the humanistic and behavioral approaches to education. While Dick & Carey clearly believe both approaches have a place in educational technology, their definition of the humanistic approach as focusing on "... the importance of the interactive relationship between the teacher and the student..." (72) describes, for me, Heinich's "myth." But if, as Heinich asserts, educational technology is relegated to a subordinate role in the field of education, why do educational technologists persist in aligning themselves with education? Heinich provides some reasons: a sense of disloyalty to education, the disconnect between what educational technologists can do and what the establishment allows them to do, the need to change from a service/nurturing role to a leadership role, and difficulty in analyzing one's own profession. In further defining technology Heinich asserts that it is replicatable, reliable, uses algorithmic decision-making, can be distributed to the masses, and can be mass-produced. In setting a new research agenda Heinich calls for the field to embrace its technological heritage by engaging in more naturalistic, field-based research designed to improve the technology rather than prove or validate the use of technology in the first place. But Heinich believes that this can better be achieved if educational technology aligns itself with technology, and not education.

Dick and Carey's article provides a clean, general systems model for instructional design. This model is the "stuff" of systems analysis, and is about the designing of something and thus is applied rather than theoretical. Most interesting is how the authors enthusiastically describe the changing role of the teacher from information disseminator to that of facilitator and evaluator. This is exactly the perceived challenge to teacher authority that Heinich claims is a one of the downfalls of educational technology. Dick and Carey's instructional design model contains a component on writing performance objectives. Like many innovations, this looks obvious to us today — of course one would want to define learning outcomes! But I am mindful of Robert Morgan's assertion in, *Educational Technology: Adolescence to Adulthood* (originally published in 1978) that the requirement of defining learning outcomes was an effect of the adoption of programmed instruction in schools (260). Dick and Carey also provide a comprehensive description of a learning module. I see a learning module as a discrete

component, a technological "widget" (my word not theirs) that can be mass-produced, joined and disjoined from other components, and mass-distributed. The components of Dick and Carey's model for instructional design are: identify an instructional goal, conduct an instructional analysis, identify student entry behaviors/characteristics, write performance objectives, develop criterion-referenced tests, develop instructional strategy, develop and select instruction, design and conduct formative evaluation, and revise instruction. Wedded to this model is: conduct summative evaluation (but this last component is not strictly part of the design process itself).

Morgan provides a succinct review of educational technology's multidisciplinary and seemingly fragmented intellectual heritage, citing influences made to education by communications, management sciences, and the behavioral sciences. Unlike Heinich, Morgan does not separate educational technology from the field of education. His review helps to frame the question: How does one define educational technology? I wonder; perhaps the field's preoccupation with defining itself comes from its multidisciplinary antecedents, or perhaps from the fact that it is still a young discipline. Nevertheless, as Morgan highlights some of the contributions made to education by other disciplines he sees this eclecticism not as a weakness but as a strength — making the field more robust. I tend to agree. Heinich probably would endorse educational technology's continued connection with management science and perhaps communications, but I think he would not want to include any Skinner boxes. In outlining innovations that programmed instruction had a hand in bringing about in the 1960s, Morgan describes these contributions as the field of education's harvesting the intellectual talent of professionals from other disciplines, a new focus on learning outcomes, and the success of learning outcomes tied to the quality of instruction (and not just to the individual student). In citing specific examples of programmed instruction Morgan provides additional scenarios that relate back to Heinich's assertion that educational technology was not wholeheartedly embraced by the educational establishment. Morgan describes CMI (computer-managed instruction) thusly: "Once a course has been developed, its use by students is limited only by availability of a terminal connected to the main computer and access to the associated instructional materials" (261). This description conforms

exactly to Heinich's assertions that instructional technology (or technology, if you will) must be replicatable, reliable, use algorithmic decision-making, be distributed to the masses, and be mass-produced. But Morgan goes on to explain that such CMI systems were very expensive to set up. The expense of the start-up costs would be presumably recouped if the system were used widely, because Morgan explains that the cost per-student for computer time was low. However, as Heinich explains, many schools declined to invest economically and emotionally in such programming. Morgan asserts that when researchers took their work into the field, they encountered a whole set of problems that were "...political, economic, and procedural" (263).

But after cursorily reviewing this small set of canonical works that attempt to define the field of IDT, perhaps the most attractive definition for me is David Wiley's, which appeared in a 2002 article in *TechTrends* (entitled: A Definition of the Field. *TechTrends*. 46, 59) because it unashamedly embraces the eclecticism described by Morgan. In fact, Wiley pulls in a myriad of disciplines such as educational psychology and computer science into his definition. I write "attractive" because as a librarian I embrace an open approach to everything I study. Like many in the profession, I have not practiced librarianship for twenty-five years without being shaped by the library environment where a question on any topic, centered on any time period, using any approach, in any field of endeavor can be (and often is) posed in any language, by someone coming from any country. A two-headed monster plagues many librarians: one head organizes everything into manageable taxonomies, and the other sees the breath of human knowledge as interlaced and seductively messy. So my sympathies resonate with Wiley because he is not so concerned with defining educational technology by domains or disciplines. He focuses instead on a *shared purpose* [my emphasis]. In essence, Wiley doesn't care in what discipline you got your degree; but if you "...seek to support learning through the application of technological solutions to instructional problems" (60) then to him you are an educational technologist. I believe that this approach, though more open than Heinich's, is more realistic and productive because it is less ridged and more adaptable. Finally, for a superb counter to the teaching-as-a-system argument I recommend reading Larry Cuban's 1986 book, *Teachers and Machines: The Classroom Use of Technology Since 1920*. New York: Teachers College Press.

Cuban's book provides a compelling case for describing teaching as an art, and makes a satisfying counterpoint to Heinich's views.