Part VIII: Epilogue

12

Toward a Personal Theory of Learning and Instruction

Throughout this book, I have tried to emphasize the nature of theories as provisional and limited in their views of learning. That is, any given learning theory accounts for only some of the data that have been amassed about learning phenomena. Moreover, each theory provides a particular picture of learning that highlights some aspects and obscures others. Because learning is such a complex matter, it is perhaps impossible to conceive of a single theory broad enough to encompass all important aspects of learning and yet still specific enough to be useful for instruction. So, like the blind men, each touching a different part of the elephant, we must evaluate each separate theory for what it illuminates about learning and for how it can guide the development of effective instruction.

Evaluating various learning theories for their validity and usefulness ultimately becomes a matter of developing a personal theory of learning and instruction. Before you began reading this book, you already possessed many intuitive theories about learning and instruction. These would have been based on your own experience of schooling and instruction, on any experiences you had as a teacher or designer of instruction, and on any previous knowledge you had acquired about learning and instruction. You may or may not, however, have given much thought to your intuitive theories or their influence on your actions in the classroom or at the design table. An experienced teacher or designer is likely to have been prompted to reflect upon his or her practices by classes that somehow went wrong or by instruction that failed to facilitate learning. But the neophyte's tacit theories have probably not been tested.

Now, however, you are in a position to construct anew your personal theory of learning, with the expectation that it should serve as an improved guide to your own instructional practices. With each chapter, you have encountered concepts and ideas that added to or challenged your previous

knowledge about learning and instruction. With each chapter, you have also had practice comparing, criticizing, and applying theories, and then reflecting on the results of those comparisons, criticisms, and applications. Summarized in Table 12.1 on pages 417–422 are the contents of the theory matrix that appeared in each chapter. In essence, you have conducted much the same process of theory building as any of the theorists discussed in this book, especially if you have had the opportunity to try out some of the ideas presented here. Figure 12.1 illustrates how the systematic and recursive process of theory building that was depicted in Figure 1.1 at the beginning of the book can be revised to represent your personal theory building.

Two aspects of Figure 12.1 are particularly noteworthy to discuss. First, evidence from diverse sources, many of which were discussed in this book, suggests that people are unlikely to change their beliefs unless prompted to reflect critically upon them. I hope that you have had many opportunities while reading this book to engage in that reflection, to examine your beliefs about

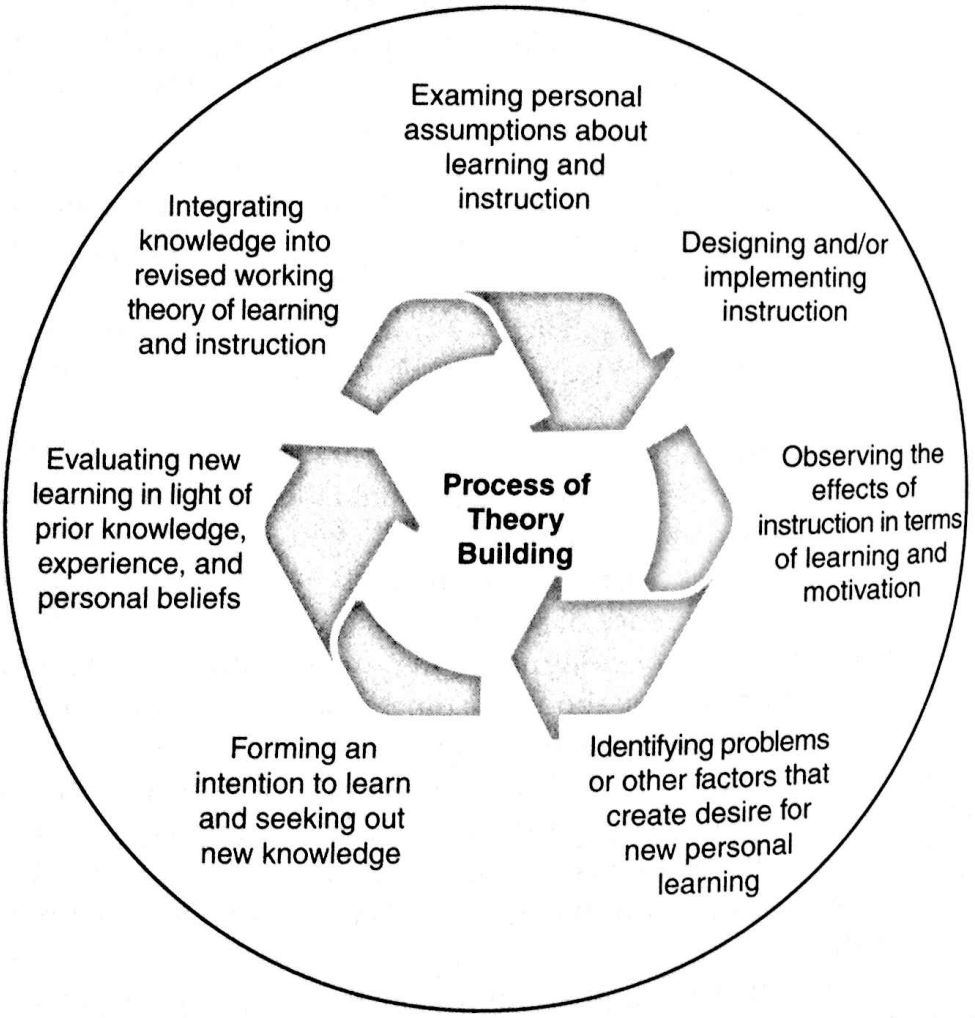

FIGURE 12.1 ***Building a Personal Theory of Learning and Instruction***

learning and instruction in light of the theories you were studying. For some, this reflection may lead to significant changes in your thinking and lead you to try new strategies in your professional practice. For others, the changes in thinking caused by critical reflection may be more subtle; rather than a restructuring of beliefs, you may have experienced an expansion—broadening or deepening—of existing beliefs.

The second aspect worth noting in Figure 12.1 is the intention to learn that springs from problems experienced in your professional practice or simply a desire to maintain currency in the knowledge that informs your practice. Either way, having the intention to learn is essential to the recursive process of personal theory building.

As you think about your personal theory of learning and instruction, you may also wish to articulate it in a specific professional context. That is, most of us work with certain populations and not others. I am concerned primarily about the learning of graduate and undergraduate students. You may be concerned about the learning of adults in training programs, or the learning of children in elementary schools, or the learning of clients in a counseling practice. As a consequence, some principles and theories of learning will be more useful to you than will others. Recently, a European colleague and I proposed an approach to assist researchers and practitioners in developing instructional theories to help design instruction (Schott & Driscoll, 1997). We wanted the approach to be prescriptive, systemic, wholistic, and humane (pp. 138–139):

> *Prescriptive*—oriented to solving problems of instruction
>
> *Systemic*—focused on relations among possibilities and constraints produced in a situated instructional context
>
> *Wholistic*—based on an integration of current learning theory
>
> *Humane*—founded in respect for the personality of individual learners

UCIT was the result: Universal Constructive Instructional Theory.

With UCIT, our intent was to provide an approach to cover a variety of different learners, different learning environments, and different subject matters. That is the universal aspect. The constructive aspect comes from the hope that our efforts would spur others to develop and present competing approaches with the effect of revitalizing discussion of instructional theory. As noted in the beginning of the section on learning and instruction (Chapter 11), few integrated or unifying instructional theories exist, yet instruction has become ever more important in today's world. "Lifelong learning has become a necessity, [and] training at the beginning of a job is often not sufficient to prepare the worker for changing conditions in the job due to new technologies or new roles" (Schott & Driscoll, 1997, p. 136). Moreover, knowledge has become something that is possessed by the tools we use to perform our jobs.

For example, word processors keep track of spelling and grammar, notifying the writer immediately about mistakes with colored wavy underlines. Such "intelligent" technology was practically unthinkable not so very long ago.

With UCIT, then, Schott and I proposed an organized and systematic approach to devising situated instructional theories. To begin with, the subject matter or function of an instructional theory pertains to the goal of instruction, and we defined three overall goals: acquisition, storage, and use of knowledge. To make these goals happen requires a dynamic interchange among the learner, learning task, and learning environment, all within a specified frame of reference. The subject matter to be learned is embedded in the learning task and other mediators of learning, such as a teacher or an interactive multimedia program (to name two), are included in the learning environment. The frame of reference accounts for the cultural and organizational context in which instruction and learning take place. Finally, situated possibilities-constraints (SPC) systems establish the range of what is possible for the learner to learn as well as the appropriate instructional methods and media to be employed. See Figure 12.2 for a depiction of the components of UCIT.

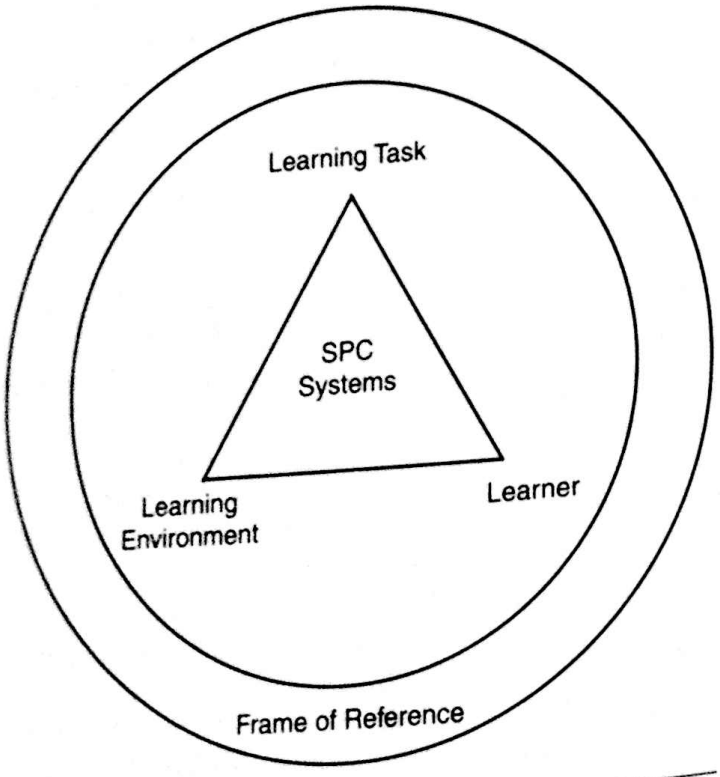

FIGURE 12.2 *Elements of a Universal Constructive Instructional Theory*

How might UCIT be used to construct a situated instructional theory? Consider the following example. In Chapter 9, I described very briefly one of the graduate courses I teach in which a goal of instruction is for students to develop self-regulated learning skills. For the most part, the learners are masters and doctoral students majoring in some aspect of education. The relevant subject matter is current research and theory on learning and instruction, especially as it represents new insights or alternatives to established views. One of the learning tasks is for students in teams to identify a topic of interest to investigate that will contribute to the overall learning goal established by the class. The learning environment includes an on-line data base of readings, software to support brainstorming, a course Web site on which students publish all their work, and the weekly meeting of the class.

Already, you should be able to see operating some of the possibilities and constraints of the SPC systems. Inability of students to use the required technology or to access the Internet would constitute constraints mitigating against the use of these tools in the instruction, despite their relevance in demonstrating application of certain learning theories. Indeed, when I first introduced e-mail as a required means of submitting assignments, I met with a great deal of opposition from students who did not own computers. Nonetheless, I believed the learning possibilities of using the technology outweighed the constraint (and inconvenience) of students having to use computers in campus labs.

The frame of reference in which my situated instructional theory is evolving includes the culture of the southeastern university and community where I work, the relatively high proportion of international students who take this course, and, in a particular semester, the enrollment of four students who took the course at a distance. These are factors over which an instructor or designer has little control, and yet they certainly influence, once again, the possibilities and constraints of the relations among learner, learning environment, and learning task. Consider, for instance, the impact on a learning task assigned to a team when one member of the team is participating from another country. Adjustments to the typical implementation of cooperative learning strategies had to be made. Likewise, the course Web site offered both possibilities and constraints to the international students—possibilities because the published work of other students provided models for improving their writing skills in English, and constraints because they were the students least likely to possess an Internet-connected computer at home. It was, however, an international student who suggested a design change to the Web site that, once effected, assisted the learning of the distance students as well. The change was to post a summary of class discussion each week on the course home page. This served to reorient the international students after classes in which they lost the thread of the discussion when it challenged their language skills. But the summary also

served to inform the distance students about what happened in class and helped them to feel more a part of the community.

This dynamic interaction among the components of UCIT will, we hope, enable designers and instructors to "create learning systems that are simultaneously and adaptively sensitive to instructional decisions at the design and delivery phases of instruction" (Schott & Driscoll, 1997, p. 170). Moreover, UCIT "should be as useful for articulating a constructivist instructional model...as in articulating a more traditional...model" (p. 170). I invite you to give the process a try.

Although this is the end of the book, it is hoped that your reflective theory building has only begun. New findings in diverse fields from neuropsychology to computer-based training continually provide information for theory and practice in psychology and education. And as you gain experience, your practical knowledge will serve to temper your theoretical understandings to enable you to make instruction as good as it can be.

TABLE 12.1 *Comprehensive Theory Matrix*

Theory	*Prominent Theorists*	*Learning Outcome(s)*	*Role of the Learner*	*Role of the Instructor*	*Inputs or Preconditions to Learning*	*Process of Learning*
Radical Behaviorism	B. F. Skinner J. B. Watson	Observable behavior	Active in the environment, consequences that follow behavior determine whether it is repeated	Identify learning goals Determine contingencies of reinforcements Implement program of behavior change Negotiate all these with the learner's input	Environmental conditions serve as discriminative stimuli, cueing which behavior is appropriate to perform	Not addressed in this theory. All learning is assumed to be explained in terms of observable behavior and environmental events surrounding its occurrence.
Cognitive Information Processing	Many including: J. R. Anderson R. C. Atkinson A. M. Collins G. A. Miller A. Paivio M. R. Quillian R. M. Shiffrin	Declarative knowledge, procedural knowledge, memory	Attend to and process incoming information, relating it to what is already in memory	Organize information, direct attention, enhance encoding and retrieval, provide practice opportunities, and help learners monitor their learning	Sensory information in the environment	Processing information and storing it in memory (including processes of attention, pattern recognition, encoding, chunking, rehearsal, and retrieval)

(continued)

TABLE 12.1 *Comprehensive Theory Matrix* (continued)

Theory	*Prominent Theorists*	*Learning Outcome(s)*	*Role of the Learner*	*Role of the Instructor*	*Inputs or Preconditions to Learning*	*Process of Learning*
Meaningful Reception Learning	D. P. Ausubel R. E. Mayer	Organized conceptual knowledge that involves understanding	Make connections between prior knowledge and to-be-learned information that results in an elaborated cognitive structure	Make materials meaningful to the learner Activate learners' prior knowledge, and organize instruction to help them make meaningful connections to what they already know	Potentially meaningful materials, an orientation toward meaningful (as opposed to rote) learning, relevant prior knowledge	Incorporating new information into cognitive structure by attaching it to anchoring ideas through processes of subsumption, superordinate and combinatorial learning
Schema Theory and Mental Models	D. A. Norman D. E. Rumelhart J. Sweller J. van Merrienboer	Organized conceptual knowledge and mental models that can be used to interpret events and solve problems	Construct schemata and mental models Use, modify and automate schemata in solving problems.	Activate learners' existing schemata Help learners' develop and refine appropriate mental models, manage cognitive load Use thought-demanding activities to facilitate understanding	Preexisting schemata that can be modified or reconstructed by analogy to account for new knowledge Materials and problems that do not overload working memory	Accretion, tuning, and restructuring of schemata Automation of schemata
Situated Cognition	Among others: C. Bereiter A. L. Brown J. G. Greeno J. Lave J. L. Lemke M. Scardamalia E. Wenger	Ability to use the concepts and tools of a community of practice Contribute to invention of new tools and practices within the community	Participate increasingly in the activities of a community of practice	Model appropriate practices as a "senior partner" in the learning enterprise Nurture semiosis and promote reflexivity in learning Help learners value participation in a community of practice	Materials and activities of the culture or community of practice	Semiosis, or sign activity (the process of interpreting and creating signs and sign systems); legitimate peripheral participation
Genetic Epistemology	J. Piaget	Physical knowledge, logical-mathematical knowledge, social knowledge	Actively manipulate objects and ideas Experience cognitive conflict Invent and reinvent knowledge through interaction with the world and people surrounding him or her	Provide a rich learning environment that supports activity of the learner and encourages interactions with peers Ask probing questions to make children aware of conflicts and inconsistencies in their thinking	Concrete materials to manipulate, cognitive conflicts to stimulate disequilibrium	Development of cognitive structuring progresses through 4 stages involving processes of assimilation, accommodation, and equilibration Global restructuring occurs through cognitive conflict

(continued)

TABLE 12.1 *Comprehensive Theory Matrix* (contined)

Theory	*Prominent Theorists*	*Learning Outcome(s)*	*Role of the Learner*	*Role of the Instructor*	*Inputs or Preconditions to Learning*	*Process of Learning*
Interactional Theories of Cognitive Development	J. S. Bruner L. S. Vygotsky	Thinking, conceptual knowledge, ability to use the tools of one's culture, awareness of one's own thinking	Interact with the instructor, peers, and sociocultural environment to solve problems	Involve learners in a process of inquiry and problem-solving Ask medium-level questions to provoke cognitive conflict Engage learners in socially organized labor activities relevant to their culture with learning partners appropriate for the desired goals of instruction	A "well-prepared mind," culturally relevant tools, and prior knowledge	For Bruner, a progression through successively more sophisticated modes of thinking (enactive to iconic, to symbolic) For Vygotsky, mediation to apprehend tools of the culture, internalization of socially-mediated understanding to become personal knowledge *For both, learning serves to pull development along*
Biological Bases of Learning	*L. Cosmides (evolution)* *M. S. Gazzaniga* *M. R. Rosenzweig* *D. L. Schacter (neuropsychology)*	Thoughts, behaviors, emotions, physical changes in the brain	Interact with a hierarchy of environments	Understand the interactive relation between nature and nurture Attempt to determine what things in learning are tied to critical periods for development Provide rich, complex, and emotionally engaging learning environments and allow for practice	Maturation, different kinds of experiences	Synaptic formation and pruning; organizing and reorganizing brain structures
Motivation and Self-Regulatiion	A. Bandura J. M. Keller P. R. Pintrich D. H. Schunk B. Zimmerman	Goal-directed behavior Ability to set goals, monitor progress, and adjust learning strategies to assure goal attainment	Determine areas of interest and value Appraise utility of learning strategies and make necessary adjustments to improve the learning process Calibrate learning efforts with results	Enhance motivation with strategies that gain attention, enhance relevance, foster confidence and ensure satisfaction Provide opportunities for learners to set goals, determine learning methods, and self-appraise	Presence and participation in a learning environment	Not specifically addressed. Modern approaches to motivation and self-regulation are consistent with a social-cognitive view of learning

(continued)

TABLE 12.1 ***Comprehensive Theory Matrix*** (continued)

Theory	*Prominent Theorists*	*Learning Outcome(s)*	*Role of the Learner*	*Role of the Instructor*	*Inputs or Preconditions to Learning*	*Process of Learning*
Gagne's Instructional Theory	R. M. Gagné	Verbal information, intellectual skills, cognitive strategies, motor skills, attitudes	Participate in instruction as processor of information Depending on circumstances, may identify own learning outcomes, arrange for conditions of learning, and supply own events of instruction	Systematically arrange conditions of learning and events of instruction based on desired learning outcomes and learner characteristics	Internal and external conditions of learning that depend on the type of learning outcome Events of instruction that facilitate information processing	Adopts the cognitive information processing model as an explanation of learning
Constructivism	D. J. Cunningham (see also Chapter 5) D. Jonassen Learning Technology Center at Vanderbilt D. Perkins E. von Glasersfeld (radical constructivism)	Reasoning, critical thinking, understanding and use of knowledge, self-regulation, mindful reflection	Active constructor of knowledge, making meaning of the world surrounding him or her	Provide complex and realistic learning environments that challenge learners to identify and solve problems Support learners' efforts and encourage them to reflect on the process	Ill-structured problems; information and technology resources to support problem-solving; ability to be self-directed or conditions to support becoming self-directed	Besides referring to structuring and restructuring knowledge and the dynamic nature of knowledge, constructivists are vague about the process of learning