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The Learning Way

Meta-cognitive Aspects of Experiential Learning

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Contemporary research on meta-cognition has reintroduced conscious experience into psychological research on learning and stimulated a fresh look at classical experiential learning scholars who gave experience a central role in the learning process—William James, John Dewey, Kurt Lewin, Carl Rogers, and Paulo Freire. In particular James's contributions are foundational for experiential learning and research on meta-cognition. Research on meta-cognition and the role it plays in the learning process are described. The meta-cognitive model is used to describe how fundamental concepts of experiential learning theory—a learning self-identity, the learning spiral, learning style, and learning spaces—can guide meta-cognitive monitoring and control of learning. Meta-cognitive strategies to help individuals improve their learning effectiveness are outlined. Learners can chart their path on the learning way by developing their meta-cognitive learning capacities, and educators can pave the way by placing learning about learning on the agenda of their educational programs.

Keywords: *experiential learning theory; games; Kolb Learning Style Inventory; learning self-identity; learning space; learning spiral; learning style; meta-cognition*

The spiral of learning from experience described in experiential learning theory (ELT; D. Kolb, 1984) can help learners "learn how to learn." By consciously following a recursive cycle of experiencing, reflecting, thinking, and acting, they can increase their learning power. More fundamentally, for many, their learning ability is stifled by a "fixed" self-concept whereby they tell themselves that they can't learn. Following "the learning way" begins with embracing the idea that "I am a learner" and continues with the development of sophisticated strategies for intentional learning based on their unique talents and the different learning challenges they face.

In this article, we describe the meta-cognitive experiential learning process originating in the works of foundational theorists of experiential learning—William James, John Dewey, Kurt Lewin, Carl Rogers, and Paulo Freire—who placed conscious

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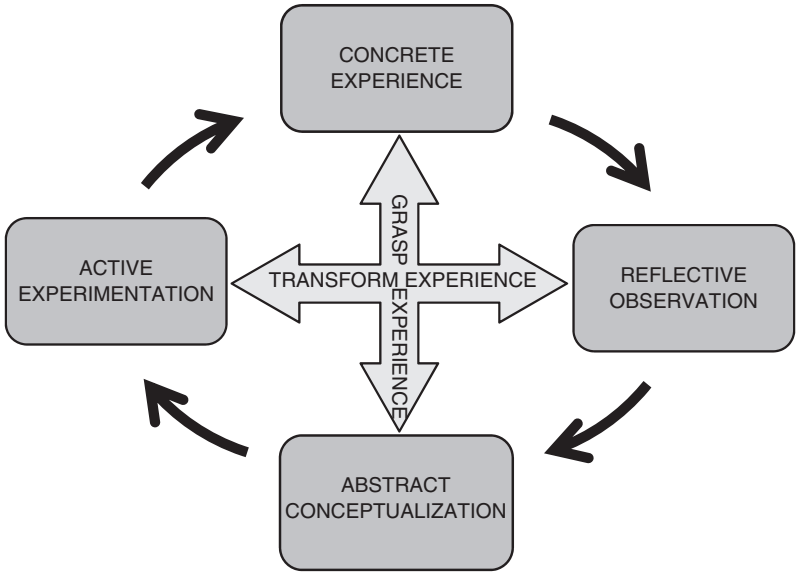
intentional action based on subjective experience at the center of the learning process. We focus particularly on the work of James, whose contributions are foundational for both experiential learning and contemporary research on meta-cognition. This is followed by an analysis of psychological research on meta-cognition and the role it plays in the learning process. Finally, the meta-cognitive model is used to describe how fundamental concepts of ELT—a learning self-identity, the learning spiral, learning style, and learning spaces—can guide meta-cognitive monitoring and control of learning.

Experiential Learning

The 40th anniversary of *Simulation & Gaming: An Interdisciplinary Journal* also marks 40 years since the creation of ELT and the Kolb Learning Style Inventory (KLSI) in 1969. Over the years the journal has published a number of important articles that have contributed to the development, validation, and application of ELT (Baker, Jensen, & Kolb, 1997; Gosenpud, 1986; Herz & Merz, 1998; Kayes, Kayes, & Kolb, 2005a, 2005b; Specht & Sandlin, 1991; Thatcher, 1986). Since its first statement in 1971 (D. Kolb, 1971; D. Kolb, Rubin, & McIntyre, 1971), there have been many studies using ELT to advance the theory and practice of experiential learning. Because ELT is a holistic theory of learning that identifies learning differences among academic specialties, it is not surprising to see that ELT research is highly interdisciplinary, addressing learning and educational issues in many fields. An analysis of the 1,004 entries in the 1999 ELT bibliography (D. Kolb, Boyatzis, & Mainemelis, 2001) shows 207 studies in management, 430 in education, 104 in information science, 101 in psychology, 72 in medicine, 63 in nursing, 22 in accounting, and 5 in law. About 55% of this research has appeared in refereed journal articles, 20% in doctoral dissertations, 10% in books and book chapters, and 15% in conference proceedings, research reports, and others. Research on ELT has increased dramatically in recent years. The 2008 Experiential Learning Theory Bibliographies (A. Kolb & Kolb, 2008a, 2008b) include 2,453 entries.

ELT defines learning as "the process whereby knowledge is created through the transformation of experience. Knowledge results from the combination of grasping and transforming experience" (D. Kolb, 1984, p. 41). The ELT model portrays two dialectically related modes of grasping experience—Concrete Experience (CE) and Abstract Conceptualization (AC)—and two dialectically related modes of transforming experience—Reflective Observation (RO) and Active Experimentation (AE). Experiential learning is a process of constructing knowledge that involves a creative tension among the four learning modes. This process is portrayed as an idealized learning cycle or spiral where the learner "touches all the bases"—experiencing, reflecting, thinking, and acting—in a recursive process that is responsive to the learning situation and what is being learned. Immediate or *concrete experiences* are

Figure 1
The Experiential Learning Cycle



the basis for observations and *reflections*. These reflections are assimilated and distilled into *abstract concepts* from which new implications for action can be drawn. These implications can be *actively tested* and serve as guides in creating new experiences (see Figure 1).

To appreciate the central role that experience plays in ELT, it is important to understand the philosophical foundations of ELT in James's philosophy of radical empiricism. James proposed radical empiricism as a new philosophy of reality and mind that resolved the conflicts between 19th century rationalism and empiricism as expressed in the philosophies of idealism and materialism. His radical empiricism was foundational for the later development of the philosophy of pragmatism with his colleagues Dewey and C. S. Peirce. Speaking of "tangles" created by philosophical and psychological inquiry in his time, he succinctly describes the central principles of both philosophies:

> It seems to me that if radical empiricism be good for anything, it ought, with its pragmatic method and principle of pure experience, be able to avoid such tangles, or at least simplify them somewhat. The pragmatic method starts from the postulate that there is no difference of truth that doesn't make a difference of fact somewhere; and it seeks to

> determine the meaning of all differences of opinion by making the discussion as soon as possible hinge on some practical or particular issue. The principle of pure experience is also a methodological postulate. . . . Everything real must be experiencable somewhere, and every kind of thing experienced must be somewhere real. (James, 1912, pp. 159-160)

For James, everything begins and ends in the continuous flux and flow of experience. In short, experience is all there is—"We start with the supposition that there is only one primal stuff or material in the world, a stuff of which everything is composed . . . we call that stuff 'pure experience'" (p. 4). In this formulation, the duality between the mind (thought) and physical world (thing) is resolved because both are experienced but with different characteristics:

> If it be the self-same piece of pure experience taken twice over that serves now as thought and now as thing . . . how comes it that its attributes should differ so fundamentally in the two takings? As thing, the experience is extended; as thought, it occupies no space or place. As thing, it is red, hard, and heavy; but who ever heard of a red, hard or heavy thought. (pp. 27-28)

The implication of the philosophy of radical empiricism for ELT and the experiential learning cycle is that it is not just the CE mode of learning that is experiential; all modes of the learning cycle (see Figure 1) are included in experience. Both modes of grasping experience—CE and AC—and both modes of transforming experience—RO and AE—are part of the experiential learning process. Consider this description of experiential learning by James describing the primacy of the direct perception of CE and how it is altered by transformation through the other learning modes:

> The instant field of the present is at all times what I call "pure experience." It is only virtually or potentially either object or subject as yet. For the time being it is plain, unqualified actuality, or existence, a simple *that* (CE). In this *naïf* immediacy it is of course valid; it is *there*, we *act* upon it (AE); and the doubling of it in retrospection into a state of mind and a reality intended thereby (RO), is just one of the acts. The "state of mind" first treated explicitly as such in retrospection will stand corrected or confirmed (AC), and the retrospective experience in its turn will get a similar treatment; but the immediate experience in its passing is always "truth," practical truth, something *to act on*, at its own moment. If the world were then and there to go out like a candle, it would remain truth absolute and objective, for it would be the "last word," would have no critic, and no one would ever oppose the thought in it to the reality intended. (James, 1912, pp. 23-24)

The implications of the radical empiricism perspective for the practical application of experiential learning are great. Many use the term *experiential learning* to refer to exercises and games used to involve students in the learning process. However, a classroom lecture may be an abstract experience, but it is also a concrete

one, when, for example, a learner admires and imitates the lecturer. Likewise a learner may work hard to create an abstract model to make sense of an internship experience or experiential exercise. From the learner's perspective solitary reflection can be an intensely emotional concrete experience and the action of programming a computer can be a highly abstract experience.

Conscious Experience

James's contribution to meta-cognitive research can be seen in the examination of conscious experience in his two volume magnum opus, *The Principles of Psychology.* He devotes the last two thirds of the works to what he called the "study of the mind from within" (James, 1890, p. 225). In particular, his examination of the role of attention in experience and his ideo-motor theory of action address how consciousness of one's learning process can be used to intentionally improve learning. For James, consciousness is an aspect of experience defined by its relation to other experiences, a "doubling" of experience in reflection as described in the quoted passage above.

Attention plays its focus "like a spotlight" across the field of consciousness in a way that is sometimes involuntary, as when a bright light or loud noise "captures" our attention, but often voluntary. Voluntary attention is determined by one's interest in the object of attention. He defines a spiral of interest-attention-selection that creates a continuous ongoing flow of experience summarized in the pithy statement, "my experience is what I agree to attend to" (James, 1890, p. 403). He defines interest as an "intelligible perspective" that directs attention and ultimately selection of some experiences over others. Selection feeds back to refine and integrate a person's intelligible perspective serving as "the very keel on which our mental ship is built" (James, cited in Leary, 1992, p. 157).

In his chapter on will, James develops a theory of intentional action that is essential for any meta-cognitive knowledge to be useful in improving one's learning ability. His ideo-motor action theory states that an idea firmly focused in consciousness will automatically issue forth into behavior—

> Every representation of a movement awakens in some degree the actual movement which is the object; and awakens it in a maximum degree whenever it is not kept from so doing by an antagonistic representation present simultaneously to the mind. (James, 1890, p. 526)

Meta-Cognition

In the early 20th century, James's emphasis on the role of intentional conscious experience in learning was eclipsed by the advent of Watson's behaviorism and the

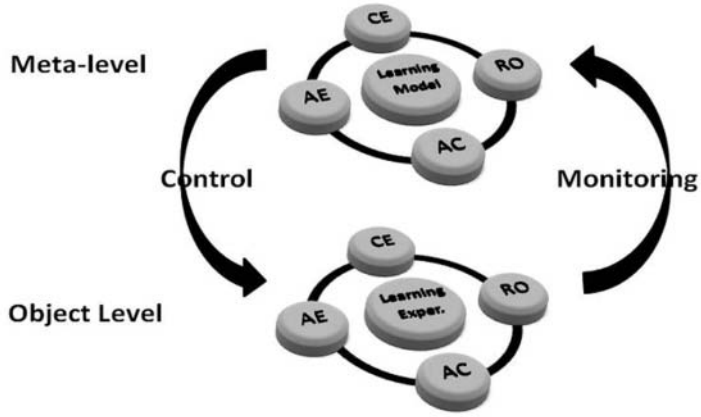
desire of psychology to become an objective science untainted by subjectivism. The prohibition of any role for consciousness in human learning theories was to continue for more than 50 years. Flavell's (1979) introduction of the concept of meta-cognition reintroduced consciousness to the study of human learning and stimulated a vigorous stream of research. His classification of four categories of meta-cognition has guided this work—meta-cognitive knowledge (e.g., "I am not as good at math as other are"), meta-cognitive experience (e.g., feeling that learning something is hard and frustrating), goals (e.g., a goal to learn how to speak a foreign language), and strategies (e.g., cognitive or behavioral actions taken to achieve learning goals). He divides meta-cognitive knowledge into three subcategories: knowledge of person variables, task variables, and strategy variables. Knowledge of person variables refer to general knowledge about how human beings learn and process information as well as individual knowledge of one's own learning processes. Task variables include knowledge about the nature of the task and what it will require of the individual. Finally, knowledge about strategy variables include knowledge about ways to improve learning as well as conditional knowledge about when and where it is appropriate to use such strategies.

Flavell provides the following example of how these categories operate in the ongoing process of meta-cognitive learning:

> Let us begin at the point where some self-imposed or externally imposed task or goal is established. Your existing meta-cognitive knowledge concerning this class of goals leads to conscious meta-cognitive experience that this is difficult to achieve. That meta-cognitive experience, combined with additional meta-cognitive knowledge causes you to select and use the cognitive strategy of asking questions of knowledgeable other people. Their answers to your questions trigger additional meta-cognitive experiences about how the endeavor is faring. These experiences, again informed and guided by pertinent meta-cognitive knowledge, instigate the meta-cognitive strategies of surveying all that you have learned to see if it fits together into a coherent whole, if it seems plausible and consistent with your prior knowledge and expectations, and if it provides an avenue to the goal. The survey turns up difficulties on one or more of these points, with consequent activation by meta-cognitive knowledge and experiences of the same or different cognitive and/or meta-cognitive strategies, and so the interplay continues until the enterprise comes to an end. (Flavell, 1979, p. 909)

More recently, Nelson (1996) and his colleagues developed a model that emphasizes processes of monitoring and control in meta-cognition. Individuals monitor their learning process at the object level and relate the observations to a model of their learning process at the meta-level. The results of the conscious introspection are used to control actual learning at the object level. Until now research on meta-cognitive learning has explored the influence of only relatively simple models of learning. For example, a study of fifth grader self-paced learning of stories found that the best

Figure 2
Nelson's Meta-cognitive Model Modified to Include the Experiential Learning Theory Learning Model



students spent more time studying difficult versus easy stories, while there was no difference in study times for the poorer students. The findings suggest that the poorer students lacked a meta-cognitive model that dictated a strategy of spending more time on difficult learning tasks (Owings, Peterson, Bransford, Morris, & Stein, 1980).

We propose that by using a model based on ELT, learners can better understand the learning process, themselves as learners, and the appropriate use of learning strategies based on the learning task and environment. This suggests a modification of Nelson's meta-cognitive model as shown in Figure 2. Here an individual is engaged in the process of learning something at the object level of direct concrete experience. His or her reflective monitoring of the learning process he or she is going through is compared at the abstract meta-level with his or her idealized experiential learning model that includes concepts such as whether he or she is spiraling through each stage of the learning cycle, the way his or her unique learning style fits with how he or she is being taught, and the learning demands of what he or she is learning. This comparison results in strategies for action that return him or her to the concrete learning situation through the control arrow. In the next section, we examine in more detail these components of the meta-cognitive experiential learning model and strategies for action.

In this section, we summarize key concepts of ELT—a learning self-identity, the spiral learning process, learning style, learning space, and learning flexibility. For

each of these aspects of the ELT meta-cognitive learning model, meta-cognitive learning strategies are described.

Learning Self-Identity

A key aspect of meta-cognitive knowledge is a person's beliefs about himself or herself, particularly his or her views about his or her ability to learn. At the extreme, if a person does not believe that he or she can learn, he or she won't. Learning requires conscious attention, effort, and "time on task." These activities are a waste of time to someone who does not believe that he or she has the ability to learn. The ELT concept of learning self-identity is based on the works of Rogers and Freire. In ELT people who see themselves as learners are those who trust their direct personal experiences and their ability to learn from them. Their primary focus is not on immediate performance or goal achievements but on the ongoing process of learning from these experiences. Instead of desiring some fixed goal, they prefer the excitement of being in the process of potentialities being born.

In his classic article on how values are learned, Rogers (1964), the great humanistic scholar and inventor of nondirective psychotherapy, emphasizes the central role of experiencing in the learning process of the mature person: "He uses his experiencing as a direct referent to which he can turn in forming accurate conceptualizations and as a guide to his behavior." The process of learning values is

> fluid and flexible . . . highly differentiated . . . the locus of evaluation is within the person. . . . There is also involved in this valuing process a letting oneself down into the immediacy of what one is experiencing, endeavoring to sense and to clarify all its complex meanings. (pp. 163-164)

Echoing James's radical empiricism, he emphasizes that experiencing includes not only direct sensations and emotions but also prior concepts:

> For there is involved in the present moment of experiencing the memory traces of all the relevant learnings from the past. This moment has not only its immediate sensory impact, but it has meaning growing out of similar experiences in the past. (p. 164)

He contrasts this approach of a mature learning person with fixed values formed through introjections acquired in youth to please loved ones:

> These conceived preferences are either not related at all, or not clearly related, to his own process of experiencing. Often there is a wide discrepancy between the evidence supplied by his own experience and these conceived values. Because these conceptions are not open to testing in experience, he must hold them in a rigid and unchanging fashion. (p. 162)

In a very different context, Freire (1993) also has emphasized the critical role that learning centered on one's own personal experience plays in forming a learning self-identity. In *Pedagogy of the Oppressed*, he describes his literacy work with Brazilian peasant farmers helping to liberate them from a self-identity formed through internalized oppression, the incorporation and acceptance by individuals within an oppressed group of the prejudices against them—

> So often do [the oppressed] hear that they are good for nothing, know nothing and are incapable of learning anything—that they are sick, lazy and unproductive—that in the end they become convinced of their own unfitness. (p. 49)

His method for achieving the personal and social transformations necessary to escape this negative, fixed self-identity was to facilitate the creation of critical consciousness in these farmers through his version of the experiential learning cycle which he called *praxis*, "reflection and action on the world in order to transform it." In a definition echoing meta-cognition, Leistyna (1999) defines critical consciousness as presence of mind in the process of learning and knowing—the ability to analyze, pose problems, and change the political and cultural realities that affect our lives.

Freire argues that traditional education also promotes a form of internalized oppression and a nonlearning self-identity. It is based on a "banking concept" where all-knowing teachers deposit ideas in students' minds to be received uncritically, mechanically memorized, and repeated. He offers the alternative of "problem-posing education" that empowers a learning self-identity. It is based on a democratic relationship between student and teacher that begins with the here and now experience of students' lives and encourages the praxis of critical reflection and action to improve their lives.

In almost 40 years of work with the KLSI, we have discovered to our amazement that not only do most people not understand their unique way of learning, many have not thought about what learning is and about themselves as learners. A story from our recent work with an experiential learning focused high school provides an example. A colleague at the school teaches remedial mathematics to freshmen and sophomore students. He was lamenting the fact that students were repeatedly failing to grasp the most elementary of mathematics concepts and was frustrated that most never did any homework. He had just given a quiz that was an exact copy of the homework he had given the week before with the "heads-up" that the homework questions would be on the upcoming quiz. Still the majority of students failed. In desperation, he asked the students what was going on. Why did they think that some students got better grades than others? Did they not understand that, if they just did the homework, they would get better grades? To his surprise, he found that students did not believe that they could learn by studying and that the reason that some students got good grades was because they were "smart."

Carol Dweck (Molden & Dweck, 2006) has studied the "lay theories" that people have about themselves and others. In particular, she and her colleagues have examined the differences between those who see their abilities and attributes as fixed and static and those who believe that they can incrementally learn and change themselves. Those individuals who believe that they can learn and develop have a learning self-identity. The learner faces a difficult challenge with a "mastery response," while the person with a fixed identity is more likely to withdraw or quit. Learners embrace challenge, persist in the face of obstacles, learn from criticism, and are inspired by and learn from the success of others. The fixed identity person avoids challenge, gives up easily, avoids criticism, and feels threatened by the success of others. Not surprisingly, students with a learning identity, regardless of their tested intelligence, are more successful in school than those with a fixed identity. Learning self-identity also affects how students relate to others. Those with a fixed versus incremental view show greater stereotype endorsement, perceive greater out-group homogeneity, are more susceptible to the fundamental attribution error, and show greater intergroup bias and more biased behavior toward out-group members (Levy, Plaks, Hong, Chiu, & Dweck, 2001).

It is possible to develop a learning self-identity. Research studies have shown that educational interventions can influence the development of a learning identity. Blackwell, Trzesniewski, and Dweck (2007) found that eight 25-minute classes for seventh graders focused on the message that "learning changes the brain by forming new connections and that students are in charge of this process" (p. 254) led to increased classroom motivation and reversed a decline in grades experienced by the control group. Similarly, Good, Aronson, and Inzlicht (2003) found that an incremental learning intervention led to significant improvements in adolescents' achievement test scores, and Aronson, Fried, and Good (2002) found that such teaching led to higher grades among college students.

Another example in higher education has focused on the difficult problem of mathematics anxiety and the sense of inferiority many students feel when required to take remedial mathematics education. Hutt (2007) implemented an experiential "learning to learn" course focused on transforming students' math learning self-identity from one of anxious inferiority ("I don't do math") to one of confident self-efficacy ("I can totally do math") as well as improving students' math learning performance in developmental mathematics courses. Results from this research showed that the experiential course content and the teachers' conscious attention to unconscious processes in the learning space, combined with the students' depth-level reflections on their learning experiences and self-talk, had positive impacts on learning. Students' mathematics anxiety was reduced, with students in the course feeling safer, more confident, and efficacious about themselves as learners.

Students in the "learning to learn" course performed a letter grade better than controls in their developmental math course. Students' learning style preferences played an interesting role in the findings. Typically in mathematics courses, students with an abstract "thinking" learning style preference, which tends to match that of

their instructor's teaching style, perform better than students with other learning styles. This learning style difference was erased for students in the experiential course, where students of all learning style preferences earned better grades than controls. Hutt maintains that change from a fixed to learning self-identity requires a safe learning space characterized by unconditional positive regard (Rogers, 1951) from the teacher. This space reduces defensive behavior and allows persons to experience themselves as learners in a new way.

Meta-cognitive Strategies for Creating a Learning Self-Identity

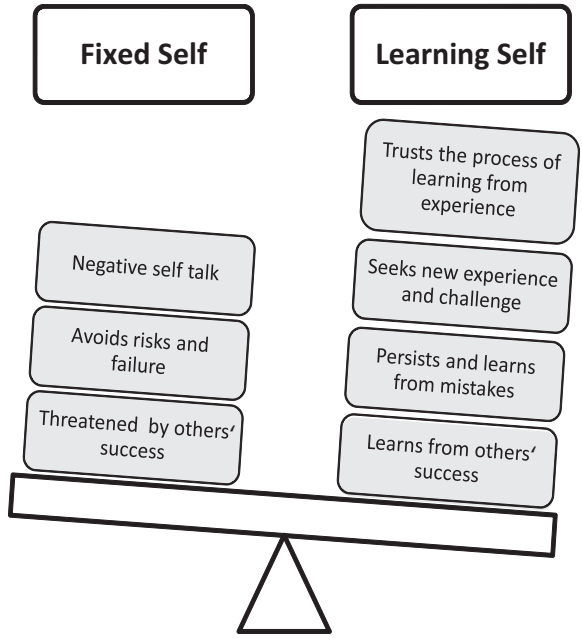
Becoming a learner, someone who can say with confidence, "I am a learner," is not accomplished overnight. One's self-identity is deeply held and defended against experiences that contradict it. For the vast majority of us, our self-identity is a mix of fixed and learning beliefs. We may feel that we are good at learning some things such as sports and not good at others such as mathematics. Dweck and her colleagues argue that lay theories are domain specific; for example, one can believe that intelligence is fixed and morality is learned (Levy et al., 2001). Every success or failure can trigger a reassessment of one's learning ability. Figure 3 depicts self-identity as balancing characteristics that reinforce a fixed self—negative self-talk, avoidance of risk, and the chance of failure and being threatened by the successes of others—and those that build a learning self—trusting one's ability to learn from experience, seeking new experiences and challenges, persistence, learning from mistakes, and using other's success as a source of learning.

Trust the process of learning from experience. For both Freire and Rogers, it is embracing the process of learning from experience that tips the balance from a fixed to a learning self-identity.

- *Trust your experience:* Place experience at the center of your learning process, making it the focal point of your choices and decisions. This does not mean that you shouldn't learn from experts or the experience of others because this advice is also part of your experience. The key is to own your choices and validate them in your experience. When you do this, you take charge of your learning and your life.
- *Trust the learning process:* Avoid an excessive focus on the outcomes of immediate performance and focus instead on the longer-term recursive process of learning by tracking your performance progress over time. Rarely is a single performance test a matter of life and death, and to treat it as such only reinforces a fixed identity. Every performance is an occasion for learning and improvement in future performances.

Redefine your relationship to failure. No one likes to fail, but failure is an inevitable part of doing something new. Thomas Edison provided a role model for the learning response to failure when he said, "Failure is the most important ingredient

Figure 3
Becoming a Learner



for success." James Dyson, the inventor of the Dyson vacuum cleaner and founder of Dyson, Inc., sees Edison as a role model, saying he

> achieved great success through repeated failure. His 10000 failures pale in comparison to his 1093 US patents. Each one of Edison's inventions, from the Dictaphone to the light bulb came from his inability to give up. (Yang, 2008, p. 28)

Failures can also help focus your priorities and life path on your talents and strengths. In her commencement address to the 2008 graduates of Harvard University, J. K. Rowling described the low period in her life after graduation, which was marked by failure on every front, and talked about its benefits:

> Failure meant a stripping away of the inessential. I stopped pretending to myself that I was anything other than what I was, and began to direct my energy into finishing the only work that mattered to me. Had I succeeded at anything else, I might never have found the determination to succeed in the one arena where I believed I truly belonged.

> I was set free because my greatest fear had been realized and I was still alive, and I still had a daughter whom I adored, and I had an old typewriter and a big idea. (Rowling, 2008, p. 56)

- *Control emotional responses to learn from failure:* Failures, losses, and mistakes provoke inevitable emotional responses. Yet it is important to learn to control emotional reactions that block learning and feed into a fixed identity. Golfers who slam their club and curse themselves and the game after a bad shot lose the opportunity to coolly analyze their mistake and plan for corrections on the next one.
- *Risk losing:* Winning is not everything, and too great a focus on it can block learning. Joel Waitzkin (2007), in *The Art of Learning,* provides a handbook of his meta-cognitive learning based on his process of becoming first a chess master and then a martial arts champion. He emphasizes the importance of losing in order to learn how to win. William Chen calls this *investment in loss.*

> If a big strong guy comes into a martial arts studio and someone pushes him, he wants to resist and push the guy back to prove that he is a big strong guy. The problem is that he isn't learning anything by doing this. In order to grow, he needs to give up his current mindset. He needs to lose to win. The bruiser will need to get pushed around by little guys for a while, until he learns to use more than brawn. Investment in loss is giving yourself to the learning process. (Waitzkin, 2007, p. 107)

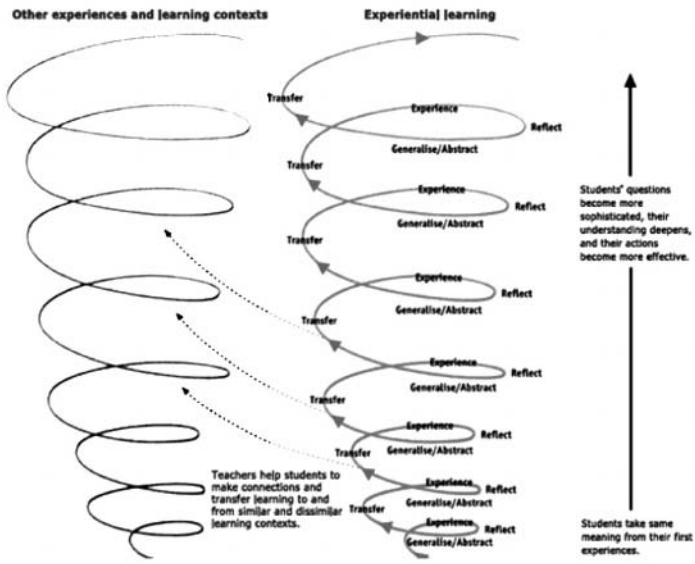
Reassess your beliefs about how you learn and what you are good at. It is important to consciously reflect on and choose how you define yourself as a learner. Often people are unaware of the way in which they characterize themselves and their abilities.

- *Monitor the messages you send yourself:* Pay attention to your self-talk. Saying to yourself "I am stupid" or "I am no good at . . ." matters and reinforces a negative fixed identity, just as saying "I can do this" reinforces a positive learning identity. Beware of internalized oppression. Some of these messages are introjections from others that you have swallowed without careful examination.
- *Balance your success and failure accounts:* Most of us remember our failures more vividly than our successes. For example, as teachers both of us tend to focus on the one or two negative remarks in our course ratings and ignore the praise and positive reactions. "Negative experiences have lasting negative effects *primarily* when they affect an individual's beliefs" (Blackwell et al., 2007, pp. 259-260). Sometimes it is useful to make an inventory of learning strengths and successes to balance your accounts.

The Spiral of Learning Process

The experiential learning cycle is actually a learning spiral. When a concrete experience is enriched by reflection, given meaning by thinking, and transformed by action, the new experience created becomes richer, broader, and deeper. Further

Figure 4
The Spiral of Experiential Learning



Source: New Zealand Ministry of Education (2004).

iterations of the cycle continue the exploration and transfer to experiences in other contexts. The New Zealand Ministry of Education (2004) has used this spiraling learning process as the framework for the design of middle school curricula. Figure 4 describes how teachers use the learning spiral to promote higher level learning and transfer to other contexts.

The transformative power of the experiential learning spiral represents the highest culmination of a learning process that can be traced to the organization of life itself. In his classic compilation of the ubiquitous presence of the spiral form in plants and animals of all kinds, Sir Theodore Cook (1914) argues that the spiral is a key to understanding the process of life and the living creations of the human mind. In his concluding chapter, he writes,

> Throughout our investigations this idea of energy and growth under resistance seems consistently to be connected with the spiral, and we have found that idea recognized in the use of the spiral as a conventional decoration not only by the philosophers of ancient China but even by peoples as old as the Aurignacian civilization of 20,000 years ago. (p. 408)

> One of the chief beauties of the spiral as an imaginative conception is that it is always growing, yet never covering the same ground, so that it is not merely an explanation of the past, but is also a prophesy of the future; and while it defines and illuminates what has already happened, it is also leading constantly to new discoveries. (p. 423)

What a wonderful description of the learning process!

Humberto Maturana (1970/1980) discovered the learning spiral in his search for the answer to his question, "What is the organization of the living?" What is the pattern of organization that characterizes all living systems and distinguishes them from nonliving physical systems? His answer was that the organization of the nervous system of all living things was basically circular, that living systems are "organized in a closed circular process that allows for evolutionary change in a way that circularity is maintained but not for the loss of the circularity itself," that is, a spiral. He called this process *autopoiesis,* which means "self-making," emphasizing the self-referential and self-organizing nature of the network of production processes that produce and transform one another in a continual process of self-making.

With his colleague Francisco Varela, Maturana proceeded to develop the systems theory of cognition, arguing that cognition, the process of knowing, was identical with *autopoiesis*, the process of life (Maturana & Varela, 1980). Their definition of cognition, however, was more akin to the holistic concept of experiential learning than the popular definition of cognition as thinking.

> The new concept of cognition, the process of knowing, is thus much broader than the concept of thinking. It involves perception, emotion, and action—the entire process of life. In the human realm cognition also includes language, conceptual thinking and all the other attributes of human consciousness. The general concept, however, does not necessarily involve thinking. (Capra, 1996, p. 175)

In fact, Maturana and Varela argue that cognition is present in all living organisms, even those without brains or nervous systems.

The way in which the *autopoeitic* cognition is a learning process is further elaborated in the concept of structural coupling. Structural coupling defines the way a system interacts with its environment, recurrently renewing and recreating itself. The environment does not specify or direct structural changes in the organism because the system is self-referential and self-maintaining, but it triggers them. These structural changes produce changes in the future behavior of the system and its environment. Structural coupling describes the continuing path of the organism's structural changes over time and thus describes the course of the organism's learning and development. Figure 5 illustrates this *autopoeitic* process in the life spiral of a shell. The spiral records the life history of the shell's path of growth around its self-referential spine. We have been inspired by these lowly mollusks and the beautiful result of their life and learning that they leave behind.

Figure 5
The Life Spiral of a Shell

The organization of the mind can be viewed as networks of these *autopoeitic* learning spirals that are embodied in the neuronal networks that cover the surface layer of the neocortex. These neuronal networks are strengthened and enlarged by spirals of learning connecting the major regions of the neocortex:

> Concrete experiences come through the sensory cortex, reflective observation involves the integrative cortex at the back, creating new abstract concepts occurs in the frontal integrative cortex, and active testing involves the motor brain. In other words, the learning cycle arises from the structure of the brain. (Zull, 2002, p. 18)

A more aesthetic representation of this idea can be found in representations of the Buddha that show his hair coiled in tiny spirals of insight that culminate in enlightenment (see Figure 6).

Learning Spiral Meta-cognitive Strategies

The pervasiveness of the spiral as a symbol of learning and renewal throughout the history of civilization is a testament to the power of the *autopoeitic* life force that it represents. To follow the learning way is to embrace fully the life force of learning

Figure 6
Spirals of Insight and Enlightenment

in every one of us. The recursive, ongoing spiraling process of self-making makes each living moment an opportunity for new beginnings and creations, fueling the awareness of ourselves as learning beings. Knowing that we are born to learn is at the core of a learning self-identity.

Practice makes perfect. Little of importance is learned in one sitting. For example, the expertise literature shows that practice is a major factor in expertise development (Ericsson & Charness, 1994). Practice is not just the amount of time doing something, so experience with something alone is not a good predictor of performance. Practice involves comparison with a mental model or explicit outcome (Keeton, Sheckley, & Griggs, 2002). In *Mastery,* George Leonard (1991) describes the master's journey as a path that follows a recurring cycle of brief spurts of progress followed by dips of performance and a plateau of performance that is slightly higher than before where nothing seems to be happening until the next spurt. For many, this path, particularly the long plateaus, proves frustrating, and efforts to learn and develop are abandoned. Leonard advises,

> To put it simply, you practice diligently, but you practice primarily *for the sake of practice itself.* Rather than being frustrated while on the plateau, you learn to appreciate and enjoy it as much as you do the upward surges. (p. 17)

Time framing. The learning spiral describes the process of learning as a recursive progression through the learning cycle over time. A key to learning success is the establishment of the appropriate time frame expectation for its achievement. The most common time framing error is the expectation of a "quick fix" and instant mastery. When it doesn't happen, the learning effort is abandoned. Learning to control one's weight is perhaps the best example. To embark on a "lose 10 pounds in 10 days" diet is to limit oneself to one turn through the learning cycle, while weight control is a long-term process with spirals of learning around many issues (calorie intake, exercise, etc.) and many contexts. The inertia of old habits takes time to change, and setbacks and failures are inevitable. By framing the learning process correctly as one that will happen with slow progress over time, quitting and fixed self-attributions can be avoided.

Self-making and the development of interest. The spiral of learning is applicable not only to the development of specific skills and subject matter, but it also applies to self-development in general. Self-development proceeds through the identification and development of a person's interests. It occurs through an ongoing spiral of learning that refines, deepens, and extends an initial interest in something. Note the central spine in the spiral shell shown in Figure 5. It is the result of the self-referential *autopoeitic* process that guided the shell's life course. The spine of the learning spiral represents interest in James's spiral of interest-attention-selection, which, as he says using another metaphor, is "the very keel on which our mental ship is built." We attend to those things that draw our interest and select those experiences that allow our interests to be explored and deepened in a continuing spiral of learning. Dewey (1897), James's colleague, describes the developmental aspects of this process:

> I believe that interests are the signs and symptoms of growing power. I believe that they represent dawning capacities . . . showing the state of development which the child has reached (and) the stage upon which he is about to enter. (p. 79)

To trust these signs of growing power and nurture the growth of one's interests is to follow the learning way.

Learning Style

Learning style describes the unique ways that individuals spiral through the learning cycle based on their preference for the four different learning modes—CE, RO, AC, and AE. Because of our genetic makeup, our particular life experiences, and the demands of our present environment, we develop a preferred way of choosing among these four learning modes. We resolve the conflict between being concrete or abstract and between being active or reflective in patterned, characteristic ways. ELT posits that learning is the major determinant of human development and how individuals learn shapes the

course of their personal development. Previous research (D. Kolb, 1984) has shown that learning styles are influenced by personality type, educational specialization, career choice, and current job role and tasks. A recent study (Joy & Kolb, 2007) has shown relationships between learning style and culture of birth and residence.

ELT argues that learning style is not a psychological trait but a dynamic state resulting from synergistic transactions between the person and the environment similar to the spiraling process of interest development just described. This dynamic state arises from an individual's preferential resolution of the dual dialectics of experiencing-conceptualizing and acting-reflecting.

> The stability and endurance of these states in individuals comes not solely from fixed genetic qualities or characteristics of human beings: nor, for that matter, does it come from the stable fixed demands of environmental circumstances. Rather, stable and enduring patterns of human individuality arise from consistent patterns of transaction between the individual and his or her environment. . . . The way we process the possibilities of each new emerging event determines the range of choices and decisions we see. The choices and decisions we make to some extent determine the events we live through, and these events influence our future choices. Thus, people create themselves through the choice of actual occasions they live through. (D. Kolb, 1984, pp. 63-64)

Much of the research on ELT has focused on the concept of learning style using the KLSI to assess individual learning styles (D. Kolb, 2007). Although individuals who have taken the KLSI show many different patterns of scores, nine consistent styles have been identified based on individuals' relative preferences for the four learning modes (Boyatzis & Mainemelis, 2000; Eickmann, Kolb, & Kolb, 2004; A. Kolb & Kolb, 2005a, 2005b). Four of these style types emphasize one of the four learning modes (Abbey, Hunt, & Weiser, 1985; Hunt, 1987):

- Experiencing (CE)
- Reflecting (RO)
- Thinking (AC)
- Acting (AE)

Four others represent style types that emphasize two learning modes, one from the grasping dimension and one from the transforming dimension of the ELT model:

- Diverging (CE and RO)
- Assimilating (AC and RO)
- Converging (AC and AE)
- Accommodating (CE and AE)

The final style type balances all four modes of the learning cycle—Balancing (CE, RO, AC, and AE). The following summaries of these nine basic learning styles are

based on research and clinical observation of these patterns of KLSI scores (A. Kolb & Kolb, 2005a; D. Kolb, 1984).

Learners with an *Experiencing* style emphasize feeling (CE) while balancing acting (AE) and reflecting (RO). Their greatest strengths reside in their ability to deeply involve themselves in concrete experiences while being equally comfortable in the outer world of action and the inner world of reflection. They are particularly adept in relationships with people. They learn by actively involving themselves in new and challenging situations and by stepping back and reflecting on their experiences from differing points of view. They love hands-on activities but also learn by carefully observing the world around them. In the formal learning situations, working in groups, role-playing, brainstorming, and fieldwork may appeal to them. Because they place the least emphasis on AC, they sometimes are disorganized, lacking plans and theories to guide them.

Learners with a *Reflecting* style emphasize reflection (RO) while balancing feeling (CE) and thinking (AC). The learning strengths of this style are a capacity for deep reflection informed by the ability to be both feeling oriented and conceptual. They learn by combining the abilities of creative idea generation and putting ideas into concise, logical form. They feel equally at home in reflection on experiencing and thinking. As a result, they have a rich and intuitive understanding of matters of importance to them. They enjoy exploring "why" things are the way they are but also thrive in uncovering "what" makes the world turn. They thrive in learning environments rich in discussions, interactions, and through readings that provide them with a deeper understanding of themselves and the world around them. Because of their low emphasis on AE, they have trouble putting plans into action, spending much time buried in thought. Because action is short-circuited in the learning cycle, their thoughts are about their feelings rather than about their direct actions. This imbalanced cycle lacks the rejuvenation provided by testing ideas in action.

Learners with a *Thinking* style emphasize thinking (AC) while balancing reflecting (RO) and acting (AE). They are deep thinkers who are able to inductively develop a particular concept or idea and deductively evaluate its validity and practicality by testing it in the real world. They can draw both on the rich inner world of reflection and abstraction and an outer world of action. They thrive on creating conceptual models that can be applied or generalized to other situations. Because they place little emphasis on feeling in their style, they value being logical and unemotional. They may be uncomfortable with personal relationships and prefer working alone. They learn best in a well-structured learning environment in which they can design or conduct scientific experiments or manipulate data.

Learners with an *Acting* style emphasize acting (AE) while balancing feeling (CE) and thinking (AC). They combine the ability to find solutions to questions or problems based on their technical analysis with attention to the needs of people and sources of information in concrete situations. They are equally comfortable in functioning in a practical world that can make use of their feelings and actions as well as

in a subjective world that requires their thinking abilities. As a result, they excel in identifying and integrating task and people needs. Their low emphasis on reflection can sometimes be a problem when they become overcommitted to their idea of how things should be done. In formal learning situations, they learn best through real-life projects, field trips, and hands-on experiments.

Learners with *Diverging* style learn primarily through feeling (CE) and reflecting (RO). They are best at viewing concrete situations and exploring them from many different points of view. Their approach to situation is to observe rather than take action. People with this style enjoy situations that call for generating a wide range of feelings and ideas, such as brainstorming sessions. They are imaginative and sensitive to feelings, have broad cultural interests, and like to gather information. In formal learning situations, they like to receive personalized attention and feedback. They prefer working in groups to gather information and listening with an open mind.

Learners with an *Assimilating* style learn primarily through thinking (AC) and reflecting (RO). They are best at understanding a wide range of information and putting it into concise, logical form. They are less focused on people and more interested in abstract ideas and concepts. Generally, they find it more important that a theory have elegance and logical soundness than practical value. Because they place less emphasis on feeling and acting in their style, they may prefer to work alone. They do not make quick decisions but think things through. In formal learning situations, they may prefer lectures, readings, exploring analytical models, and having time to think things through.

Learners with a *Converging* style emphasize thinking (AC) and acting (AE) in learning situations. People with this style are best at finding practical uses for ideas and theories. They like to solve problems and make decisions based on finding logical solutions to issues or problems. They prefer dealing with technical tasks and problems than with social and interpersonal issues. Because they place less emphasis on feeling and reflection in their learning style, they can be uncomfortable in ambiguous situations and interpersonal issues. In formal learning situations, they may prefer to experiment with ideas and engage in simulations, laboratory assignments, and practical applications.

Learners with an *Accommodating* style learn primarily through acting (AE) and feeling (CE). They have the ability to learn from "hands-on" experience and function well in ambiguous and uncertain situations. They enjoy achieving goals and involving themselves in new and challenging experiences. Their tendency may be to act on intuitive "gut" feelings rather than on logical analysis. In solving problems, individuals with an Accommodating learning style rely more heavily on people for information than on their own technical analysis. Because they place less emphasis on reflection and thinking in their approach to learning, they can sometimes be disorganized and act before thinking. In formal learning situations, people with this learning style prefer to work with others to get assignments done, to set goals, to do field work, and to test out different approaches to completing a project.

Learners with a *Balancing* style balance the extremes of the dialectics of action-reflection and concrete-abstract by finding a middle ground between them. Their central position on the four learning modes allows them to see many different perspectives on issues and bridge differences between people with different styles. They are often creative but also experience difficulty in making decisions. They are able to change their learning style to meet the learning demands of the task they face. In a team they often adapt to fill in the missing style needed to get the task done. In formal learning environments they can change their learning style to meet the learning demands of the task they face.

Learning Style Meta-cognitive Strategies

An understanding of one's unique learning preferences and capabilities and the match between these and the demands of learning tasks can increase learning effectiveness. It can suggest why performance is not optimal and suggest strategies for improvement as well as help explain why some topics and courses are interesting and others are painful. It can also help explain why some develop a nonlearning self-identity. Our most gratifying experiences in interpreting the results of their KLSI scores with people have been when they come up and say, "My whole life I thought I was stupid because I didn't do well in school. Now I realize that it is just because I learn in a different way than schools teach."

Many examples of the use of meta-cognitive knowledge about learning style come from our work with doctoral students on their dissertation research. Working with us, they gain an understanding of ELT and in many cases a deep understanding of their learning style and its consequences for their learning. The PhD dissertation is a big, unstructured research project with the goal to produce an original contribution to the field. As such, successful completion requires navigating all phases of the learning cycle presenting different challenges for individuals with different learning styles. One woman with a strong assimilating style realized that her abstract writing style needed to include examples to communicate better. Another assimilating type realized that his great respect for the published literature was blocking him from expressing his own ideas. A woman with a strong diverging style spent years discovering one new creative idea after another before finally accepting that to finish she needed to converge on one and complete it.

Those who use the KLSI to assess their learning style often decide that they wish to develop their capacity to engage in one or more of the four learning modes, experiencing (CE), reflecting (RO), thinking (AC), and acting (AE). In some cases this is based on a desire to develop a weak mode in their learning style. In others it may be to increase capability in a mode that is particularly important for their learning tasks. Because of the dialectic relationships among the learning modes, containing the inhibiting effects of opposing learning modes can be as effective in getting into a mode as actively trying to express it. Overall learning effectiveness is improved

when individuals are highly skilled in engaging all four modes of the learning cycle. One way to develop in the learning modes is to develop the skills associated with them. The Learning Skills Profile (Boyatzis & Kolb, 1991, 1992, 1995) was created to help learners assess the learning skills associated with the four modes of the learning cycle—interpersonal skills for CE, information skills for RO, analytic skills for AC, and action skills for AE.

*Developing the capacity for **experiencing***. Experiencing requires fully opening oneself to direct experience. Direct experience exists only in the here and now, a present moment of endless depth and extension that can never be fully comprehended. In fact, the thinking mode, being too much "in your head," can inhibit the ability to directly sense and feel the immediate moment. Engagement in concrete experience can be enhanced by being present in the moment and attending to direct sensations and feelings. This presence and attention are particularly important for interpersonal relationships. Interpersonal skills of leadership, relationship, and giving and receiving help in the development and expression of the experiencing mode of learning.

*Developing the capacity for **reflecting***. Reflection requires space and time for it to take place. It can be inhibited by impulsive desires and/or pressures to take action. It can be enhanced by the practices of deliberately viewing things from different perspective and empathy. Stillness and quieting the mind foster deep reflection. Information skills of sense making, information gathering, and information analysis can aid in the development and expression of the reflecting mode of learning.

*Developing the capacity for **thinking***. Thinking requires the ability to represent and manipulate ideas in your head. It can be distracted by intense direct emotion and sensations as well as pressure to act quickly. Engagement in thinking can be enhanced by practicing theoretical model building and the creation of scenarios for action. Analytical skills of theory building, quantitative data analysis, and technology management can aid in the development and expression of the thinking mode of learning.

*Developing the capacity for **action***. Acting requires commitment and involvement in the practical world of real consequences. In a sense it is the "bottom line" of the learning cycle, the place where internal experiencing, reflecting, and thinking are tested in reality. Acting can be inhibited by too much internal processing in any of these three modes. Acting can be enhanced by courageous initiative taking and the creation of cycles of goal setting and feedback to monitor performance. Action skills of initiative, goal setting, and action taking can aid in the development and expression of the acting mode of learning.

Learning Spaces

If learning is to occur, it requires a space for it to take place. In ELT this space exists in the experience of the learner and is formed both by objective factors such as the physical setting and time available for learning and by subjective factors such as learning preferences and expectations. The idea of learning space builds on Kurt Lewin's field theory and his concept of life space. For Lewin, person and environment are interdependent variables where behavior is a function of person and environment and the life space is the total psychological environment that the person experiences subjectively. To take time as an example, in many organizations today employees are so busy doing their work that they feel that there is no time to learn how to do things better. This feeling is shaped by the objective conditions of a hectic work schedule and also the expectation that time spent reflecting will not be rewarded. Teachers objectively create learning spaces by the information and activities they offer in their course; but this space is also interpreted in the students' subjective experience through the lens of their learning style.

Learning spaces are nested in the social system such that the wider social environment can influence learners' experience of a learning space. Urie Bronfrenbrenner (1977, 1979) defines the ecology of learning and development spaces as a topologically nested arrangement of structures, each contained within the next. The learner's immediate setting such as a course or classroom is called the *microsystem,* while other concurrent settings in the person's life such as other courses, the dorm, or family are referred to as the *mesosystem.* The *exosystem* encompasses the formal and informal social structures that influence the person's immediate environment, such as institutional policies and procedures and campus culture. Finally, the *macrosystem* refers to the overarching institutional patterns and values of the wider culture, such as cultural values favoring abstract knowledge over practical knowledge, that influence actors in the person's immediate microsystem and mesosystem.

The socially embedded nature of the learning space is further elaborated in situated learning theory (Lave & Wenger, 1991). Like ELT, situated learning theory draws on Vygotsky's (1978) activity theory of social cognition for a conception of social knowledge that conceives of learning as a transaction between the person and the social environment. Situations in situated learning theory like life space and learning space are not necessarily physical places but constructs of the person's experience in the social environment. These situations are embedded in communities of practice that have a history, norms, tools, and traditions of practice. Knowledge resides not in the individual's head but in communities of practice such as a trade or profession. Learning is thus a process of becoming a member of a community of practice through legitimate peripheral participation (e.g., apprenticeship). Situated learning theory enriches the learning space concept by reminding us that learning spaces extend beyond the teacher and the classroom. They include socialization into a wider community of practice that involves membership, identity formation, transitioning from

novice to expert through mentorship and experience in the activities of the practice, and the reproduction and development of the community of practice itself as newcomers replace old-timers.

Lewin introduced a number of concepts for analysis of the life space and a person's relationship to it that are applicable to the study of learning spaces, including position, region, locomotion, equilibrium of forces, positive and negative valence, barriers in the person and the world, conflict, and goal. In ELT the experiential learning space is defined by the attracting and repelling forces (positive and negative valences) of the poles of the dual dialectics of action-reflection and experiencing-conceptualizing, creating a two-dimensional map of the regions of the learning space. An individual's learning style positions him or her in one of these regions depending on the equilibrium of forces among action, reflection, experiencing, and conceptualizing. As with the concept of life space, this position is determined by a combination of individual disposition and characteristics of the learning environment. The KLSI measures an individual's preference for a particular region of the learning space, his or her home region so to speak. The regions of the ELT learning space offer a typology of the different types of learning based on the extent to which they require action versus reflection, experiencing versus thinking, thereby emphasizing some stages of the learning cycle over others (see Figure 7).

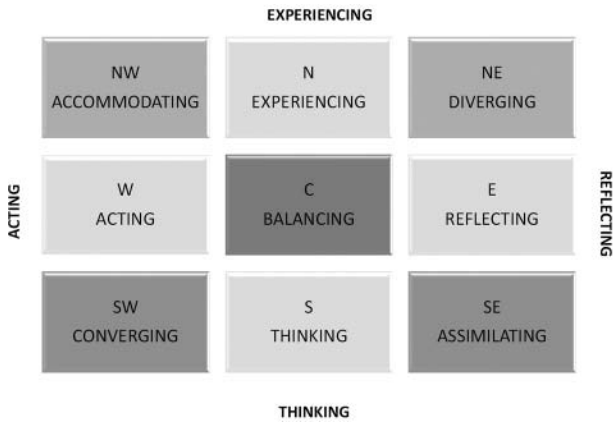
The ELT learning space concept emphasizes that learning is not one universal process but a map of learning territories, a frame of reference within which many different ways of learning can flourish and interrelate. It is a holistic framework that orients the many different ways of learning to one another. The process of experiential learning can be viewed as a process of locomotion through the learning regions that is influenced by a person's position in the learning space. One's position in the learning space defines one's experience and thus defines one's "reality."

In our recent research on experiential learning, we have focused on the importance of learning spaces and have developed principles for creating them (A. Kolb & Kolb, 2005b). For a learner to engage fully in the learning cycle, a space must be provided to engage fully in the four modes of the cycle—feeling, reflection, thinking, and action. It needs to be a hospitable, welcoming space that is characterized by respect for all. It needs to be safe and supportive but also challenging. It must allow learners to be in charge of their own learning and allow time for the repetitive practice that develops expertise.

Learning Space Meta-cognitive Strategies

Customizing learning spaces. When embarking on a course of learning, it is useful to consider the learning spaces where this learning will happen and to customize these spaces for yourself based on your learning style and the particular subject matter of your learning. When teachers plan their courses, they may or may not explicitly consider the kinds of learning spaces they are creating and the appropriateness of these

Figure 7
The Nine Regions of the Experiential Learning Theory Learning Space



spaces for the students in their course and/or for the material being taught. For example, John and Tanya Reese (1998) created "Connecting with the Professor" workshops to help law students bridge the differences between the learning spaces created by law school professors and their own learning space preferences resulting from their individual learning style. Recognizing that law school professors were unlikely to change their course and learning style, they worked with students to develop the learning skills needed to succeed in the learning spaces created by their professors. Another strategy is to supplement the learning space that is given with other spaces that suit your style. For example, a person who learns best by diverging may want to form a group of classmates to talk about the material in the course, or a thinking style person may want to prepare in advance by reading about material to be covered in the course.

Learning flexibility and learning space locomotion. Learning effectiveness is increased when one can move from one learning mode to the other in the learning cycle entering the different corresponding regions of the learning space. Lewin used the term *locomotion* to describe this movement through the regions of the learning space. He spoke of boundaries of the learning regions and how they can act as barriers to entering a region. The Adaptive Style Inventory (ASI; Boyatzis & Kolb, 1993) was developed to help individuals assess their learning flexibility. Mainemelis, Boyatzis, and Kolb (2002) found that individuals who balance AC-CE and AE-RO have greater adaptive flexibility in their learning as measured by the

ASI. Earlier studies found that ASI adaptive flexibility is positively related to higher levels of ego development on Loevinger's instrument (D. Kolb & Wolfe, 1981). Individuals with high adaptive flexibility are more self-directed, have richer life structures, and experience less conflict in their lives (D. Kolb, 1984). Recently, Moon (2008) found that ASI flexibility was related to sales performance, and Akrivou (2008) showed that it moderated the move from self-complexity to self-integration in adult development.

Fazey (Fazey & Marton, 2002) has argued that learning leads to understanding with greater retention and transfer when an "experiential space of variation" is created through repeated practice from different perspectives and under different conditions. This space of variation can be portrayed as the number of learning regions that a person engages in the learning process. Another popular way of representing this idea is a learning pyramid where learning retention is increased from 20% when one learning mode is engaged to 90% when all four modes are engaged (Dale, 1969; Reese, 1998). Although we have seen no studies that have assessed these retention percentages by learning mode empirically, Specht and Sandlin (1991) have showed that retention of accounting concepts after 6 weeks was 84% for students in a course taught using a learning method that followed the experiential learning cycle and only 46% in a course taught using the traditional lecture method.

Learning About Learning: Developing Meta-cognitive Learning Skills

To summarize, we have argued that contemporary research on meta-cognition has reintroduced conscious experience into psychological research on learning and thereby stimulated a fresh look at the works of classical experiential learning scholars who gave experience a central role in the learning process. We have suggested a modified meta-cognitive learning model based on ELT that includes concepts of learning self-identity, the learning spiral, learning style, and learning space. Based on these concepts, we have outlined meta-cognitive strategies that individuals can use to improve their learning effectiveness.

In conclusion, let us examine how individuals can develop their own individualized ELT meta-cognitive learning model to guide their learning activities. Returning to Figure 2, we have emphasized thus far two cycles of learning shown in the illustration. The cycle of learning at the object level represents the learner's actual concrete learning experience. The cycle at the meta level describes the learner's normative model of how his or her learning should be. A closer look at Figure 2 reveals that the monitoring and control arrows between one's meta-cognitive model of experiential learning and one's learning experience complete another cycle of experiential learning. This third learning cycle describes how individuals develop their meta-level model of learning, that is, how they learn about their learning process.

Current meta-cognitive research suggests that these three cycles operate not simultaneously but sequentially. For example, judgments of how well one has learned something are less accurate when they are made immediately than when they are delayed for some time (Nelson, 1996). When one is immersed in a learning task such as solving math problems, one may not be thinking much about one's meta-model of how one should be going about the task and not at all about perfecting that meta-model. The meta-model of learning may be most useful prior to engagement in learning. It can be used to plan strategies for engaging and mastering the immediate learning task.

The learning about learning cycle requires a longer time perspective and reflection on previous learning experiences and their fit with the meta-cognitive normative learning model. We have already seen that educational interventions can facilitate this process and improve learning effectiveness (Blackwell et al., 2007; Good et al., 2003; Hutt, 2007; Reese, 1998). Supportive learning relationships and learning spaces are often essential to explore and change a deeply held learning identity and unconscious learning habits. Ultimately, however, it is the learners who manage their learning about learning and take control of their learning process through meta-cognitive monitoring and control. Learners can chart their path on the learning way by developing their meta-cognitive learning capacities, and educators can pave the way by placing learning about learning on the agenda of their educational programs.

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