

The Dick and Carey Model: Will It Survive the Decade?

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Many instructional designers and numerous organizations have adapted the Dick and Carey model for use in their training functions. This article reviews the changes that have occurred to the model in the 20 years since its original publication, and identifies various influences that may determine whether it will continue to be useful in the years ahead. Consideration is given to alternative instructional design textbooks and the potential decline in interest in instructional design within academic programs. The influence of constructivist theory on the 1996 version of the Dick and Carey model is described, and the long term impact of constructivist and objectivist models on public education and business and industry is assessed.

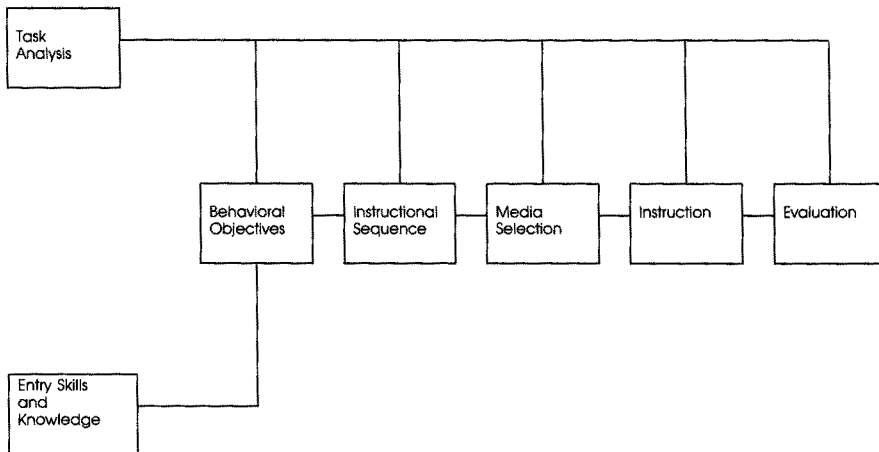
□ Many instructional designers first learned the process of designing instruction by studying one of the four editions of Dick and Carey's text, *The Systematic Design of Instruction* (1978, 1985, 1990, 1996). The past five years have seen the emergence of many new tools and concepts that some have argued will lead to the total reengineering of the design process. The purpose of this paper is to review the historical development of the Dick and Carey model in order to indicate the evolutionary changes that have occurred, and then to assess its competitors and its likely viability for the future.

The first public version of the model appeared in 1968 when I was invited to address the faculty of the College of Education at Florida State University on the topic of "New Directions in Learning." My background for developing the paper was experience in developing Skinnerian programmed instruction and efforts to create CAI instruction for an IBM 1500 system. The model that was shared with the Florida State faculty appears in Figure 1.

Examination of the model in Figure 1 indicates that the boxes do not include verbs, just terms like *instruction*. Also, there is no goal identification step. It was assumed that the user would know what the goal was, and would simply proceed to a task analysis and identification of entry behaviors and knowledge. Prominent by their omission are development of criterion-referenced assessments and development of instructional strategies.

The clients for the 1968 model were educators because there were no instructional designers, per se, at that time. The educators' reactions to the model were predictable: nearly total rejection of the use of behavioral objec-

Figure 1 □ New Directions in Learning



tives; rejection of Gagné's hierarchical analysis as a means of identifying the content of instruction; disregard for concerns for selecting appropriate media, and rejection of the notion of formative evaluation.

During the late 60s and early 70s, I used the model in the development of several computer-based instruction projects, and as the organizing vehicle for teaching a course on how to develop instructional materials. In 1974, I concluded that computers would never play an important role in education because they were much too expensive, and educators found them dehumanizing. Therefore, I turned my attention to the design of instruction rather than the delivery of instruction. Four years later, Lou Carey and I published the first edition of *The Systematic Design of Instruction*. It was a small, 200-page book that contained nearly everything we knew about designing instruction. The model that appeared in that book is presented in Figure 2.

The model as presented in the 1978 edition of the book remained essentially unchanged through the second and third editions. We added a goal identification step, and included verbs in all the boxes to indicate what the designer is doing at each step in the process. We merged some steps, such as media selection and instructional strategy; portrayed the formative/summative evaluation distinction; and in later editions, added feedback lines

from the formative evaluation box to all other boxes except the goal.

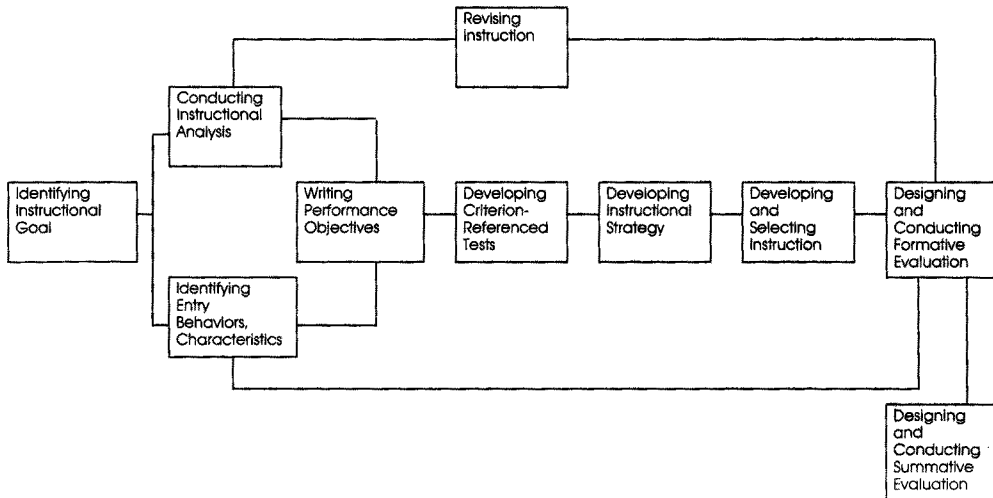
During the 1980s, we discovered that the book was being used to train instructional designers, and that most of the designers were going to work in business and industry and the military. Consequently our thinking over the years about the design process and the examples that we used changed from a public school emphasis to a business and industry emphasis. But, the model itself did not change.

THE SHAPING OF THE DICK AND CAREY MODEL OF 1996

The design model has been somewhat modified in the 1996 edition of the Dick and Carey text. These modifications were the result of the emergence of several important concepts and procedures. These influences include performance technology (Rosenberg, 1990), context analysis (Tessmer & Harris, 1992), multi-level evaluation models (Kirkpatrick, 1987), and total quality management (Dick, 1993). The purpose of discussing the impact of these factors is to indicate the evolution that seems both inevitable and appropriate for design models.

Performance technology is an umbrella term that focuses on the importance of identifying significant organizational performance

Figure 2 □ Systems Approach Model for Designing Instruction
1978, 1985, 1990 (First Three Editions)



problems before launching into instructional development projects. Instructional goals are not determined by fiat by subject matter experts (SMEs) or corporate vice-presidents, but rather through an analysis of the current status of the organization's mission, goals, and objectives. A design model should reflect this reality if it is to result in the development of useful products.

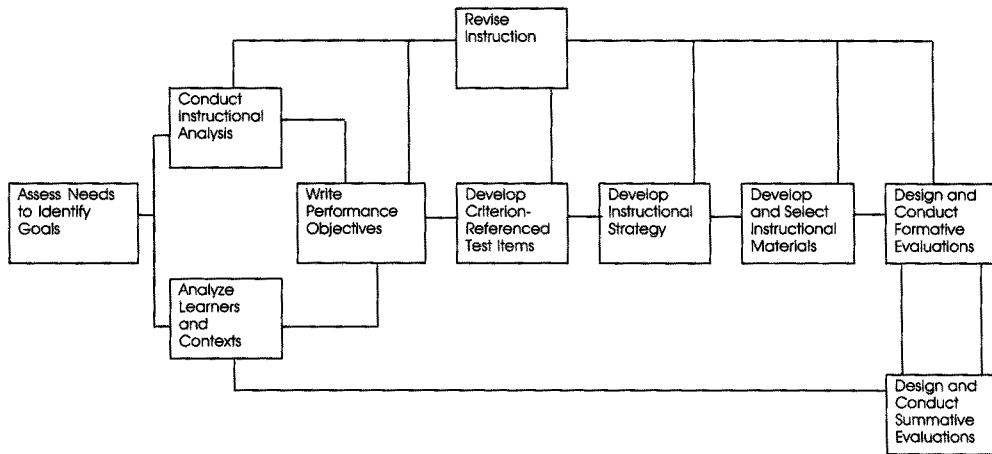
Another change has been the growing recognition in both theory and research of the importance of understanding the contexts in which students will learn and use the skills that will be taught in the instruction. Instructional strategies must take into account the performance context—where will the learners use the skills they are learning? Clients don't want to pay for performance on a posttest; they are interested in performance on the job or at the next level of learning. Transfer of training is now a critical issue for designers, and probably always should have been.

In recent years there has developed a new jargon for talking about evaluation. Writers and speakers routinely refer to Kirkpatrick's four levels of evaluation with confidence that everyone understands. Corporations have been increasingly interested in elevating their measurements from level one reactions to the assessment of performance in the workplace. Although the impact of training on the organization is still debated (level 4 evaluation),

efforts are being made to report to decision makers what they are getting for their investments in human resource solutions to performance problems. The Kirkpatrick model has not only influenced how summative evaluation is viewed; it has had a retroactive impact on the formation of instructional strategies (i.e., planning for transfer to the workplace) and on the conduct of formative evaluations in the workplace (i.e., if newly-learned skills are not being used on the job, how can the instruction be revised to ensure that they are)?

Finally, the accountability movement has been succeeded by total quality management. The TQM approach emphasizes the critical importance of the perceptions of the client in the determination of quality. Thus the designer must understand clearly who the clients are, involve them in deliberations, and seek to provide them with instruction with which they are totally satisfied. Clients are now prominent in the needs assessment process and in the selection of the solutions to the problems that are identified. Some models would have the clients extensively involved in the design and development process as well. Unquestionably, clients will determine when products meet their expectations. Focus on the client has forced us to broaden the conceptions of the role of training in the overall solution to significant organizational problems.

Figure 3 □ Dick and Carey Systems Approach Model for Designing Instruction
1996 (Fourth Edition)



The 1996 version of the Dick and Carey model appears in Figure 3. It is similar to earlier models, but it has been greatly influenced by the trends just noted. The first box now states that a needs assessment should be used to determine instructional goals. In addition, a major change occurs in the relabeling of a box from "Identify Entry Behaviors and Characteristics" to "Analyze Learners and Contexts." This reflects the importance of front-end consideration of the learners' characteristics and the contexts in which learning and performance will occur.

What is not apparent from the graphic representation of the model are the underlying changes in the instructional strategy and evaluation boxes. These processes now emphasize the importance of planning instruction that will facilitate the transfer of learning to the performance environment, and conducting formative evaluations in the workplace after training has been completed.

Figure 3 presents the model as it appears in the fourth edition of the text. The question remains whether the model will still be in use in the next century.

LIMITATIONS OF THE MODEL

Before assessing the viability of the current version of the Dick and Carey model, it is

important to point out several characteristics of the model that have been questioned in the past which could be seen as limiting its usefulness in the future. The first is that it is not a complete ISD model, that is, it does not include procedures for a total performance systems analysis, nor does it include procedures for implementing and maintaining instruction. Other books and models very adequately cover these topics, and they have never been our primary focus of interest because our book is written for beginners in the field. (See Kaufman, 1991; Rossett, 1987; and Zemke & Kramlinger, 1982.)

Second, some researchers have indicated that practitioners do not necessarily follow all of the steps in the model in sequence, and sometimes ignore some of the steps (Wedman & Tessmer, 1993). It should be noted that our model was originally developed for training novices who required a methodology for producing instruction. There were almost no practitioners when the model was developed, therefore, it was never intended to be a reflection of what practitioners actually do. The fact that some practitioners do some of the steps in the model is taken as a compliment by the authors, but it is recognized that many factors determine what practitioners do and do not do on any given project in any given organization.

The greatest controversy has come from those who view the model as a fixed, linear approach to designing instruction. (See, for example, Willis, 1995, which is discussed at length later in this article.) This point has served as a straw man for more than one critic who has observed that design is just not practiced that way—that designers move back and forth in the model and do not always get to start at the beginning. Of course these observations are true and always have been. When the model is used to create instruction, the flow of information is always two-way and changes are made to various components of the process based upon the new information.

However, this is not to deny that the model remains basically a *systems* model, that is, the output of one step is the input for the next step. Ultimately there must be a connection between the boxes, a consistency in the flow, from box to box. Similarly, how can novices be told, “just start anywhere you like and try to cover as many of the steps as you can in any sequence that seems appealing to you”? That would be chaos; the frustration level would be extremely high. It is likely that little would be learned and the result would be unskilled designers with bad attitudes.

Novice designers are encouraged to learn the process by beginning at the beginning and working through the model in an orderly fashion. In their initial learning projects they typically get to be the subject-matter expert, the evaluator, the graphics designer, the writer, the manager, and the “gopher” as well. It is understood that in the real world designers work in teams, they use adapted models, and they often return to a step in the process when later information indicates the need to do so.

I have never been convinced that the model in any way constrains the creative processes of the designer or causes designers to do dumb things. It is a tool that is used effectively in many different settings by designers who were initially trained by a variety of instructors. In light of these comments about the possible limitations of the model and its uses, we will now consider its likelihood of surviving into the next century,

WILL SUPPORTERS INSURE THAT THE MODEL SURVIVES THE DECADE?

Survival of the model will be determined by several different clients and decision makers. It might be argued that the primary consumers of the model are students who are learning instructional design (ISD). Many will use the fourth edition of the book, obtain various training positions, and adapt their use of the model to the context in which they find themselves. Thus the model will continue to be widely used.

Whether students are taught this model, however, depends, in part, on the text that professors choose to use. Unlike in the past, there are now several fine alternatives such as Smith and Ragan (1993), and Seels and Glasgow (1990). Whereas these books may be viewed as competitors, their message is generally consistent with, and supportive of, the model in the Dick and Carey text.

A detrimental trend that may emerge among programs with limited numbers of faculty is to combine the teaching of instructional design and computer-based instruction. Typically, this is a course in which learners design a lesson that will be delivered via computer. A potential concern with such courses is that the design gets lost in the effort to simply get something up and running on the computer. The result can be the training of an adequate programmer who knows relatively little about design.

A related concern is the availability of experienced faculty who are interested in teaching instructional design. The model will not survive if fewer and fewer faculty see this as an area of interest and expertise. Whereas design is usually seen as a foundational competency in educational technology/instructional systems program, it seems that fewer and fewer doctoral graduates are identifying with this area. Although there is no data on this, it appears that graduates tout their competencies in areas such as computer applications, performance technology, and technology for teachers. Few indicate a major interest in instructional design. Thus, the design model could lose its prominence through the simple decline in interest in the systematic design process.

WILL OPPONENTS MAKE THE MODEL OBSOLETE?

Although many designers feel very comfortable with their use of the Dick and Carey model, it is recognized that there are those who differ with the model on a philosophical level. They would argue that we are in a paradigm shift, and that the traditional model will soon be obsolete, if it isn't already. Most of the objectors would be classified as constructivists. They, in turn, would view the Dick and Carey model as an example of positivistic, objectivist thinking.

In recent years, constructivists have written of the subjectivity of language and the arbitrariness of descriptions of reality. They object to pre-specifying objectives and criterion-referenced evaluations for all learners. They endorse contextualized learning environments in which learners can explore and set their own goals, and be assessed via an examination of portfolios and other idiosyncratic accomplishments.

The most likely scenario for the rapid demise of the Dick and Carey model would be the emergence of a constructivist model that was adopted by a majority of the design community as a desirable paradigm shift. Although recent literature contains numerous constructivist articles that describe what is wrong with objectivist models, there have been almost no articles in which explicit alternative models are presented.

A major exception to this observation is publication of the Recursive, Reflective Design and Development Model that was recently described in a lengthy article by Willis (1995) in *Educational Technology*. Willis places himself in the constructivist-interpretivist camp. His model will be briefly described along with a project that was guided by the model. The purpose of this review is to provide an indication of the nature of one of the major alternatives that is being proposed by constructivists and to contrast it with the Dick and Carey model. Perhaps some constructivists believe that models other than Willis's better represent their views, but this is the one that is most current in the instructional design literature.

Willis's model, which he refers to as the R2D2 Model, is shown in Figure 4. It has three

major focal points, not steps. These points are Define, Design and Develop, and Disseminate. The drawing is intended to show that the model has no beginning or ending, and there is continuous interaction among the three major focal points. In his description Willis emphasizes that the model is *recursive*, which means that "the same issues may be addressed many times." He also indicates that the major focal point is design and development because this is the creative process, and that extensive preliminary front-end analysis is not necessary.

It is most helpful that Willis has provided us with an example of the use of his model. In his article he describes a CD-ROM project which resulted in the creation of a simulation to enhance literacy skills. My summary of the major sequence of steps used by the development team is shown in Table 1. In the Define stage there was a needs assessment and a learner analysis. The task and concept analysis led to the selection of an "authentic" reading task for a simulation of the process of looking for and obtaining a job.

The last Define task differs from traditional design. Willis sees no need to establish objectives at this point. He states, ". . . it is not important to write specific objectives at the beginning of a project. It may even be impossible to do that because the specific focus and direction of the ID project may not be well understood. What is important from the beginning is to involve end users, in this case, teachers and students, in the entire design process" (p. 17).

The Design and Development focal point also includes four activities. Following media and format selection, the team decides on the authoring tools that will be used. In the literacy project, team members played multiple roles during the design and development process, and rapid prototyping (my term) and formative evaluation were important features. Willis stresses the interaction of progress with reflection and recursion (doing it over), during this phase.

The final focal point is Dissemination, which consists of final packaging, diffusion and adoption of the instruction. Willis points out that there is little or no summative evalua-

Figure 4 □ Graphic Representation of Willis's R2D2 ID Model

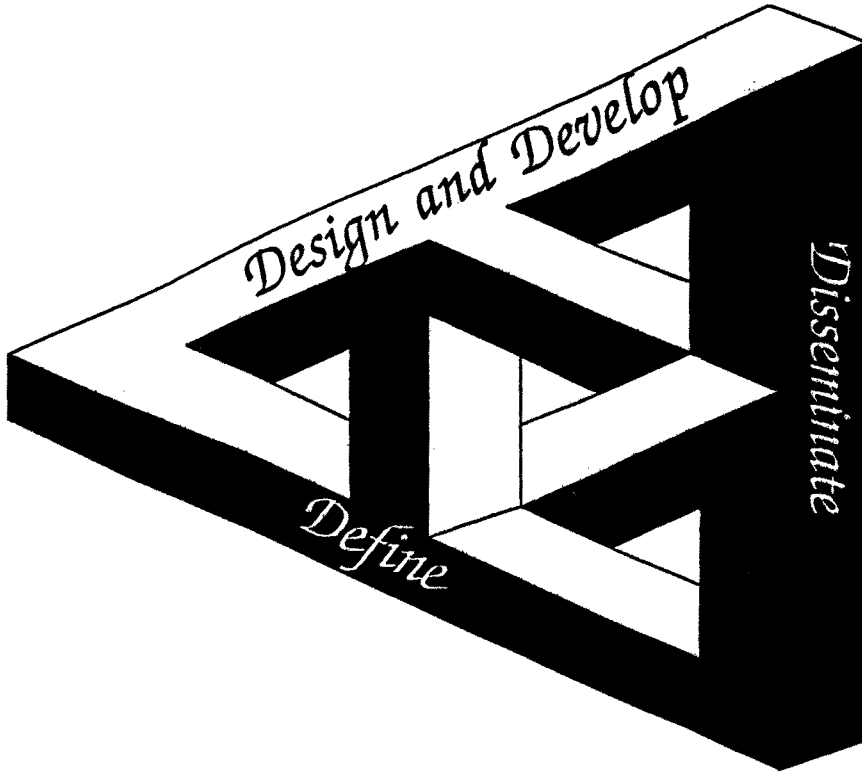


Table 1 □ Willis's Instructional Design Processes

<i>Willis' Instructional Design Model Focal Points and Tasks</i>
Definition Focus Front-End Analysis Learner Analysis Task and Concept Analysis (No statement of instructional objectives)
Design and Development Focus Media and Format Selection Selection of a Development Environment Product Design and Development Rapid Prototyping and Formative Evaluation
Dissemination Focus Final Packaging Diffusion Adoption (No summative evaluation)

tion in his model. He states, "Constructivist approaches often encourage individual goal

setting by students and advocate diverse learning activities among a group of students, even when they are 'studying the same thing'. Objective tests are not always a good fit with this type of learning. Projects, diaries, activity logs, reflective journals, reports, and assessments of mentors, and portfolios are often more appropriate, but they do not always lend themselves to traditional summative evaluation procedures" (p. 20).

We have now reviewed Dick and Carey's 1996 Model and Willis's R2D2 constructivist-interpretivist model. When Willis made such a comparison, he had this to say about our model: ". . . Dick's approach is not balanced; it proposes adding a bit of constructivist seasoning to the behavioral ID stew. Even when you add the seasoning you are still eating behavioral stew" (p. 9).

Willis has this to say about his own work: "Constructivists are not simply arguing that we should begin to use a few more instructional strategies with names like anchored

instruction, they are arguing that we ought to look at learning and teaching from a different framework, one that begins with a different set of givens . . . adopt a constructivist approach to instruction, including the foundational assumptions of the approach, and then judiciously use direct instruction strategies . . . to support student-centered learning. We do not, however, believe that we are adopting a behavioral approach or even combining the two approaches. The foundation of our approach remains constructivist" (p. 9). My assessment of the situation is summarized in the conclusions below.

CONCLUSIONS

1. The Dick and Carey model currently incorporates concepts and procedures that are important to the constructivists including recognition of the importance of learner motivation and prior experience (but these were already in the model), and the importance of context for both learning and performance. Although these points are consistent with constructivist philosophy, they are also consistent with objectivist research findings as well as with the performance technology methodology that is being adopted by more and more designers in business and industry.

2. What appear to be the real differences between the models? Willis's model depends upon emerging objectives rather than explicit ones, he rejects the use of criterion-referenced assessments for all learners, and there is a great emphasis on multiple players on the design/development team who have the freedom to revise based upon prototype development and reviews. The process seems to favor simulations as the fundamental instructional strategy. However, it seems that when constructivist models are proceduralized, they look very much like traditional design models. Considering the total length and complexity of the instructional design process, it appears that there are many more similarities than differences between the two models.

3. Therefore, given conclusions 1 and 2, it seems inevitable that, despite the outcries of

some on either side of the issue, there will be a blending of the two approaches such that the best and strongest points of each will survive. Discussions with designers in business and industry suggest that this is already happening. There is, in the best of situations, a blending of the analysis and evaluation of the objectivist approach with the simulation and individualized progress of the constructivist approaches.

3a. An alternative interpretation of the conclusions in 1 and 2 would be that the appearance of similarities of the two models is superficial and that, in practice, the two will not be merged because they have two fundamentally different purposes. The ISD objectivist models are used to design and develop efficient and effective instructional solutions to human performance problems. On the other hand, the constructivist models attempt to create educational environments which will engage the attention of learners, and thereby lead to idiosyncratic learning outcomes. Willis and others have implied that this is the case. Willis states, "The creation of 'good' instruction may be more like the creation of art than building a bridge that does not fall down" (p.20). He goes on to state that such instruction should be evaluated along the lines of procedures used in the arts and humanities as opposed to using objective measures of academic progress.

Therefore, it may be inferred that public education will informally adapt the constructivist philosophy (some have argued that it will never be a methodology) as their approach to instruction. Constructivism seems to be attractive to those concerned with public education because of the diversity of learners in the system, and the critical need to simply motivate and engage students. Learning seems sometimes to be a distant second priority.

If, in fact, the two models remain separate and the schools use a constructivist approach, it is equally likely that the systems approach models will be retained by organizations that are focusing on performance improvement. If this is correct, then the designers we train should be competent in the use of the ISD model, because it is likely that most of them

will be hired by organizations that focus on performance improvement.

A final comment about constructivist design models is in order. Willis concludes his article on the R2D2 model with an assessment of its strengths and weaknesses. Perhaps his description will be applicable to all constructivist attempts at instructional design modeling: "Alternative answers to two core issues—the role of language and the definition of truth—lead us [constructivists] to an instructional design model that is less rigid, less authoritarian, less confident of decisions, and more than a little fuzzy. In a recursive, non-linear model, many decisions are made over and over, and developers begin the process of instructional design without a crisp, clear definition of where they are headed. . . . recursive approaches, like linear models, can be taken to extremes that are both frustrating and nonproductive" (p.21). Enough said. □

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REFERENCES

- Dick, W. (1993). Quality in training organizations. *Performance Improvement Quarterly*, 6(3), 35–47.
- Dick, W. & Carey, L.M. (1978, 1985, 1990, 1996). *The systematic design of instruction*. (editions 1 through 4.) New York: HarperCollins.
- Kaufman, R. (1991). *Strategic planning plus*. Newbury Park, CA: Sage Publications.
- Kirkpatrick, D. (1987). Evaluation. In R.L. Craig (ed.), *Training and development handbook*, (3rd ed.). New York: McGraw-Hill.
- Rosenberg, M. (1990). Performance technology working the system. *Training*, 27(2), 42–48.
- Rossett, A. (1987). *Training needs assessment*. Englewood Cliffs, NJ: Educational Technology Publications.
- Seels, B., & Glasgow, Z. (1990). *Exercises in instructional design*. Columbus, OH: Merrill.
- Smith, P.L., & Ragan, T.J. (1993). *Instructional design*. New York: Macmillan.
- Tessmer, M., & Harris, D. (1992). *Analyzing the instructional setting*. London: Kogan Page.
- Wedman, J., & Tessmer, M. (1993). Instructional designers' decisions and priorities: A survey of design practices. *Performance & Instruction*, 6(2), 43–57.
- Willis, J. (1995). A recursive, reflective instructional design model based on constructivist-interpretivist theory. *Educational Technology*, 30, Nov-Dec, 5–23.
- Zemke, R., & Kramlinger, T. (1982). *Figuring things out: A trainer's guide to needs and task analysis*. Reading, MA: Addison-Wesley.