

1999

# The Dangers of Theory-Based Design

Brent G. Wilson

*School of Education and Human Development at the University of Colorado Denver, [brent.wilson@ucdenver.edu](mailto:brent.wilson@ucdenver.edu)*

Follow this and additional works at: [http://source.ucdenver.edu/ilt\\_publications](http://source.ucdenver.edu/ilt_publications)

 Part of the [Instructional Media Design Commons](#)

---

## Recommended Citation

Wilson, B. G. (1999). The dangers of theory-based design. Invited paper to ITForum. ITForum is the premiere listserv for instructional technology professionals. Periodically, they solicit research papers from leaders in the field as a basis for discussion. This paper was presented to the listserv January 1999, followed by a week of online discussion and critique. Online: <http://carbon.ucdenver.edu/~bwilson/dangers.htm>

This Article is brought to you for free and open access by the Information and Learning Technologies (ILT) Faculty Scholarship at source. It has been accepted for inclusion in ILT Faculty Publications by an authorized administrator of source. For more information, please contact [kelly.ragland@ucdenver.edu](mailto:kelly.ragland@ucdenver.edu).

# The Dangers of Theory-Based Design

Brent G. Wilson

University of Colorado at Denver

In an earlier paper (Wilson, 1997), I expressed an ambivalent stance toward theory: On the one hand, I am instinctively drawn to intellectual debates and to theoretical discussions. Just like music and literature, a good theory is something to appreciate aesthetically. And the practical impact of powerful ideas can be enormous. On the other hand, I have grown increasingly wary of how theory is commonly used and abused--when talking amongst ourselves, and when working on problems of practice.

This paper continues that discussion. I want to talk about how we use theory in instructional design--as researchers and practitioners. I intend to take a somewhat cautious stance, arguing that care needs to be taken when considering theory-based approaches to practice.

I begin with a narrative, tracing certain currents within the field of instructional design (ID). While the story below is somewhat familiar, it is not complete or objective. My intent is to convey how certain views have evolved over a period of years, then to provide a framework for continuing the theory/practice discussion.

## **The Old Days: Searching for a Complete Theory of Instruction**

In the old days--back when I was a doctoral student in the 1970s--researchers like Gagné, Merrill, Glaser, Scandura, Briggs, Tennyson, and Reigeluth sought to identify the principles and rules governing effective instruction. I remember my first student paper drew heavily on Art Lumsdaine's (1964/1996) vision of a science of instruction:

In view of the complexity of human learning and the diversity of human learning tasks, we can expect to find relatively few universal generalizations that hold for all classes of instructional objectives, all classes of learners, and all conditions of instruction. Rather, what is likely to be most needed is a series of contingent generalizations that take account of the interactions of variables. (Lumsdaine, 1964/1996, p. 79).

A science of instruction would accumulate rules for designing instruction, depending on specific objectives, learners, and conditions. The matrix of rules for various cases would become our grand theory of instruction. How would we discover these rules? Lumsdaine suggested:

...factorial experiments in which two or more variables are studied in combination, so that qualifications on a generalization can be determined, and we may validate

contingent generalizations of the form: "Under condition A, result one is obtained, whereas under condition B, result two is obtained." (Lumsdaine, 1964/1996, p. 79)

I remember conducting such factorial experiments, aimed at identifying conditions for applying different instructional rules and strategies--presenting rules, examples, and practice with feedback of various kinds; learner control over instructional components; advance organizers; etc. We expected that with accumulative research, we could identify which strategies to apply under different conditions, in order to best facilitate learning.

In retrospect, it is clear that the underlying assumptions implicit in this view were rarely examined, which indeed is a marker for a stable scientific paradigm (Kuhn, 1970). The mindset of identifying optimal conditions for instructional design came to be termed the "conditions-of learning" paradigm (Ragan & Smith, 1996), and continues to hold some force today.

## **The Cognitive Turn**

The advent of the Information-Processing Revolution in the 1970s and 80s was cause for reform but did not fundamentally challenge the prevailing mindset. Information-processing psychology, like behaviorism, tended toward objective views of machine-like processes. The status of ID theory was challenged, however, when some researchers, following the expert-novice research method, studied instructional designers carefully and found a general disregard for strict application of theory or models of any kind. If expert designers weren't simply applying theory or following a given model, what were they doing? This was an early indication that the relationship between ID theory and professional practice is indeed complex.

The 1990s brought on the Constructivist Revolution. This version of cognitivism aimed deeper and challenged many cherished notions. For example, as we have noted, prevailing ID theory assumed that strategies could be prescribed for teaching under different conditions. Constructivists argued that such an approach bypassed the most important step--that of individual meaning construction. Students could interpret a given strategy in so many ways, some would learn while others would not. A science or theory that skipped cognitive processes and constructions could hold no lasting value. Moreover, many constructivists challenged the whole positivist stance of the field, and looked for alternatives to mechanistic explanations of learning. Focus shifted from quasi-scientific ID theories, partly descriptive and partly prescriptive, to a qualitative focus on the thoughts and reflections of designers, teachers, and students. Theorists advocated the construction of open learning environments wherein students participate more directly in shaping learning goals and choosing activities. Impetus to this move came in the form of new technologies (hypertext, multimedia, Web) which made such environments more popular and amenable to study.

## **Responses to Plurality**

Constructivism marked only the beginning. Reflecting the turbulence in psychology and social sciences generally, instructional design has, in Dave Merrill's words, been "tossed to and fro" by storms of increasing violence and frequency. Critical theorists offer postmodern critiques that attack the grounding of a "science" of instruction. Feminists challenge the authority of invisible subject-matter experts and a mindset that seeks to control and optimize learning for others. Situativity theorists question the notion of designers standing apart from the discourse and

practices of the community. Activity- and systems theorists see knowledge in the activity, relationships, and interactions among people and tools. More than ever before, the field of instructional design--and education more generally--is in a state of indeterminacy and indirection. The old paradigm has been toppled from its dominant position, yet we have no clear successor. The result is a plurality and multiplicity of models and theories that can be daunting to both researcher and practitioner. I can understand Dave Merrill's reaction, wherein he calls for a return to the comforting values and beliefs of a prior time. Yet surely, returning blindly to an objectivist epistemology and simple belief in science will not make the storms go away. What are we to do in such times--both as practitioners and as researchers?

One response to the confusion is fairly traditional: You speak up a little louder, promoting your view of the best theory. You show how your theory is foundational or true or most useful, and you pursue a focused agenda around that theory. In a recent paper, Barab and Duffy (1998) argue two models for instruction: practice fields and communities of practice. Both models have progressed past the "acquisition" metaphor of learning to the participation metaphor. Practice fields are good, but communities of practice are better. Barab and Duffy present a thoughtful case which in many respects is persuasive. Yet their general approach to ID theory is fairly traditional: They are promoting the latest psychological theory and applying that theory to the design of instruction, arguing that good instruction should follow its rules and expectations. Once again psychology is telling ID theorists, who in turn tell practitioners, how to do their jobs effectively and well.

### **Grounded Design**

Hannafin and colleagues take a different tack. They have backed down from advocating a particular learning theory, acknowledging that any number of theories nowadays have legitimate grounds for serious consideration. Any good, validated theory will do, they say. The important thing is that ID practices (or approaches) be grounded in some theory. Grounded-learning systems design is defined by Hannafin, Hannafin, Land, and Oliver (1997) as "the systematic implementation or processes and procedures that are rooted in established theory and research in human learning" (p. 102).

Following the grounded-design concept, good objectivist instruction would coherently and consistently follow a Gagné-style approach, for example; while good constructivist instruction would be grounded on very different principles and values. Consistency is a key:

A learning environment described as reflecting cognitive-information processing views of learning, yet failing to account for limitations in short-term memory, reflects a mismatch between presumed foundations and assumptions and their associated methods. A constructivist's learning environment that decontextualizes and tutors to mastery is equally ungrounded. (Hannafin, 1997)

Following this view, the test for legitimacy has shifted from using the right theory to grounding practice in the right way. "Grounded design involves establishing links between the practice of learning systems design and related theory and research" (Hannafin, 1997). Grounded practice for instructional design must be:

1. based on a defensible theoretical framework;
2. consistent with research validating that theoretical framework;

3. generalizable to other cases and situations;
4. empirically validated through successive tryout and revision (Hannafin, 1997; Hannafin, et al., 1997).

I read this as a clear attempt to accommodate multiple theories and conceptual models for designing sound instruction. Many designers may find a grounded approach more realistic than the search for the one true theory--which seems to change almost by the year lately.

I am generally sympathetic to this position, especially its effort to negotiate a truce among theoretical positions so all can co-exist together peacefully. But I need some clarifying of the construct. The examples given by Hannafin et al. (1997) seem to be of two different sorts:

- real-life schools and instructional programs (e.g., airplane pilot schools); and
- models or materials designed by theorists to be more broadly used by practitioners (e.g., the Jasper series; the Knowledge Integration Environment (KIE); Microworlds Project Builder).

These two types of product are very different. While the models incorporate substantial elements of design and decision-making, they are not instruction in the usual sense. Rather, I think of them as models or tools to facilitate instruction. Instruction happens in real settings with real people.

The authors do present an example of two private airplane pilot schools: one employing a directed-instruction approach and one more hands-on and situational (Hannafin et al., 1997, p. 107). Given the brief description, I am left to wonder: Did the two schools design their approaches by reference to particular theories, or did they arrive at their approaches without recourse to theory? I could imagine either scenario: Maybe the schools hired a consultant or a trainer schooled in a particular theory. Or maybe a veteran pilot saved her money, started a school, and developed the curriculum in the way that seemed best. Or more likely, the training approach evolved over time, undergoing occasional revision based on a number of influences, some theory-based, some intuitive, some reflecting constraints of the business or of the teaching situation.

Here is my point. I like the idea of grounded design as it relates to the development of working models based on general theories. The cognitive apprenticeship model should be consistent with its grounding theory of situated cognition. The Jasper Series should be consistently aligned with principles of authentic, constructivist learning advocated by its designers. Gagné's nine events of instruction should be grounded in the behavioral/cognitive learning theory of its author. These specific models provide a concreteness and directness that practitioners find extremely helpful in converting theories to practical action. On the other hand, I wouldn't expect--or want--the same level of consistency between real-life instruction and a given theory. In fact, I believe that most real-life instructional programs would be ill-served by a strong linkage to a particular theory. To explain my concerns, I need to return to a more general discussion of educational theories and their relation to practice.

### **Educational Theory--making in Cultural Context**

The cultural grounding of theory construction seems obvious in today's diverse landscape.



Subscribing to a particular theory seems a lot like deciding on a political party--you choose the position that seems to suit you best. At the same time, different parties are vying for influence and position. To use another metaphor, the jousting and jockeying for position is like playing King of the Hill. Seymour Papert would refuse to appear on a TV show if Hubert Dreyfus was also appearing. Which group or theorist will rise to the top--the constructivist, the traditionalist, the situationist, the techno-advocate, the anti-theorist? It's a political enterprise, and the costs and consequences are real, manifest in tenure positions, journal editorships, project funding--even finding their way down to school boards, training budgets, apprenticeships, and classrooms.

The cultural grounding of educational theory should be no real surprise. Labaree (1998) does a good job showing how educational knowledge is different from knowledge found in physics, economics, or medicine. According to his typology, educational knowledge is:

- soft (as opposed to hard) knowledge that is not easily verifiable, definitive, and cumulative; and
- applied (as opposed to pure) knowledge that is more local, less generalizable, and less theoretical.

Labaree (1998) further offers an interesting analogy. Imagine knowledge in geographical/architectural terms. An "urban" discipline would accumulate knowledge in concentrated, central locations. High-rise buildings could be built on the strong foundation of secure, replicable findings. Hard sciences are like that. In contrast, education more closely resembles a rural landscape, with farmhouses and outbuildings distributed across wide open spaces. Educational knowledge is hard to build up into strong, stable structures; rather, it seems very locally distributed across settings, problems, and content areas. Shulman (1986) makes a similar point about education's special epistemological status:

Education is not a "science" in the sense of those sciences discussed by Popper, Kuhn, Lakatos, Feyerabend ... [its] major focus is (or ought to be) on an artifact called "practice"... It is the marriage of theoretical knowledge with practical action which characterizes education (along with medicine, law, and other "professional fields") and requires a philosophical perspective of its own (pp. 39-40).

The soft, applied, "rural" nature of educational knowledge results in some predictable effects, some good, some bad: lower status within the academy; more flexibility in determining research problems; more pendulum swings and fad cycles; more diversity in perspective; greater influence of outside theories and frameworks. One would hope, as Shulman suggests, for greater appreciation of practical knowledge. Too often, though, the knowledge and wisdom gained from years of practitioner experience is subordinated to the structured, formal knowledge of the university researcher or textbook. Practitioners are asked to "apply" the knowledge or theory developed by the researcher; the practitioner role is at risk of being reduced to that of technician.

### **Theory-based or Theory-informed?**

How then should practitioners make use of theory? A theory-centered approach would put theory in charge, and the practitioner subordinate to the ideas. In my opinion, Bednar, Cunningham, Duffy, and Perry (1995) come close to such a view when they state:

...effective instructional design is possible only if the developer has reflexive awareness of the theoretical basis underlying the design"[it] emerges from the deliberate application of some particular theory of learning (pp. 101-102, cited in Hannafin et al., 1997).

I read this as a fairly cognitive/rational position. Instructional designers deliberately apply some theory of learning. Whatever decisions or strategies they choose should be consistent with this underlying theory. The Hannafin idea of grounded practice rests on this same premise.

How else can we imagine the stance of practitioners toward theory? I am told that most clinical psychologists report being "eclectic" in their stance towards the various theories of psychotherapy. Many teachers and instructional designers take the same hands-off stance toward theory. They prefer a menu or toolbox metaphor instead of an application/consistency metaphor. They might try viewing a problem from one theoretical perspective, then try another perspective and compare results. This approach to theory might be termed "eclectic" or "grab-bag," but I prefer to think of it as problem- or practitioner-centered. People, rather than ideologies, are in control. The needs of the situation rise above the dictates of rules, principles, or even standard values. In a sense, such a person-centered approach is the most situated of approaches, even when the resulting strategies do not look "situated" or "authentic" at all.

In an influential paper on metaphors of learning, Svard (1998) highlights the dangers of narrowly applying a single theory to practice:

When a theory is translated into an instructional prescription, exclusivity becomes the worst enemy of success. Educational practices have an overpowering propensity for extreme, one-for-all practical recipes. A trendy mixture of constructivist, social-interactionist, and situationist approaches "is often translated into a total banishment of "teaching by telling," an imperative to make "cooperative learning" mandatory to all, and a complete delegitimization of instruction that is not "problem-based" or not situated in a real-life context".

But this means putting too much of a good thing into one pot. Because no two students have the same needs and no two teachers arrive at their best performance in the same way, theoretical exclusivity and didactic single-mindedness can be trusted to make even the best of educational ideas fail. (Sfard, 1998, pp. 10-11)

Sfard seems to be arguing for precisely the opposite of tidy consistency. She continues:

What is true about educational practice also holds for theories of learning. ... Dictatorship of a single metaphor, like a dictatorship of a single ideology, may lead to theories that serve the interests of certain groups to the disadvantage of others. ...When two metaphors compete for attention and incessantly screen each other for possible weaknesses, there is a much better chance for producing ... a liberating and consolidating effect on those who learn and those who teach. (Sfard, 1998, p. 11)

I believe that good ID practice is informed by theory, but not slave to it. Expert designers will keep a theory in mind--or maybe many theories at once--when considering a problem and deciding on a course of action. But the problem is at the center, not the theory. Local conditions dictate a solution--not by the rule set that Lumsdaine imagined, but rather in the contextualized, contingent reasoning of professional practice, which cannot be captured by the

technical rationality of abstract theories, research, and generalities.

### **Respecting Real Communities**

To this point, culture has been seen to constrain and define educational knowledge, within which individual practitioners take action. But think about a typical problem in practice: to a large extent, the community defines what is possible and what is real. I try to imagine a school district applying a uniformly consistent constructivist theory, and I have reservations. Even Boulder, where I live, has a sizable conservative block pleading for back-to-basics curriculum. Consistent theoretical grounding is only possible or desirable where participants share a common ideology. Examples might include the military, a small company, or a charter school. But even in these cases, constituencies have this maddening tendency to diverge off the beaten path; to seek innovation and change; to differ on even fundamental points. Resulting instructional designs are likely to be some sort of compromise, reflecting the diversity of the community. And rather than being seen as a weakness for lack of theoretical consistency, I tend to see such compromises as valuable reality checks. The hegemony of theory is resisted, and the needs of real people are accounted for. Through democratic and dialogical processes, a local solution is found to problems, synthesizing diverse interests, beliefs, and needs, hopefully crossing ideological boundaries to include the full community.

### **Situational Irony**

One of the implications of constructivism is the constructed, contingent nature of knowledge. It's a short step of logic to turn that implication toward the theory of constructivism itself. If knowledge is constructed, then there is something contingent and transitory--not just in students' and teachers' daily constructions, but in the theories we use to understand those constructions. I find it ironic that a constructivist or situativist would give lip service to multiple perspectives, yet call for monotheoretical strategies and perspectives in a classroom (cf. Tripp, 1993).

### **Beyond Method**

My critique of theory is related to another issue: that of ID's fixation on method. I don't have space to go into this issue at length, but I want to raise it briefly. Consistent with my argument so far, I believe that instructional quality cannot be determined by adherence to a particular method or strategy. Quality or effectiveness has as much to do with relationships, contexts, and situations, as it does with method. Quality has as much to do with how a method is instantiated, than with how the method is typed or categorized. Parker Palmer (1997, p. 16) put it this way: "Good teaching cannot be reduced to technique; good teaching comes from the identity and integrity of the teacher." Because this strikes a blow at the heart of the ID paradigm, I don't expect converts. I hope, though, that you can see the parallel between theory and method--and how each can become the object of false worship and idolatry.

### **Conclusion: How Do I See/use Theory?**

Learning technologists stress how technologies are tools with both good and bad consequences.



This point can be repeated to a point of weariness, but I think we tend to forget that theories are tools too. Theories, like any tools, have good and bad consequences, expected and unexpected effects. In an interesting, if somewhat overstated, critique, Thomas (1997) claims that the lack of precision in the definition of "theory" has resulted in its meaning simply "intellectual endeavor" (p. 75). He speaks of the hegemony of theory and argues for more "ad hocery" (Toffler, 1985) and anarchy in thought and method. All dissertating doctoral students hounded by their advisors for a stronger theoretical base should read his diatribe:

Theory of any kind is "a force for conservatism, for stabilizing the status quo through the circumscription of thought within a hermetic set of rules, procedures, and methods. Seen in this way, theory--far from being emancipatory"--is in fact an instrument for reinforcing an existing set of practices and methods in education. (Thomas, 1997, p. 76)

Why is theory harmful? The answer is that theory structures and thus constrains thought. Thought actually moves forward, Feyerabend says, by "a maze of interactions"[by] accidents and conjunctures and curious juxtapositions of events (Feyerabend, 1993, p. 9). The naive and simple minded rules that methodologists use cannot hope to provide the progress for which we wish. [Feyerabend] quotes Einstein as saying that the creative scientist must seem to the systematic epistemologist to be an "unscrupulous opportunist." Holton (1995) also draws on Einstein, saying that the essence of scientific method is in the seeking "in whatever manner is suitable, a simplified and lucid image of the world. There is no logical path, but only intuition (p. 168). In other words, Feyerabend (1993) concludes, "the only principle that does not inhibit progress is anything goes" (p. 14). (Thomas, 1997, p. 85)

I don't fully accept Thomas's critique, because I see as much upside as downside to the use of theory. Theory is like language--it's pervasive. Yes, it can blind you, but it also open your eyes to see. Precisely because of its considerable power, theory users should take pains not to abuse or use theory uncritically. As an instructional designer in the age of ideological pluralism, I want to remain open to as many theories as possible, but I reserve decision-making authority to my own best judgment.

## References

- Barab, S. A., & Duffy, T. (1998, November). *From practice fields to communities of practice*. ITForum Paper #28. [ <http://itech1.coe.uga.edu/ITForum/paper28/paper28.html> ]
- Hannafin, M. J. (1997). *The case for grounded learning systems design: What the literature suggests about effective teaching, learning, and technology*. Keynote presentation at the annual meeting of the Australian Society for Computers in Tertiary Education (ASCILITE), Perth, Australia. [ <http://www.curtin.edu.au/conference/ASCILITE97/papers/Hannafink/Hannafink.html> ]
- Hannafin, M. J., Hannafin, K. M., Land, S. M., & Oliver, K. (1997). Grounded practice and the design of constructivist learning environments. *Educational Technology Research & Development*, 45(3), 101-117.
- Kuhn, T. (1970). *The structure of scientific revolutions* (2nd ed.). Chicago: University of Chicago Press.
- Lumsdaine, A. A. (1996/1964). Educational technology, programed learning, and instructional science. In D. P. Ely & T. Plomp (Eds.), *Classic writings on instructional technology* (pp. 65-90). Englewood CO: Libraries Unlimited. (Reprinted from *Theories of learning and instruction: The sixty-third yearbook of the National Society for the Study of Education, Part 1*, edited by E. R. Hilgard, 371-401. Chicago: University of Chicago Press.

Palmer, P. J. (1997, November/December). The heart of a teacher: Identity and integrity in teaching. *Change*, 15-21.

Ragan, T. J., & Smith, P. L. (1996). Conditions-based models for designing instruction. In D. H. Jonassen (Ed.), *Handbook of research for educational communications and technology* (pp. 541-569). New York: Macmillan LIBRARY Reference USA.

Sfard, A. (1998, March). On two metaphors for learning and the dangers of choosing just one. *Educational Researcher*, 4-13.

Thomas, G. (1997). What's the use of theory? *Harvard Educational Review*, 67(1), 75-104.

Tripp, S. D. (1993). Theories, traditions, and situated learning. *Educational Technology*, 33(3), 71-77.

Wilson, B. G. (1997). Thoughts on theory in educational technology. *Educational Technology*, 37(1), 22-26.

**Brent G. Wilson**

**University of Colorado at Denver  
Information & Learning Technologies**

**Phone: 303.556.4363**

**Fax: 303.556.4479**

**E-mail: [brent\\_wilson@ce.cudenver.edu](mailto:brent_wilson@ce.cudenver.edu)**