The Kolb Experiential Learning Profile

A Guide to Experiential Learning Theory, KELP Psychometrics and Research on Validity

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Abstract

The Kolb Experiential Learning Profile (KELP) released in 2021, is the latest version of the original Learning Style Inventory developed by David A. Kolb. Like its predecessors, the KELP is based on experiential learning theory (Kolb 2015, Kolb & Kolb 2017) and is designed to help individuals identify the way they learn from experience. This revision includes new norms that are based on a larger, more diverse and representative sample of 26,356 users. The first chapter of the technical specifications describes the conceptual foundations of the KELP in the theory of experiential learning (ELT). Chapter 2 provides a description of the KELP that includes its purpose, history, and format. Chapter 3 describes the characteristics of the KELP normative sample. Chapter 4 includes internal reliability and test-retest reliability studies of the Learning Style inventories. Chapter 5 provides information about research on the internal and external validity for the instrument. Internal validity studies using correlation and factor analysis are reported. External validity includes research on demographics, educational specialization, concurrent validity with other experiential learning assessment instruments, aptitude test performance, academic performance, and experiential learning in teams. Chapter 6 describes the Learning Flexibility Index including scoring formulas, normative data and validity evidence.

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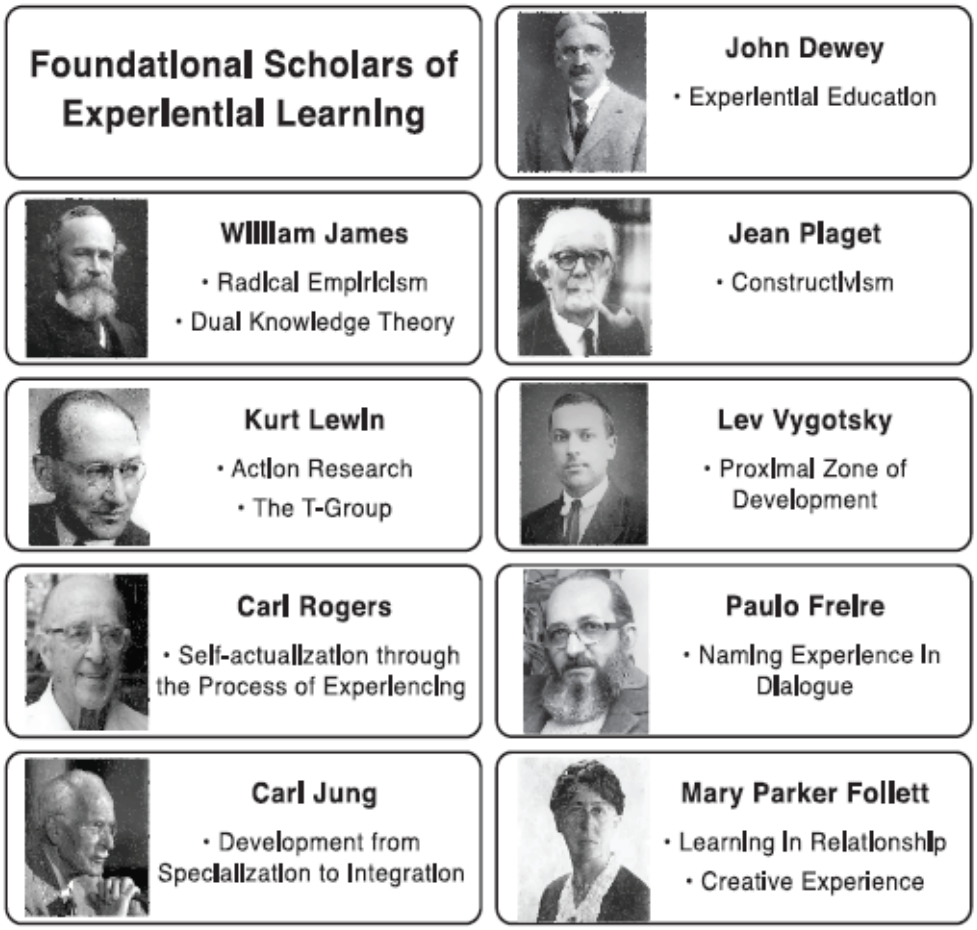
1. Experiential Learning Theory and Individual Learning Styles

The Kolb Learning Style Inventory differs from other tests of learning style and personality used in education by being based on a comprehensive theory of learning and development. Experiential Learning Theory (ELT) draws on the work of prominent 20th century scholars who gave experience a central role in their theories of human learning and development—notably John Dewey, Kurt Lewin, Jean Piaget, Lev Vygotsky, William James, Carl Jung, Paulo Freire, Carl Rogers and Mary Parker Follett—to develop a holistic model of the experiential learning process and a multi-dimensional model of adult development (Figure 1.)

Figure 1.



The theory, described in detail in *Experiential Learning: Experience as the Source of Learning and Development* (Kolb 2015, 1984), is built on six propositions that are shared by these scholars.

1. *Learning is best conceived as a process, not in terms of outcomes.* Although punctuated by knowledge milestones, learning does not end at an outcome, nor is

it always evidenced in performance. Rather, learning occurs through the course of connected experiences in which knowledge is modified and re-formed. To improve learning in higher education, the primary focus should be on engaging students in a process that best enhances their learning – a process that includes feedback on the effectiveness of their learning efforts. "…education must be conceived as a continuing reconstruction of experience: … the process and goal of education are one and the same thing." (Dewey 1897: 79)

2. *All learning is re-learning.* Learning is best facilitated by a process that draws out the students' beliefs and ideas about a topic so that they can be examined, tested and integrated with new, more refined ideas. Piaget called this proposition constructivism—individuals construct their knowledge of the world based on their experience and learn from experiences that lead them to realize how new information conflicts with their prior experience and belief.

3. *Learning requires the resolution of conflicts between dialectically opposed modes of adaptation to the world.* Conflict, differences, and disagreement are what drive the learning process. These tensions are resolved in iterations of movement back and forth between opposing modes of reflection and action and feeling and thinking.

4. *Learning is a holistic process of adaptation to the world.* Learning is not just the result of cognition but involves the integrated functioning of the total person—thinking, feeling, perceiving and behaving. It encompasses other specialized models of adaptation from the scientific method to problem solving, decision making and creativity.

5. *Learning results from synergetic transactions between the person and the environment.* In Piaget's terms, learning occurs through equilibration of the dialectic processes of assimilating new experiences into existing concepts and accommodating existing concepts to new experience. Following Lewin's famous formula that behavior is a function of the person and the environment, ELT holds that learning is influenced by characteristics of the learner and the learning space.

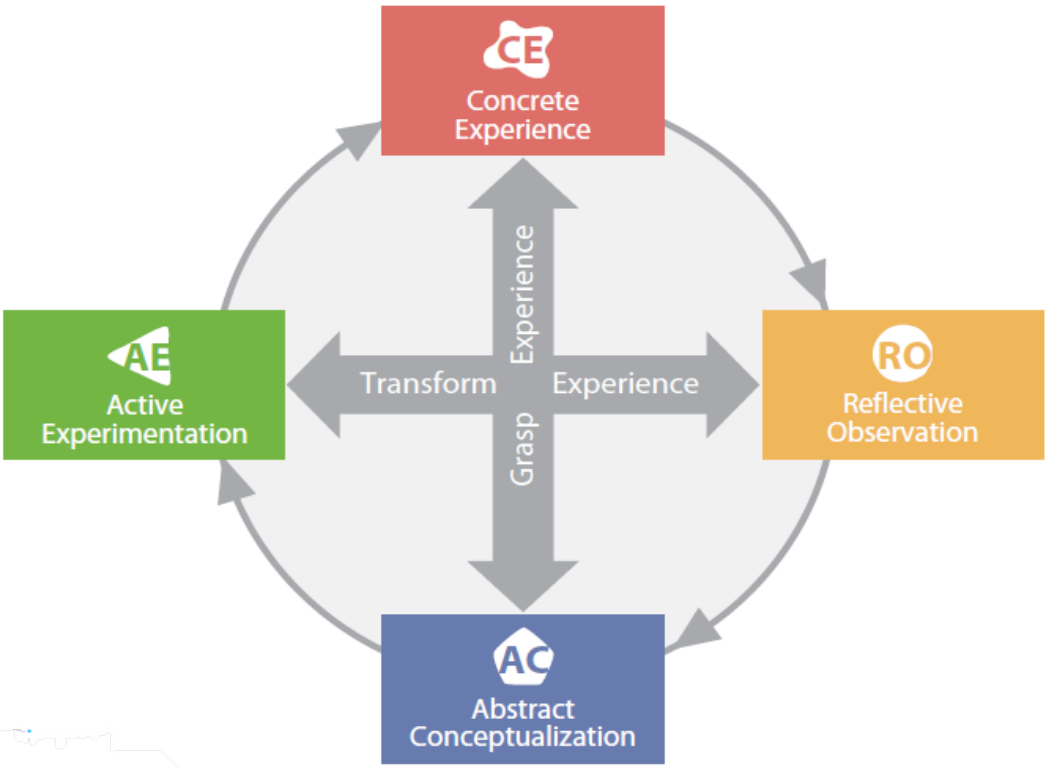
6. *Learning is the process of creating knowledge.* In ELT, knowledge is viewed as the transaction between two forms of knowledge: social knowledge, which is co-constructed in a socio-historical context, and personal knowledge, the subjective experience of the learner. This conceptualization of knowledge stands in contrast to that of the "transmission" model of education in which pre-existing, fixed ideas are transmitted to the learner. ELT proposes a constructivist theory of learning whereby social knowledge is created and recreated in the personal knowledge of the learner.

The Cycle of Learning from Experience

ELT is a dynamic view of learning based on a learning cycle driven by the resolution of the dual dialectics of action/reflection and experience/abstraction. Learning is defined as "the

process whereby knowledge is created through the transformation of experience. Knowledge results from the combination of grasping and transforming experience." (Kolb, 1984, p. 41). Grasping experience refers to the process of taking in information, and transforming experience is how individuals interpret and act on that information. 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). Learning arises from the resolution of creative tension among these four learning modes. This process is portrayed as an idealized learning cycle or spiral where the learner "touches all the bases"—experiencing (CE), reflecting (RO), thinking (AC), and acting (AE)—in a recursive process that is sensitive to the learning situation and what is being learned. Immediate or concrete experiences are 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 (Figure 2).

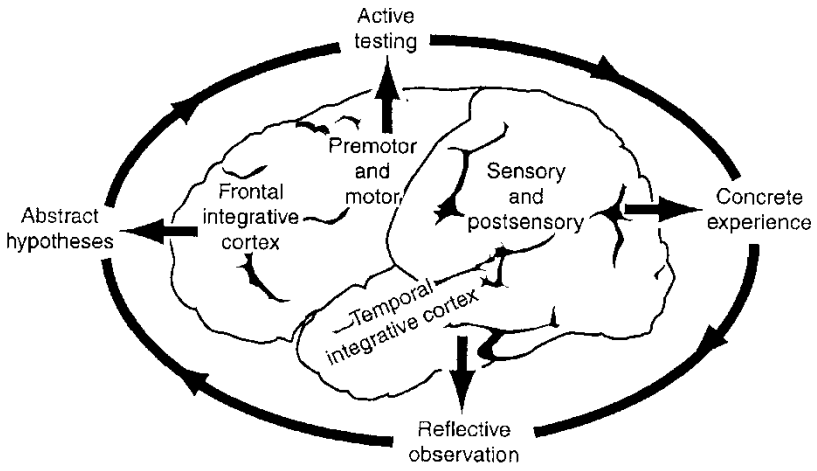
Figure 2. The Experiential Learning Cycle



In *The art of changing the brain: Enriching teaching by exploring the biology of learning,* James Zull a biologist and founding director of CWRU's University Center for Innovation in Teaching and Education (UCITE) sees a link between ELT and neuroscience research,

suggesting that this process of experiential learning is related to the process of brain functioning as shown in Figure 2. "Put into words, the figure illustrates that 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: 18-19; 2011)

Figure 3. The Experiential Learning Cycle and Regions of the Cerebral Cortex.



Reprinted with permission of the author (Zull 2002)

Learning Style

Learning style describes the unique ways individuals spiral through the learning cycle based on their preference for the four different learning modes—CE, RO, AC, & AE. Because of one's genetic makeup, particular life experiences, and the demands of the present environment, a preferred way of choosing among these four learning modes is developed. The conflict between being concrete or abstract and between being active or reflective is resolved in patterned, characteristic ways. Much of the research on ELT has focused on the concept of learning style using the Kolb Learning Style Inventory (KLSI) to assess individual learning styles (Kolb & Kolb 2005b). In the KLSI a person's learning style is defined by their unique combination of preferences for the four learning modes defining a "kite" shape profile of their relative preference for the four phases of the learning cycle. Because each person's learning style is unique, everyone's kite shape is a little different.

ELT posits that learning style is not a fixed psychological trait but a dynamic state resulting from synergistic transactions between the person and the environment. 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 the actual occasions that they live through" (Kolb, 1984, p. 63-64).

Previous research with KLSI versions 1-3.1 identified four learning style groupings of similar kite shapes that are associated with different approaches to learning —Diverging, Assimilating, Converging, and Accommodating. This research has shown that learning styles are influenced by culture, personality type, educational specialization, career choice, and current job role and tasks (Kolb & Kolb, 2013; Kolb, 1984, 2015). These patterns of behavior associated with the four basic learning styles are shaped by transactions between persons and their environment at five different levels—personality, educational specialization, professional career, current job role, and adaptive competencies. While some have interpreted learning style as a personality variable (Garner 2000, Furnam, Jackson & Miller 1999), ELT defines learning style as a social psychological concept that is only partially determined by personality. Personality exerts a small but pervasive influence in nearly all situations; but at the other levels learning style is influenced by increasingly specific environmental demands of educational specialization, career, job, and tasks skills. Table 1 summarizes previous research that has identified how learning styles are determined at these various levels.

Table 1
Relationship Between Learning Styles and Five Levels of Behavior.

Behavior level	Diverging	Assimilating	Converging	Accommodating
Personality types	Introverted Feeling	Introverted Intuition	Extraverted Thinking	Extraverted Sensation
Educational specialization	Arts, English History Psychology	Mathematics Physical Science	Engineering Medicine	Education Communication Nursing
Professional career	Social service Arts	Sciences Research Information	Engineering Medicine Technology	Sales Social service Education
Current jobs	Personal jobs	Information jobs	Technical jobs	Executive jobs
Adaptive competencies	Valuing skills	Thinking skills	Decision skills	Action skills

Personality Types. Although the learning styles of and learning modes proposed by ELT are derived from the works of Dewey, Lewin and Piaget many have noted the similarity of these concepts to Carl Jung's descriptions of individuals' preferred ways for adapting in the world. Several research studies relating the LSI with the Myers-Briggs Type Indicator (MBTI) indicate that Jung's Extraversion/Introversion dialectical dimension correlates with the Active/Reflective dialectic of ELT and the MBTI Feeling/Thinking dimension correlates with the LSI Concrete Experience/ Abstract Conceptualization dimension. The MBTI Sensing type is associated with the LSI Accommodating learning style and the MBTI Intuitive type with the LSI Assimilating style. MBTI Feeling types correspond to LSI Diverging learning styles and Thinking types to Converging styles. The above discussion implies that the Accommodating learning style is the Extraverted Sensing type, and the Converging style the Extraverted Thinking type. The Assimilating learning style corresponds to the Introverted Intuitive personality type and the Diverging style to the Introverted Feeling type. Myers (1962) descriptions of these MBTI types are very similar to the corresponding LSI learning styles as described by ELT (Kolb, 1984, pp: 83-85).

Educational Specialization. Early educational experiences shape people's individual learning styles by instilling positive attitudes toward specific sets of learning skills and by teaching students how to learn. Although elementary education is generalized, there is an increasing process of specialization that begins in high school and becomes sharper during the college years. This specialization in the realms of social knowledge influences individuals' orientations toward learning, resulting in particular relations between learning styles and early training in an educational specialty or discipline. For example, people specializing in the arts, history, political science, English, and psychology tend to have Diverging learning styles, while those majoring in more abstract and applied areas like medicine and engineering have Converging learning styles. Individuals with Accommodating styles often have educational backgrounds in education, communication and nursing, and those with Assimilating styles in mathematics and physical sciences.

Professional Career. A third set of factors that shape learning styles stems from professional careers. One's professional career choice not only exposes one to a specialized learning environment, but it also involves a commitment to a generic professional problem, such as social service, that requires a specialized adaptive orientation. In addition, one becomes a member of a reference group of peers who share a professional mentality, and a common set of values and beliefs about how one should behave professionally. This professional orientation shapes learning style through habits acquired in professional training and through the more immediate normative pressures involved in being a competent professional. Research over the years has shown that social service and arts careers attract people with a Diverging learning style. Professions in the sciences and information or research have people with an Assimilating learning style. The Converging learning styles tends to be dominant among professionals in technology intensive fields like medicine and engineering. Finally, the Accommodating learning style characterizes people with careers in fields such as sales, social service and education.

Current Job Role. The fourth level of factors influencing learning style is the person's current job role. The task demands and pressures of a job shape a person's adaptive

orientation. Executive jobs, such as general management, that require a strong orientation to task accomplishment and decision making in uncertain emergent circumstances require an Accommodating learning style. Personal jobs, such as counseling and personnel administration, that require the establishment of personal relationships and effective communication with other people demand a Diverging learning style. Information jobs, such as planning and research, that require data gathering and analysis, as well as conceptual modeling, require an Assimilating learning style. Technical jobs, such as bench engineering and production that require technical and problem-solving skills require a convergent learning orientation.

Adaptive competencies. The fifth and most immediate level of forces that shapes learning style is the specific task or problem the person is currently working on. Each task we face requires a corresponding set of skills for effective performance. The effective matching of task demands and personal skills results in an adaptive competence. The Accommodative learning style encompasses a set of competencies that can best be termed Acting skills: Leadership, Initiative, and Action. The Diverging learning style is associated with Valuing skills: Relationship, Helping others, and Sense-making. The Assimilating learning style is related to Thinking skills: Information-gathering, Information-analysis, and Theory building. Finally, the Converging learning style is associated with Decision skills like Quantitative Analysis, Use of Technology, and Goal-setting (Kolb, 1984).

The Original Four Learning Style Typology. The following summary of the original four learning styles is based on both research and clinical observation of these patterns of KLSI scores (Kolb, 1984,2015; Kolb & Kolb 2013).

An individual with diverging style has CE and RO as dominant learning abilities. People with this learning style are best at viewing concrete situations from many different points of view. It is labeled "Diverging" because a person with it performs better in situations that call for generation of ideas, such as a "brainstorming" session. People with a Diverging learning style have broad cultural interests and like to gather information. They are interested in people, tend to be imaginative and emotional, have broad cultural interests, and tend to specialize in the arts. In formal learning situations, people with the Diverging style prefer to work in groups, listening with an open mind and receiving personalized feedback.

An individual with an assimilating style has AC and RO as dominant learning abilities. People with this learning style are best at understanding a wide range of information and putting into concise, logical form. Individuals with an Assimilating style are less focused on people and more interested in ideas and abstract concepts. Generally, people with this style find it more important that a theory have logical soundness than practical value. The Assimilating learning style is important for effectiveness in information and science careers. In formal learning situations, people with this style prefer readings, lectures, exploring analytical models, and having time to think things through.

An individual with a converging style has AC and AE as dominant learning abilities. People with this learning style are best at finding practical uses for ideas and theories. They have the ability to solve problems and make decisions based on finding solutions to questions or

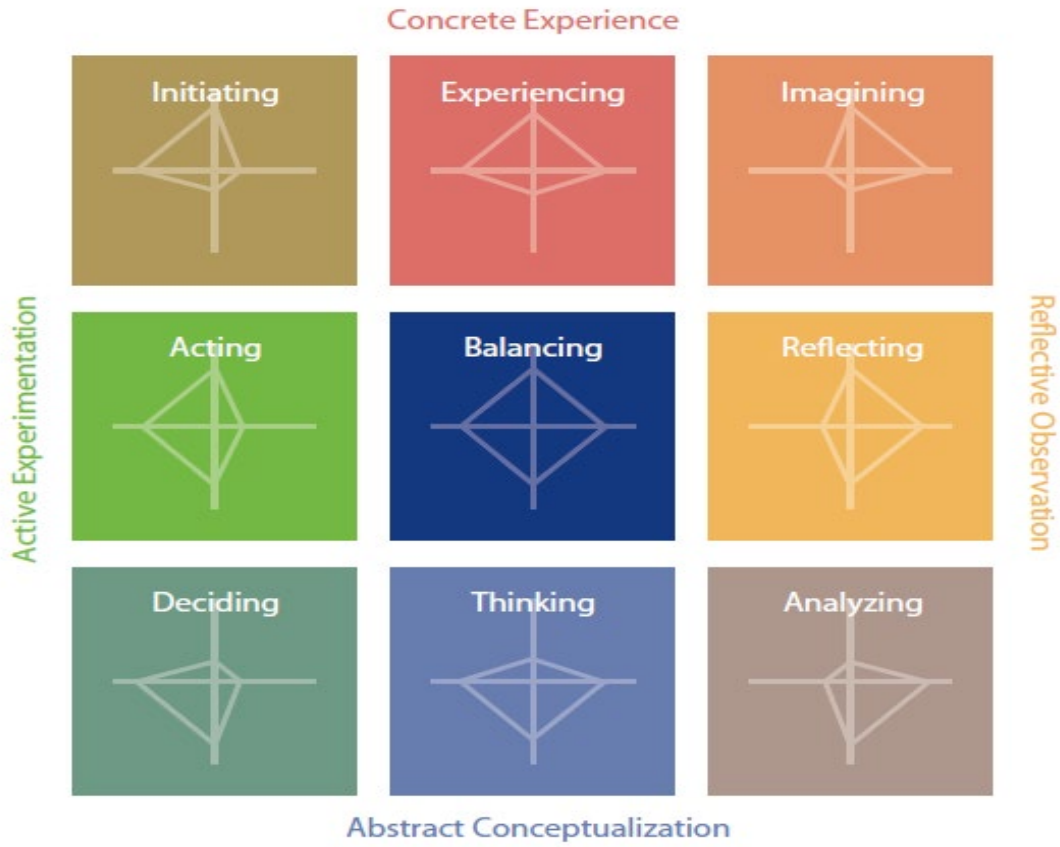
problems. Individuals with a Converging learning style prefer to deal with technical tasks and problems rather than with social issues and interpersonal issues. These learning skills are important for effectiveness in specialist and technology careers. In formal learning situations, people with this style prefer to experiment with new ideas, simulations, laboratory assignments, and practical applications.

An individual with an accommodating style has CE and AE as dominant learning abilities. People with this learning style have the ability to learn from primarily "hands-on" experience. They enjoy carrying out plans and involving themselves in new and challenging experiences. Their tendency may be to act on "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. This learning style is important for effectiveness in action-oriented careers such as marketing or sales. In formal learning situations, people with the Accommodating 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.

The nine learning styles of the KELP. Data from empirical and clinical studies over the years has shown that these original four learning style types—Accommodating, Assimilating, Converging and Diverging— can be refined further into a nine style typology that better defines the unique patterns of individual learning styles and reduces the confusions introduced by borderline cases in the old 4 style typology (Eickmann, Kolb, & Kolb, 2004; Kolb & Kolb, 2005a&b; Boyatzis & Mainemelis, 2000). With feedback from users we first began noticing a fifth "balancing" style describing users who scored at the center of the Learning Style grid. Later we discovered that individuals who scored near the grid boundary lines also had distinctive styles. For example an "Experiencing" style was identified between the Accommodating and Diverging styles Four of these style types emphasize one of the four learning modes—Experiencing (CE), Reflecting (RO), Thinking (AC) and Acting (AE) (Abbey, Hunt & Weiser, 1985; Hunt, 1987). 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—Imagining (CE & RO), Analyzing (AC & RO), Deciding (AC &AE) and Initiating (CE &AE). The final style type balances all four modes of the learning cycle—Balancing (CE, RO, AC &AE; Mainemelis, Boyatzis, & Kolb, 2002).

The KELP assesses these nine style types by moving from a 4 pixel to 9-pixel resolution of learning style types as described below. The learning style types can be systematically arranged on a two-dimensional learning space defined by Abstract Conceptualization-Concrete Experience and Active Experimentation-Reflective Observation. This space, including a description of the distinguishing kite shape of each style, is depicted in Figure 4. See Appendix 7 for detailed descriptions and case studies of the nine types.

Figure 4. The Nine Learning Styles in the KLSI 4.0



The **Initiating** style - initiating action to deal with experiences and situations.
The Initiating style is characterized by the ability to initiate action in order to deal with experiences and situations. It involves active experimentation (AE) and concrete experience (CE).

The **Experiencing** style - finding meaning from deep involvement in experience. The Experiencing style is characterized by the ability to find meaning from deep involvement in experience. It draws on concrete experience (CE) while balancing active experimentation (AE) and reflective observation (RO).

The **Imagining** style - imagining possibilities by observing and reflecting on experiences. The Imagining style is characterized by the ability to imagine possibilities by observing and reflecting on experiences. It combines the learning steps of concrete experience (CE) and reflective observation (RO).

The **Reflecting** style - connecting experience and ideas through sustained reflection. The Reflecting style is characterized by the ability to connect experience and ideas through sustained reflection. It draws on reflective observation (RO) while balancing concrete experience (CE) and abstract conceptualization (AC).

The **Analyzing** style - integrating ideas into concise models and systems through reflection. The Analyzing style is characterized by the ability to integrate and systematize ideas through reflection. It combines reflective observation (RO) and abstract conceptualization (AC).

The **Thinking** style - disciplined involvement in abstract reasoning and logical reasoning. The Thinking style is characterized by the capacity for disciplined involvement in abstract and logical reasoning. It draws on abstract conceptualization (AC) while balancing active experimentation (AE) and reflective observation (RO).

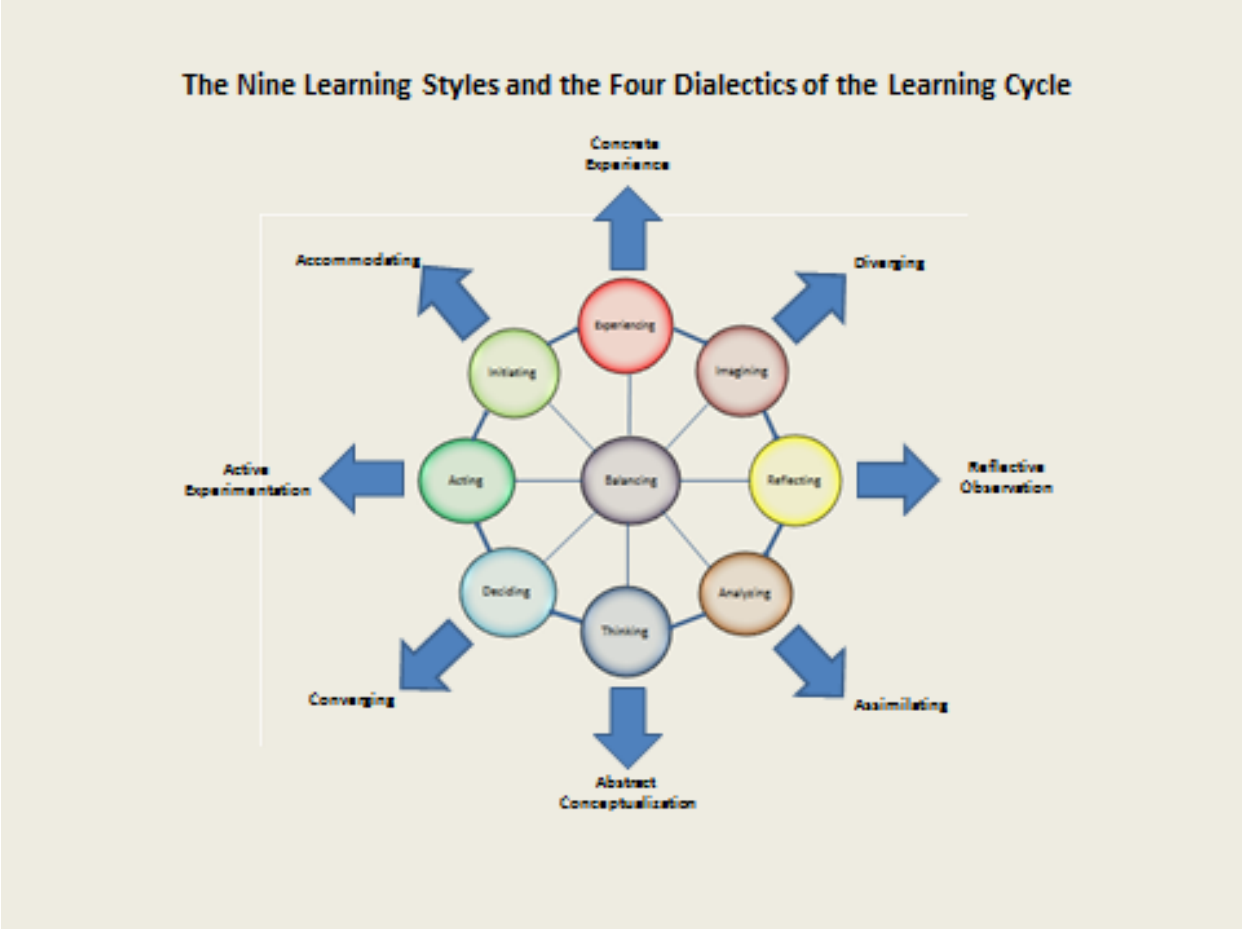
The **Deciding** style - using theories and models to decide on problem solutions and courses of action. The Deciding style is characterized by the ability to use theories and models to decide on problem solutions and courses of action. it combines abstract conceptualization (AC) and active experimentation (AE).

The **Acting** style - a strong motivation for goal directed action that integrates people and tasks. The Acting style is characterized by a strong motivation for goal directed action that integrates people and tasks. It draws on active experimentation (AE) while balancing concrete experience (CE) and abstract conceptualization (AC).

The **Balancing** style - adapting by weighing the pros and cons of acting versus reflecting and experiencing versus thinking. The Balancing style is characterized by the ability to adapt; weighing the pros and cons of acting versus reflecting and experiencing versus thinking. It balances concrete experience, abstract conceptualization, active experimentation and reflective observation.

These nine KELP learning styles further define the experiential learning cycle by emphasizing four dialectic tensions in the learning process. In addition to the primary dialectics of Abstract Conceptualization/Concrete Experience and Active Experimentation/Reflective Observation, the combination dialectics of Assimilation/Accommodation and Converging/Diverging are also represented in an eight stage learning cycle with Balancing in the center. Thus The Initiating style has a strong preference for active learning in context (Accommodation) while the Analyzing style has a strong preference for reflective conceptual learning (Assimilation). The Imagining style has a strong preference for opening alternatives and perspectives on experience (Diverging) while the Deciding style has a strong preference for closing on the single best option for action (Converging). The formulas for calculating the continuous scores on these combination dialectics are reported on page 41. Figure 5 depicts this expanded learning cycle and illustrates how an individual's particular style represents their preferred space in the cycle.

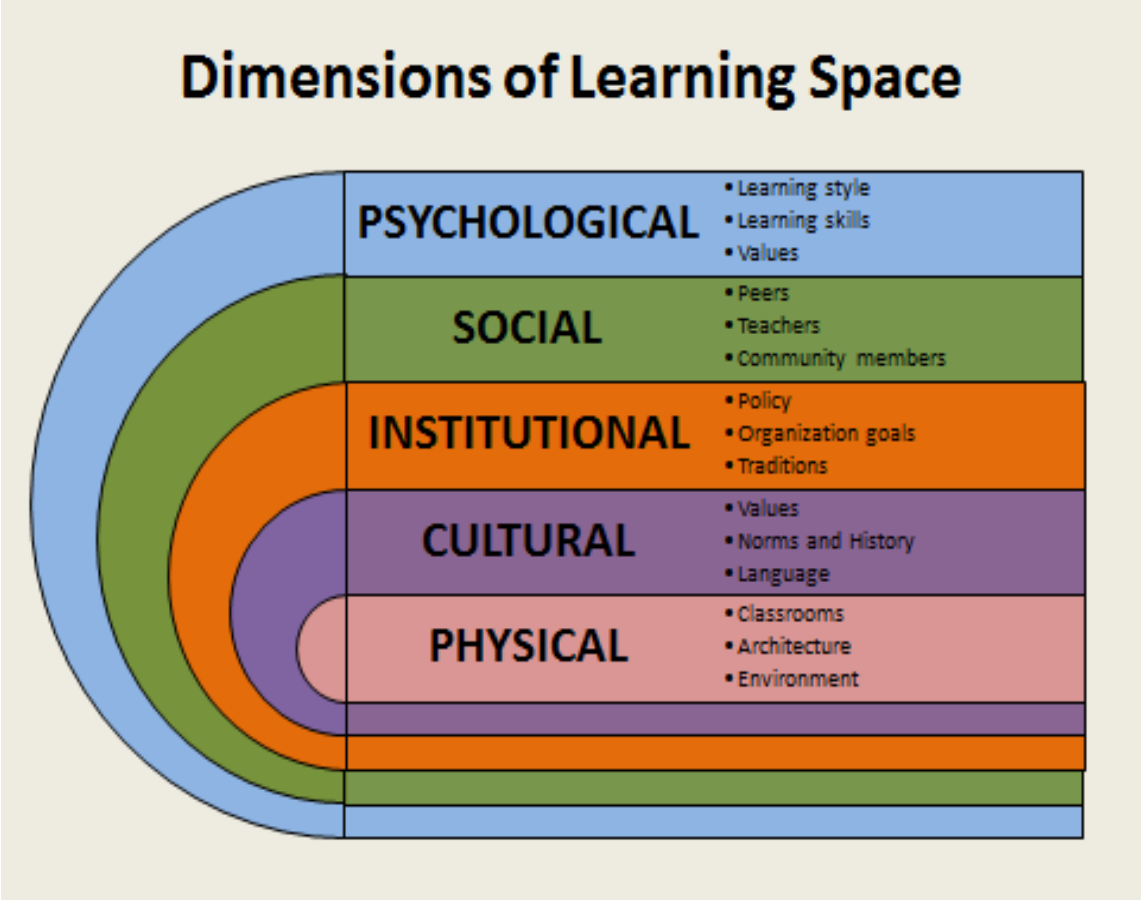
Figure 5



Learning Space

If learning is to occur, it requires a space for it to take place. While, for most, the concept of learning space first conjures up the image of the physical classroom environment, it is much broader and multi-dimensional. Dimensions of learning space include physical, cultural, institutional, social and psychological aspects (See Figure 6).

Figure 6



In ELT these dimensions all come together in the experience of the learner. This concept of learning space builds on Kurt Lewin's field theory and his concept of life space (1951). 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, which 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 along with the expectation that time spent reflecting will not be rewarded.

Three other theoretical frameworks inform the ELT concept of learning space. Urie Bronfenbrenner's (1977, 1979) work on the ecology of human development has made significant sociological contributions to Lewin's life space concept. He defines the ecology of learning/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. This theory provides a framework for analysis of the social system factors that influence learners' experience of their learning spaces.

Another important contribution to the learning space concept is situated learning theory (Lave and 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. 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, as well as the reproduction and development of the community of practice itself as newcomers replace old-timers.

Finally, in their theory of knowledge creation, Nonaka and Konno (1998) introduce the Japanese concept of "ba", a "context that harbors meaning", which is a shared space that is the foundation for knowledge creation. "Knowledge is embedded in *ba,* where it is then acquired through one's own experience or reflections on the experiences of others." (Nonaka and Konno 1998:40) Knowledge embedded in *ba* is tacit and can only be made explicit through sharing of feelings, thoughts and experiences of persons in the space. For this to happen, the *ba* space requires that individuals remove barriers between one another in a climate that emphasizes "care, love, trust, and commitment". Learning spaces similarly require norms of psychological safety, serious purpose, and respect to promote learning.

Since a learning space is in the end what the learner experiences it to be, it is the psychological and social dimensions of learning spaces that have the most influence on learning. From this perspective learning spaces can be viewed as aggregates of human characteristics. "Environments are transmitted through people and the dominant features of a particular environment are partially a function of the individuals who inhabit it" (Strange & Banning, 2001). Using the "human aggregate" approach, 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 like that shown in Figure 4. An individual's learning style positions him/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, their 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 vs. reflection and

experiencing vs. thinking, thereby emphasizing some stages of the learning cycle over others. A number of studies of learning spaces in higher education have been conducted using the human aggregate approach by showing the percentage of students whose learning style places them in the different learning space regions (Kolb & Kolb, 2005a; Eickmann, Kolb & Kolb, 2004). Figure 7, for example, shows the ELT learning space of the MBA program in a major management school. In this particular case, students are predominately concentrated in the abstract and active regions of the learning space, as are the faculty. This creates a learning space that tends to emphasize the quantitative and technical aspects of management over the human and relationship factors.

Figure 7. The Learning Space of an MBA Program Defined by the Learning Styles of MBA Students (n = 1286; Kolb & Kolb 2005a)

Concrete Experience

Initiating 10.1%	Experiencing 6%	Imagining 5.1%
Acting 13.5%	Balancing 10.2%	Reflecting 9.3%
Deciding 12.7%	Thinking 17%	Analyzing 16%

Active Experimentation

Reflective Observation

Abstract Conceptualization

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 their experience and thus defines their "reality." Teachers objectively create learning spaces by the information and activities they offer in their course; but this space is interpreted in the students' subjective experience through the lens of their learning style.

Creating learning spaces for experiential learning. In our recent research we have focused on the characteristics of learning spaces that maximize learning and development and have developed principles for creating them (Kolb & Kolb, 2005a, 2017). For a learner to engage fully in the learning cycle, a space must be provided to engage 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.

The enhancement of experiential learning can be achieved through the creation of learning spaces that promote growth producing experiences for learners. A central concept in Dewey's educational philosophy is the continuum of experience that arrays experiences that promote or inhibit learning. "The belief that all genuine education comes about through experience does not mean that all experiences are genuinely educative…For some experiences are mis-educative. Any experience is mis-educative that has the effect of arresting or distorting the growth of further experience…Hence the central problem of an education based on experience is to select the kind of present experiences that live fruitfully and creatively in subsequent experiences" (Dewey 1938, p. 25-28). There are a number of educational principles that flow from this philosophy.

Respect for Learners and their Experience. A growth producing experience in the philosophy of experiential learning refers not just to a direct experience related to a subject matter under study but to the total experiential life space of the learner. This includes the physical and social environment and the quality of relationships. We refer to this as the Cheers/Jeers experiential continuum. At one end learners feel that they are members of a learning community who are known and respected by faculty and colleagues and whose experience is taken seriously, a space "where everybody knows your name". At the other extreme are "mis-educative" learning environments where learners feel alienated, alone, unrecognized and devalued. Learning and growth in the Jeers environment "where nobody knows your name" can be difficult if not impossible. This principle an be problematic for even the finest educational institutions. President Lawrence Summers of Harvard dedicated his 2003 commencement address to the introduction of a comprehensive examination of the undergraduate program, motivated in part by a letter he received from a top science student which contained the statement, "I am in the eighth semester of college and there is not a single science professor here who could identify me by name." Summers concludes "The only true measure of a successful educational model is our students' experience of it." (Summers 2003:64)

Begin Learning with the Learner's Experience of the Subject Matter. To learn experientially one must first of all own and value their experience. Students will often say, "But I don't have any experience." meaning that they don't believe that their experience is of any value to the teacher or for learning the subject matter at hand. The new science of learning (Bransford, Brown and Cocking 2000) is based on the cognitive constructivist theories of Piaget and Vygotsky that emphasize that people construct new knowledge and understanding from what they already know and believe based on their previous experience. Zull (2002) suggests that this prior knowledge exists in the brain as neuronal networks which cannot be erased by a teacher's cogent explanation. Instead the effective teacher activates prior knowledge, building on exploration of what students already know and believe, on the sense they have made of their previous concrete experiences. Beginning with these or related concrete experiences allows the learner to re-examine and modify their previous sense-making in the light of new ideas.

Creating and Holding a Hospitable Space for Learning. To learn requires facing and embracing differences; be they differences between skilled expert performance and one's novice status, differences between deeply held ideas and beliefs and new ideas or differences in the life experience and values of others that can lead to understanding them. These differences can be challenging and threatening, requiring a learning space that encourages the expression of differences and the psychological safety to support the learner in facing these challenges (Sanford 1966). As Robert Kegan says, "…people grow best where they continuously experience an ingenious blend of challenge and support" (1994: 42). As Kegan implies by his use of the term "ingenious blend", creating and holding this learning space is not easy. He notes that while educational institutions have been quite successful in challenging students, they have been much less successful in providing support. One reason for this may be that challenges tend to be specific and immediate while support must go beyond an immediate "You can do it." statement. It requires a climate or culture of support that the learner can trust to "hold" them over time. In *Conversational Learning* (Baker, Jensen and Kolb 2002) we draw on the work of Henri Nouwen (1975) and Parker Palmer (1983, 1990, 1998) to describe this challenging and supportive learning space as one that welcomes the stranger in a spirit of hospitality where "students and teachers can enter into a fearless communication with each other and allow their respective life experiences to be their primary and most valuable source of growth and maturation" (Nouwen: 60).

Making Space for Conversational Learning. Human beings naturally make meaning from their experiences through conversation. Yet genuine conversation in the traditional lecture classroom can be extremely restricted or nonexistent. At the break or end of the class the sometimes painfully silent classroom will suddenly come alive with spontaneous conversation among students. Significant learning can occur in these conversations, although it may not always be the learning the teacher intended. Making space for good conversation as part of the educational process provides the opportunity for reflection on and meaning making about experiences that improves the effectiveness of experiential learning (Keeton, Sheckley, and Griggs 2002, Bunker 1999). For example, the creation of learning teams as part of a course promote effective learning when psychologically safe conditions are present (Wyss-Flamm 2002). *Conversational Learning* describes the dimensions of spaces that allow for good conversation. Good conversation is more likely to occur in spaces that integrate thinking and feeling, talking and listening, leadership and solidarity, recognition of individuality and relatedness and discursive and recursive processes. When the conversational space is dominated by one extreme of these dimensions, e.g. talking without listening, conversational learning is diminished.

Making Space for Development of Expertise. With vast knowledge bases that are ever changing and growing in every field, many higher education curricula consist of course after course "covering" a series of topics in a relatively superficial factual way. Yet as the National Research Council in it's report on the new science of learning recommends on the basis of research on expert learners; effective learning requires not only factual knowledge, but the organization of these facts and ideas in a conceptual framework and the ability to retrieve knowledge for application and transfer to different contexts (Bransford, Brown, and Cocking 2002). Such deep learning is facilitated by deliberate, recursive practice on areas that are related to the learner's goals (Keeton, Sheckley, and Griggs 2002). The process of

learning depicted in the experiential learning cycle describes this recursive spiral of knowledge development. Space needs to be created in curricula for students to pursue such deep experiential learning in order to develop expertise related to their life purpose.

Making Spaces for Acting and Reflecting. Learning is like breathing; it involves a taking in and processing of experience and a putting out or expression of what is learned. As Dewey noted, "…nothing takes root in mind when there is no balance between doing and receiving. Some decisive action is needed in order to establish contact with the realities of the world and in order that impressions may be so related to facts that their value is tested and organized." (1934: 45) Yet many programs in higher education are much more focused on impressing information on the mind of the learner than on opportunities for the learners to express and test in action what they have learned. Many courses will spend 15 weeks requiring students to take in volumes of information and only a couple of hours expressing and testing their learning, often on a multiple choice exam. This is in contrast to arts education built on the demonstration-practice-critique process where active expression and testing are continuously involved in the learning process. Zull (2002) suggests that action may be the most important part of the learning cycle because it closes the learning cycle by bringing the inside world of reflection and thought into contact with the outside world of experiences created by action. (cf. Dewey 1897) Keeton, Sheckley and Gross (2002) propose another level of action/reflection integration, emphasizing the importance of active reflection in deepening learning from experience.

Making Spaces for Feeling and Thinking. We have seen a polarization between feeling and thinking in the contrast between the feeling oriented learning space of CIA arts education and the thinking oriented learning spaces of the Case undergraduate and MBA programs (Kolb & Kolb 2005a). It seems that educational institutions tend to develop a learning culture that emphasizes the learning mode most related to their educational objectives and devalues the opposite learning mode. Yet, Damasio (1994, 2003), LeDoux (1997), Zull (2002) and others offer convincing research evidence that reason and emotion are inextricably related in their influence on learning and memory. Indeed, it appears that feelings and emotions have primacy in determining whether and what we learn. Negative emotions such as fear and anxiety can block learning, while positive feelings of attraction and interest may be essential for learning. To learn something that one is not interested in is extremely difficult.

Making Space for Inside-out Learning. David Hunt (1987, 1991) describes inside-out learning as a process of beginning with oneself in learning by focusing on one's experienced knowledge; the implicit theories, metaphors, interests, desires and goals that guide experience. Making space for inside-out learning by linking educational experiences to the learner's interests kindles intrinsic motivation and increases learning effectiveness. Under the proper educational conditions, a spark of intrinsic interest can be nurtured into a flame of committed life purpose. (Dewey 1897) Yet learning spaces that emphasize extrinsic reward can drive out intrinsically motivated learning (Kohn 1993, Deci and Ryan 1985, Ryan and Deci 2000). Long ago Dewey described the trend toward emphasis on extrinsic reward in education and the consequences for the teacher who wields the carrot and stick: "Thus in education we have that systematic depreciation of interest which has been noted…Thus we

have the spectacle of professional educators decrying appeal to interest while they uphold with great dignity the need of reliance upon examinations, marks, promotions and emotions, prizes and the time honored paraphernalia of rewards and punishments. The effect of this situation in crippling the teacher's sense of humor has not received the attention which it deserves. (1916: 336)

Making Space for Learners to Take Charge of their own Learning. Many students enter higher education conditioned by their previous educational experiences to be passive recipients of what they are taught. Making space for students to take control of and responsibility for their learning can greatly enhance their ability to learn from experience. Some use the term self-authorship to describe this process of constructing one's own knowledge vs. passively receiving knowledge from others, considering self-authorship to be a major aim of education (Kegan 1994, King 2003, Baxter-Magolda 1999). Others describe this goal as increasing students' capacity for self direction (Boyatzis 1994, Robertson 1988). The Management Development and Assessment course in the Case MBA program aims to develop student self direction through assessment and feedback on learning skills and competencies and the development of a learning plan to achieve their career/life goals (Boyatzis 1994). Bransford, Brown, and Cocking (2002) argue for the development of meta-cognitive skills to promote active learning. By developing their effectiveness as learners (Keeton, Sheckley and Griggs 2002), students can be empowered to take responsibility for their own learning by understanding how they learn best and the skills necessary to learn in regions that are uncomfortable for them. Workshops on experiential learning and learning styles can help students to develop meta-cognitive learning skills. At CIA and the Case undergraduate programs student workshops help students interpret their LSI scores and understand how to use this information to improve their learning effectiveness. John Reese at the University of Denver Law School conducts "Connecting with the Professor" workshops in which students select one of four teaching styles based on the four predominant learning styles that they have difficulty connecting with. The workshop gives multiple examples of remedial actions that the learner may take to correct the misconnection created by differences in teaching/learning styles. Peer group discussions among law students give an opportunity to create new ideas about how to get the most from professors with different learning/teaching styles (Reese 1998).

The Spiral of Learning and Adult Development

In ELT, adult development occurs through learning from experience. This is based on the idea that 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 iterations of the cycle continue the exploration and transfer to experiences in other contexts. In this process learning is integrated with other knowledge and generalized to other contexts leading to higher levels of adult development.

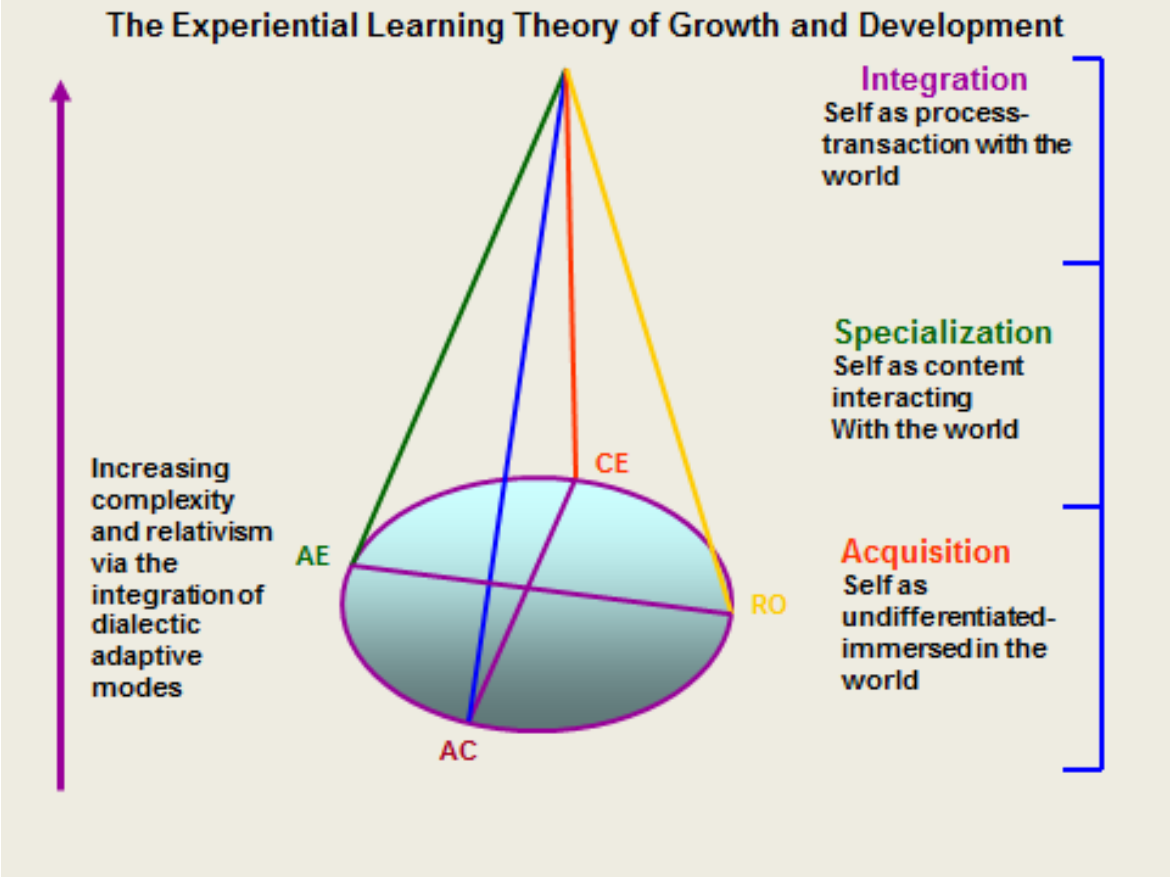
Zull (2002) explained a link between ELT and neuroscience research, suggesting that the spiraling process of experiential learning is related to the process of brain functioning.

Humberto Maturana (1970) also arrived at the concept of a spiral when he searched for the pattern of organization that characterizes all living systems. He concluded that all living systems are organized in a closed circular process that allows for evolutionary change in a way that circularity is maintained. He called this process *autopoeisis,* which means "self-making," emphasizing the self-referential and self-organizing nature of life. Applying autopoeisis to cognition, he argued that the process of knowing was identical to autopoeisis, the spiraling process of life (Maturana & Varela, 1980). As these researchers suggest, the organization of the mind can be viewed as networks of *autopoeitic* learning spirals which are embodied in the neuronal networks that cover the surface layer of the neo-cortex. These neuronal networks are strengthened and enlarged by spirals of learning recursively cycling through these major regions of the neo-cortex.

Progress toward development is seen as increases in the complexity and sophistication of the dimensions associated with the four modes of the learning cycle—affective, perceptual, symbolic and behavioral complexity—and the integration of these modes in a flexible full cycle of learning.

The ELT developmental model (Kolb, 1984) follows Jung's theory that adult development moves from a specialized way of adapting toward a holistic integrated stage that he calls individuation. The model defines three stages: (1) *acquisition,* from birth to adolescence where basic abilities and cognitive structures develop; (2) *specialization,* from formal schooling through the early work and personal experiences of adulthood where social, educational, and organizational socialization forces shape the development of a particular, specialized learning style; and (3) *integration* in mid-career and later life where non-dominant modes of learning are expressed in work and personal life. Development through these stages is characterized by increased integration of the dialectic conflicts between the four primary learning modes (AC-CE and AE-RO) and by increasing complexity and relativism in adapting to the world. Each of the learning modes is associated with a form of complexity that is used in conscious experience to transform sensory data into knowledge such that development of CE increases affective complexity, of RO increases perceptual complexity, of AC increases symbolic complexity, and of AE increases behavioral complexity (Figure 8). These learning modes and complexities create a multi-dimensional developmental process that is guided by an individual's particular learning style and life path.

Figure 8



The concept of *deep learning* describes the developmental process of learning that fully integrates the four modes of the experiential learning cycle—experiencing, reflecting, thinking and acting (Jensen & Kolb, 1994; Border, 2007). Deep learning refers to the kind of learning that leads to development in the ELT model. Development toward deep learning is divided into three levels. In the first level learning is registrative and performance-oriented, emphasizing the two learning modes of the specialized learning styles. The second level is interpretative and learning-oriented involving three learning modes, and the third level is integrative and development-oriented involving all four learning modes in a holistic learning process. In his foundational work, *Learning from Experience toward Consciousness,* William Torbert (1972) described these levels of learning as a three-tiered system of feedback loops; work that has been extended by Chris Argyris, Donald Schön, Peter Senge and others in the concepts of single and double loop learning. The traditional lecture course, for example, emphasizes first level, registrative learning emphasizing the learning modes of reflection and abstraction involving little action (often multiple choice tests that assess registration of concepts in memory) and little relation to personal experience. Adding more extensive learning assessments that involve practical application of concepts covered can create second level learning involving the three learning modes where reflection supplemented by action serve to further deepen conceptual understanding. Further addition of learning experiences that involve personal experience such as internships or field projects create the potential for third level integrative learning (cf. Kolb `1984, Chapter 6). As a counter example, an

internship emphasizes registrative learning via the modes of action and experience. Deeper interpretative learning can be enhanced by the addition of activities to stimulate reflection such as team conversation about the internship experience and/or student journals. Linking these to the conceptual material related to the experience adds the fourth learning mode, abstraction and integration though completion of the learning spiral.

A study by Clarke (1977) of the accounting and marketing professions illustrates the ELT developmental model. The study compared the learning styles of cross-sectional samples of accounting and marketing students and professionals in school and at lower, middle and senior level career stages. The learning styles of marketing and accounting students were similar, being fairly balanced among the four learning modes. Lower level accountants had convergent, abstract and active learning styles, and this convergent emphasis was even more pronounced in middle-level accountants, reflecting a highly technical specialization. The senior level accountants, however, became more accommodative in learning style integrating their non-dominant concrete learning orientation. Clark found a similar pattern of development in the marketing profession. Gypen (1981) found the same move from specialization to integration in his study of the learning styles of a cross-sectional sample of social work and engineering university alumni from early to late career. “As engineers move up from the bench to management positions, they complement their initial strengths in abstraction and action with the previously non-dominant orientations of experience and reflection. As social workers move from direct service into administrative positions they move in the opposite direction of the engineers.” (1981: ii)

Notice that in both studies the transitions to non-dominant learning modes in later life stages are associated with changes in the work environment. Development appears not to be solely a function of individual factors alone, but of the transaction between the person and his or her environment. For example, engineers who move from the “bench” into management may become more integrated because of the demands of the interpersonal and unstructured management role. However, choosing to move into the management position required individual development in interest and talent to do so. It is also important to note that these cross-sectional studies do not offer proof of the sequential development through stages predicted in Jung’s model. This would require longitudinal studies of individuals showing that they must first be in a specialized developmental stage before proceeding to the integrative stage. In fact, in spite of their theoretical similarity, elegance and plausibility, we are aware of no empirical evidence for stage-related development in any of the theories of adult development. This evidence is lacking in both the psychoanalytic models of Erikson and Loevinger and the Piaget inspired theories of King and Kitchener, Kegan, or Perry.

For both of these reasons, in our recent work we have considered development in a way that is more context specific, less age related and non-hierarchical. ELT describes registrative, interpretative and integrative levels of consciousness and three modes of adaptation - performance, learning and development (Boyatzis & Kolb, 2000) - which individuals will enter into at different times and situations depending on their life circumstances. While these modes may be typical of the acquisition, specialization and development ELT developmental stages, there may be many exceptions in individual cases. Thus, a young person who has been primarily in a performance mode may transition into a period in the development mode

"to figure out what to do with his life" or an older person in the development mode may return to the performance mode to work on a project of importance.

Learning Flexibility

Another important aspect of learning style is learning flexibility, the extent to which an individual adapts his or her learning style to the demands of the learning situation. As we have seen above, learning style is not a fixed personality trait but more like a habit of learning shaped by experience and choices—it can be an automatic, unconscious mode of adapting or it can be consciously modified and changed. The stability of learning style arises from consistent patterns of transaction between individuals and learning situations in their life. This process is called accentuation—the way we learn about a new situation determines the range of choices and decisions we see, the choices and decisions we make influence the next situation we live through and this situation further influences future choices. Learning styles are thus specialized modes of adaptation that are reinforced by the continuing choice of situations where a style is successful (Kolb 1984).

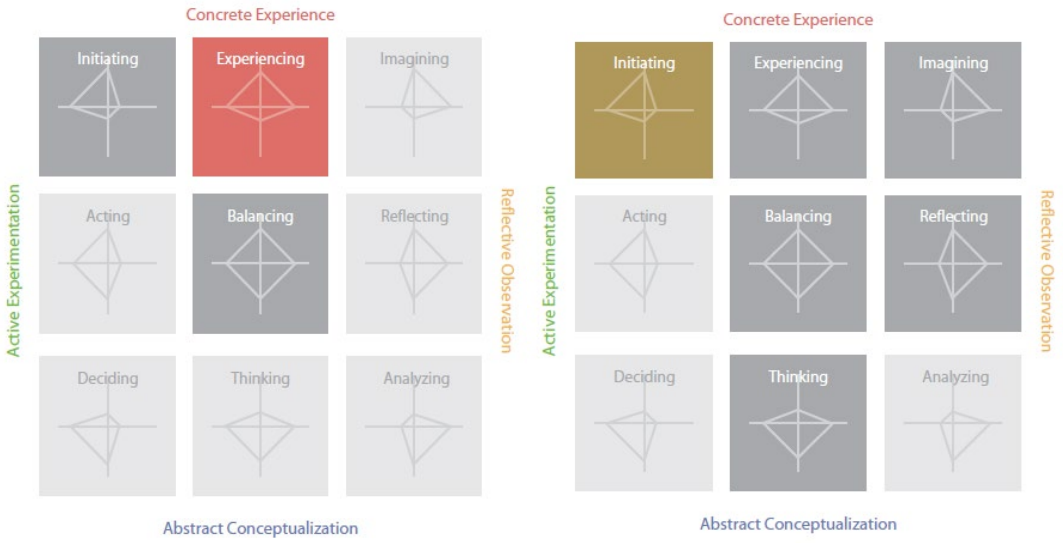
Since a specialized learning style represents an individual preference for only one or two of the four modes of the learning cycle, its effectiveness is limited to those learning situations that require these strengths. Learning flexibility indicates the development of a more holistic and sophisticated learning process The learning style types described above portray how one prefers to learn in general. Many individuals feel that their learning style type accurately describes how they learn most of the time. They are consistent in their approach to learning. Others, however, report that they tend to change their learning approach depending on what they are learning or the situation they are in. They may say, for example, that they use one style in the classroom and another at home with their friends and family. These are flexible learners.

Learning flexibility indicates the development of a more holistic and sophisticated learning process. Following Jung's theory that adult development moves from a specialized way of adapting toward a holistic integrated way, development in learning flexibility is seen as a move from specialization to integration. Integrated learning is a process involving a creative tension among the four learning modes that is responsive to contextual demands. Learning flexibility is the ability to use each of the four learning modes to move freely around the learning cycle and to modify one's approach to learning based on the learning situation. Experiencing, reflecting, thinking and acting each provide valuable perspectives on the learning task in a way that deepens and enriches knowledge.

This can be seen as traveling through each of the regions of the learning space in the process of learning. The flexibility to move from one learning mode to another in the learning cycle is important for effective learning. Learning flexibility can help us move in and out of the learning space regions, capitalizing on the strengths of each learning style. Learning flexibility broadens the learning comfort zone and allows us to operate comfortably and effectively in more regions of the learning space, promoting deep learning and development. In addition to providing a measure of how flexible one is in their approach to learning, the

KLSI 4.0 also provides an indication of which learning space they move to in different learning contexts—their back-up learning styles. Figure 9 shows the backup styles of Initiating and Balancing for an Experiencing type with a low flexibility score and the backup styles of Experiencing, Imagining, Balancing, Reflecting and Thinking for an Initiating learning style with a high flexibility score. High flexibility individuals tend to show more backup styles and hence a greater ability to move around the learning cycle (See Chapter 6).

Figure 9
Backup Styles for High and Low Learning Flexibility Learners



Deliberate Experiential Learning

A primary purpose of the KELP is to empower learners to understand and intentionally improve their learning capability. This ability to deliberately learn from experience is perhaps the most powerful source of adult learning. In leadership development for example, Ashford and DeRue point out, "…consider the fact that leadership development programs customarily teach leadership concepts and skills, but rarely do development programs teach individuals how to learn leadership — which is ironic considering that over 70% of leadership development occurs as people go through the ups and downs of challenging, developmental experiences on the job. We contend that the return on investment in leadership development would be much greater if organizations invested in developing individuals' skills related to the learning of leadership from lived experiences, as opposed to simply teaching leadership concepts, frameworks, and skills. (2012 p147). Deliberate experiential learning draws on theories in three areas; meta-cognition (Kolb & Kolb 2009), mindfulness (Yeganeh 2006; Yeganeh & Kolb 2009),) and studies of expert learning called deliberate practice (Ericsson, Krampe & Tesch-Römer 1993).

Meta-cognition--Understanding yourself as a learner. Deliberate experiential learning refers to individuals' conscious meta-cognitive control of their learning process that enables

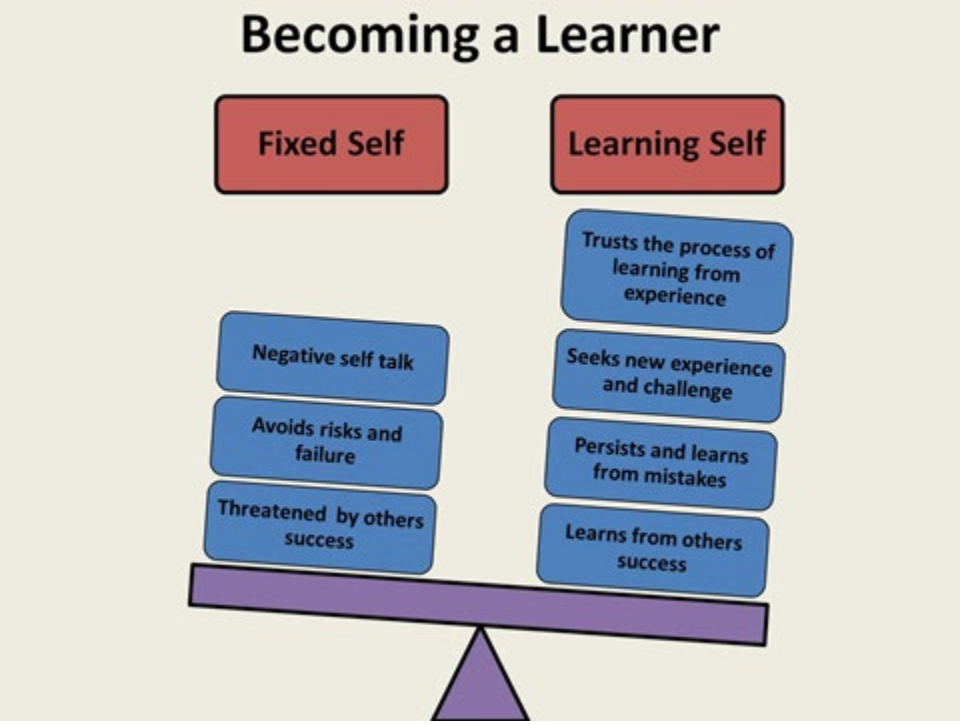
them to monitor and select learning approaches that work best for them in different learning situations. In the late 1970's Flavell (1979) introduced the concept of meta-cognition. He divided meta-cognitive knowledge into three sub-categories: 1) Knowledge of person variables refers to general knowledge about how human beings learn and process information, as well as individual knowledge of one's own learning processes. 2) Task variables include knowledge about the nature of the task and what it will require of the individual. 3) 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.

By using the experiential learning model, learners can better understand the learning process, themselves as learners and the appropriate use of learning strategies based on the learning task and environment. When individuals engaged in the process of learning by reflective monitoring of the learning process they are going through, they can begin to understand important aspects of learning: how they move through each stage of the learning cycle, the way their unique learning style fits with how they are being taught, and the learning demands of what is being taught. This comparison results in strategies for action that can be applied in their ongoing learning process.

Develop a learning identity. A key aspect of meta-cognitive learning is a person's beliefs about themselves, particularly their views about their ability to learn. At the extreme, if a person does not believe that they can learn they 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 they have the ability to learn. On the other hand, there are many successful individuals who attribute their achievements to a learning attitude. Oprah Winfrey for example has said, "I am a woman in process. I'm just trying like everybody else. I try to take every conflict, every experience, and learn from it. Life is never dull."

One's self-identity is deeply held. One is likely to defend against experiences that contradict this identity. 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 like sports and not good at others like mathematics. Every success or failure can trigger a reassessment of one's learning ability. Figure 10 depicts one's self-identity as balancing characteristics that reinforce a fixed self and a learning self. Fixed self characteristics shift the balance to the fixed self. Factors associated with the learning self tip the balance toward becoming a learner.

Figure 10



From the above figure we suggest several practical steps for developing a positive meta-cognitive learning 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 since 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 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 2008:28).

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 2008:56)

Let go of strong emotional responses in order to learn from failure. Failures, losses and mistakes provoke inevitable emotional responses. Yet it is important to learn to regulate 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 hole. An effective way to deal with the emotions that follow judging oneself a failure is to breath calmly and intentionally while accepting the current moment as it is. This enables a clearer mind with which to move forward. *Risk losing.* Joel Waitzkin 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. "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. (Waitzkin 2007: 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/failure accounts. Most of us remember our failures more vividly than our successes. For example, in our experience as teachers we both tend to focus on the one or two negative remarks in our course ratings and ignore the praise and positive reactions. The danger of this type of focus is adjusting one's teaching style to suit one or two negative comments and risking losing the majority of positive experiences in the room. A deeper danger is that such a focus will negatively shape longer term thoughts and behaviors about oneself (Blackwell, Trzesniewski, & Dweck 2007:259-260). Sometimes it is useful to make an inventory of learning strengths and successes to balance your accounts.

Learning style. In addition to believing in ourselves as learners, it is also important to understand how it is that we learn best, our learning style. 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 non-learning self-identity. Our most gratifying experiences in teaching individuals about their learning style 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."

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.

Mindful Experiential Learning. Mindfulness is one special form of meta-cognition that is especially effective for enhancing learning from experience. Mindfulness is an age old set of practices used to overcome the tendency to "sleep walk" automatically through our lives. In recent times these practices have been accepted into mainstream psychology, social psychology, and medicine. Empirical studies are now finding statistical support for what many have known for two millennia: that practicing mindfulness enhances mental and physical health, creativity, and contextual learning.

William James (1890), the originator of the theory of experience on which ELT is based, stated, "no state once gone can recur and be identical with what it was before" (p.155). The mind often neglects the rich context available for observation. Instead it automatically labels stimuli based on limited exposure and moves on to the next stimulus to under-observe. Labeling experiences as fun, boring, sad, happy, urgent, relaxed, and so on are also often based in automatically categorizing experience, rather than being fully present in the unique context of every moment. For James, everything begins and ends in the continuous flux and flow of experience. This emphasis on immediate direct sensual experience is exactly the focus on here and now experience that characterizes mindfulness. James emphasized the importance of attention, as he noted—"My experience is what I agree to attend to." (1890, p. 403). This also is a central element of mindfulness.

The practices of mindfulness are aimed at helping the individual: 1) focus on present and direct experience, 2) be intentionally aware and attentive and accept life as an emergent process of change. Our research on mindfulness and experiential learning (Yeganeh 2006, Yeganeh & Kolb 2009) suggests that the practice of mindfulness can help individuals learn from experience by enhancing presence and intentional attention.

To be present and engaged in direct experience, one must anchor in present-centered awareness by attending to the 5 senses. One of the strongest ways to attend to the present moment is through calm and aware breathing (Good & Yeganeh 2006, Yeganeh, 2006, Yeganeh & Kolb, 2009). Attending to the present moment serves to quiet the mind; reducing automatic, habitual patterns of thinking and responding. Presence enhances Concrete Experience and allows the learning cycle to begin. In a sense, we cannot learn from experience if we do not first *have* an experience, and often, automatic routines make it difficult for direct experiencing in the moment to occur.

Intentional attention—the process of being aware and choiceful about what we are attending to—is, as James says, the process that creates our experience. Mindfulness becomes important when we consider *how* we choose to process and learn from the events in our lives. By intentionally guiding the learning process and paying attention to how we are going through the phases of the learning cycle, we make ourselves through learning. How and what we learn determines the way we process the possibilities of each new emerging experience, which in turn 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, we create ourselves through the choices of the actual occasions they live through. For many, this learning style choice is relatively unconscious, an auto-pilot program for learning. Mindfulness can put the control of our learning and our life back in our hands.

Deliberate Practice—Becoming an Expert Learner. We all know that learning involves repeated practice. However, time spent practicing does not necessarily lead to learning and improved performance. Going to the golf practice range and hitting bucket after bucket of balls doesn't necessarily improve your game and in fact may make it worse by ingraining bad habits. Expert performance research initiated in the early 1990's by K. Anders Ericsson (Ericsson, Krampe & Tesch-Römer 1993; Ericsson & Charness 1994; Ericsson 2006; Baron & Henry 2010) teaches a great deal about learning from practice. The good news from this work is that greatness, for the most part, is not a function of innate talent; it is learned from experience. The not-so-good news is that it involves long term commitment (ten years or 10,000 hours for many top experts) and a particular kind of practice that is hard work, called deliberate practice.

The basic techniques of deliberate practice are useful for improving our ability to learn from experience. Essentially deliberate practice involves intense concentrated, repeated performance that is compared against an ideal or "correct" model of the performance. It requires feedback that compares the actual performance against the ideal to identify "errors" that are corrected in subsequent performance attempts. In this sense deliberate practice can be seen as mindful experiential learning—focused reflection on a concrete performance experience that is analyzed against a meta-cognitive ideal model to improve future action in a recurring cycle of learning. Learning relationships can be of great help in deliberate practice by providing expert models, feedback and support for the focused effort required.

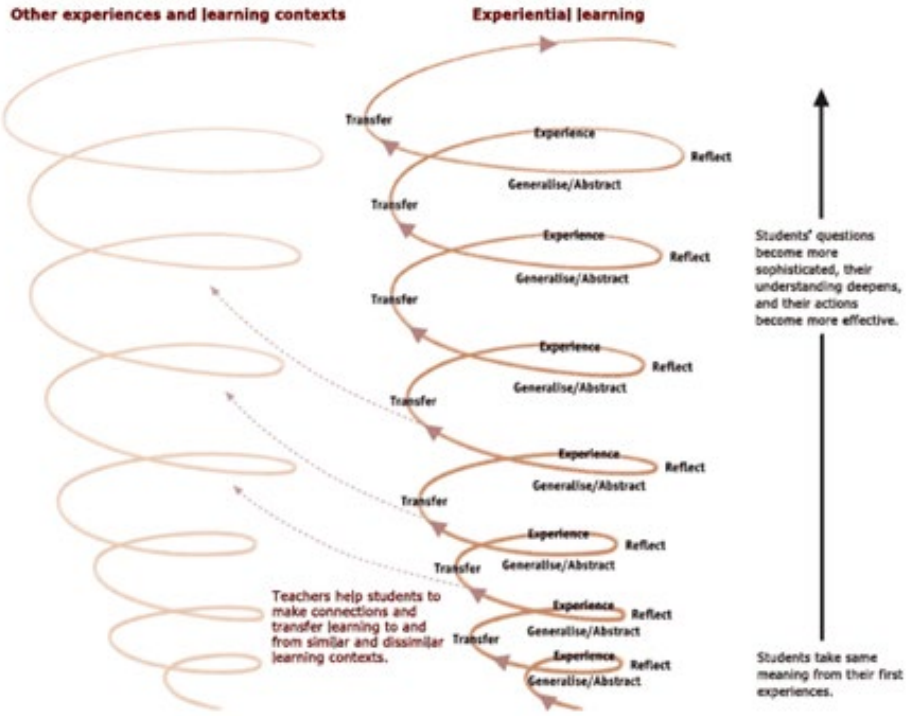
Educator Role and Teaching around the Learning Cycle

The major implication of ELT for education is to design educational programs in a way that teaches around the learning cycle so that learners can use and develop all learning styles in a way that completes the learning cycle for them and promotes deep learning. Chapter seven includes numerous examples of programs that have been created in this way in many fields of study. Appendix 10 gives sample experiential learning designs that teach to all learning styles and Appendix 11 describes the Personal Application Assignment which was created as a way to holistically assess learning in a way that equally evaluates all learning modes.

In our interviews and observations of experienced, successful educators we find that they tend to "teach around the learning cycle" in this manner. They organize their educational activities in such a manner that they address all four learning modes—experiencing, reflecting, thinking, and acting. As they do this, they lead learners around the cycle; shifting the role they play depending on which stage of the cycle they are addressing. In effect the role they adopt helps to create a learning space designed to facilitate the transition from one learning style to the other. Often they do this in a recursive fashion, repeating the cycle many times in a learning program. In effect the cycle becomes a spiral with each passage through the cycle deepening and extending learners' understanding of the subject.

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 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 11 describes how teachers use the learning spiral to promote higher level learning and to transfer knowledge to other contexts.

Figure 11. Teaching and the Learning Spiral

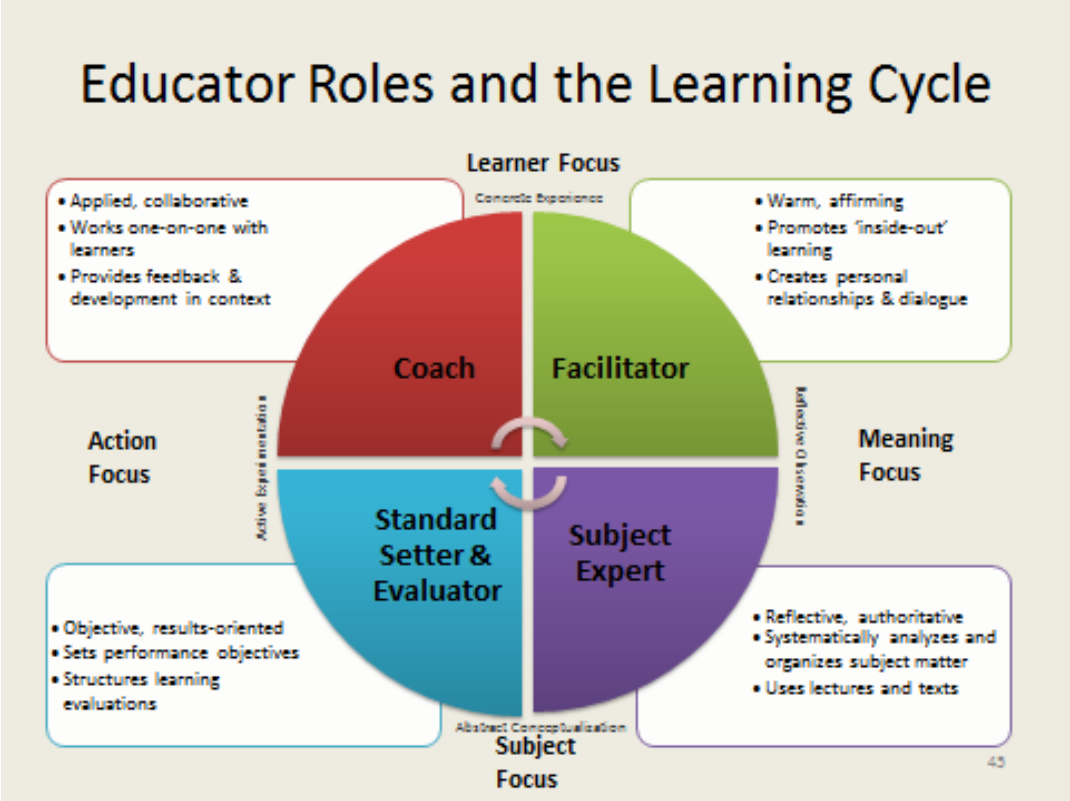


Educator Roles. Teaching around the learning cycle and to different learning styles introduces the need for adjustments in the role one takes with learners. The Educator Role Profile (Kolb & Kolb, 2011) was created to help educators understand their preferred teaching role and plan for how they can adapt to teaching around the learning cycle. The self-report instrument is based on the assumption that preferences for teaching roles emerge from a combination of beliefs about teaching and learning, goals for the educational process,

preferred teaching style, and instructional practices. Educator roles are not limited to individuals in formal classroom teaching situations. The framework can be extended to individuals in all walks of life who "teach" as leaders, coaches, parents, friends, etc.

A teaching role is a patterned set of behaviors that emerge in response to the learning environment, including students and the learning task demands. Each teaching role engages students to learn in a unique manner, using one mode of grasping experience and one mode of transforming experience. In the facilitator role, educators draw on the modes of concrete experience and reflective observation to help learners get in touch with their own experience and reflect on it. Subject matter experts, using the modes of reflective observation and abstract conceptualization, help learners organize and connect their reflection to the knowledge base of the subject matter. They may provide models or theories for learners to use in subsequent analysis. The standard setting and evaluating role uses abstract conceptualization and active experimentation to help students apply knowledge toward performance goals. In this role, educators closely monitor the quality of student performance toward the standards they set, and provide consistent feedback. Finally, those in the coaching role draw on concrete experience and active experimentation to help learners take action on personally meaningful goals. These roles can also be organized by their relative focus on the student versus the subject and action versus knowledge as illustrated in Figure 12.

Figure 12



The Educator Role Profile (ERP) describes four role positions—Facilitator, Expert, Evaluator and Coach. Educators play these roles as they help learners maximize learning by moving through the four stages of the experiential learning cycle.

- **The Facilitator Role.** When facilitating, educators help learners get in touch with their personal experience and reflect on it. They adopt a warm affirming style to draw out learners' interests, intrinsic motivation and self-knowledge. They often do this by facilitating conversation in small groups. They create personal relationships with learners.

- **The Expert Role.** In their role as subject expert, educators help learners organize and connect their reflections to the knowledge base of the subject matter. They adopt an authoritative, reflective style. They often teach by example, modeling and encouraging critical thinking as they systematically organize and analyze the subject matter knowledge. This knowledge is often communicated through lectures and texts.

- **The Evaluator Role.** As a standard setter and evaluator, educators help learners master the application of knowledge and skill in order to meet performance requirements. They adopt an objective results-oriented style as they set the knowledge requirements needed for quality performance. They create performance activities for learners to evaluate their learning.

- **The Coaching Role.** In the coaching role, educators help learners apply knowledge to achieve their goals. They adopt a collaborative, encouraging style, often working one-on-one with individuals to help them learn from experiences in their life context. They assist in the creation of personal development plans and provide ways of getting feedback on performance.

Most of us adopt each of these roles to some extent in our educational and teaching activities. This is in part because these roles are determined by the way we resolve fundamental dilemmas of teaching. Do we focus on the learner's experience and interest or subject matter requirements? Do we focus on effective performance and action or on a deep understanding of the meaning of ideas? All are required for maximally effective learning. Individuals, however, tend to have a definite preference for one or two roles over the others; because of their educational philosophy, their personal teaching style, and the requirements of their particular educational setting including administrative mandates and learner needs. The ERP is designed to help you sharpen your awareness of these preferences and to make deliberate choices about what works best for you in your specific situation.

2. The Kolb Experiential Learning Profile

The Kolb Experiential Learning Profile (KELP) released in 2021, is the seventh version of the original Learning Style Inventory published in 1971. The primary goal for this version is to focus users on the most important concept in ELT, the cycle of learning from experience, and the unique way they use the learning cycle for learning in school and in their personal lives. Learning style describes the characteristics of nine typical ways learners use the learning cycle and learning flexibility portrays the dynamic process of adapting one's preferred learning style, using other styles to achieve full cycle learning.

The redesigned personal report provides learners with a self-reflection tool to help them understand how they learn from experience and their unique individual approach to learning and living. It helps learners take charge of their learning with a planning guide for learning and tips for application in work and personal life.

Based on 50 years of research on Experiential Learning Theory and Learning Style, the KELP has been informed by improvements made through six previous versions and by an extensive research base including over 112,000 scholarly citations. Users in 164 countries around the world have contributed to the KELP normative comparison group of over 26,000 students and working adults from a wide range of occupations and educational backgrounds. The questionnaire format, items, and scoring remain identical with KLSI 4.0, making previous reliability and validity research applicable to the KELP.

Purpose

The Learning Style inventory (LSI) was created to fulfill two purposes:

1. To serve as an educational tool to increase individuals' understanding of the process of learning from experience and their unique individual approach to learning. By increasing awareness of how they learn, the aim is to increase learners' capacity for meta-cognitive control of their learning process; enabling them to monitor and select learning approaches that work best for them in different learning situations. By providing a language for talking about learning styles and the learning process the inventory can foster conversation among learners and educators about how to create the most effective learning environment for those involved. For this purpose, the inventory is best presented, not as a test, but as an experience in understanding how you learn. Scores on the inventory should not be interpreted as definitive, but as a starting point for exploration of how one learns best. To facilitate this purpose a self-scoring and interpretation book that explains the experiential learning cycle and the characteristics of the different learning styles along with scoring and profiling instructions is included with the inventory.

2. To provide a research tool for investigating experiential learning theory (ELT) and the characteristics of individual learning styles. This research can

contribute to the broad advancement of experiential learning and specifically to the validity of interpretations of individual learning style scores. A research version of the instrument including only the inventory to be scored by the researcher is available for this purpose.

The LSI is not a criterion-referenced test and is not intended for use to predict behavior for purposes of selection, placement, job assignment, or selective treatment. This includes not using the instrument to assign learners to different educational treatments, a process sometimes referred to as "tracking". Such categorizations based on a single test score amounts to stereotyping that runs counter to the philosophy of experiential learning that emphasizes individual uniqueness and the dynamic nature of learning style. "When it is used in the simple, straightforward, and open way intended, the LSI usually provides a valuable self-examination and discussion that recognizes the uniqueness, complexity and variability in individual approaches to learning. The danger lies in the reification of learning styles into fixed traits, such that learning styles become stereotypes used to pigeonhole individuals and their behavior." (Kolb, 1981: 290-291)

The LSI is constructed as a self-assessment exercise and tool for construct validation of ELT. Tests designed for predictive validity typically begin with a criterion like academic achievement and work backward to identify items or tests with high criterion correlations. Even so, even the most sophisticated of these tests rarely rises above a .5 correlation with the criterion. For example, while Graduate Record Examination Subject Test scores are better predictors of first-year graduate school grades than either the General Test score or undergraduate GPA, the combination of these three measures only produces multiple correlations with grades ranging from .4 to .6 in various fields (Anastasi & Urbina, 1997).

Construct validation is not focused on an outcome criterion, but on the theory or construct the test measures. Here the emphasis is on the pattern of convergent and discriminant theoretical predictions made by the theory. Failure to confirm predictions calls into question the test and the theory. "However, even if each of the correlations proved to be quite low, their cumulative effect would be to support the validity of the test and the underlying theory." (Selltiz, Jahoda, Deutsch, & Cook, 1960, p. 160) Judged by the standards of construct validity ELT has been widely accepted as a useful framework for learning centered educational innovation, including instructional design, curriculum development, and life-long learning. Field and job classification studies viewed as a whole also show a pattern of results consistent with the ELT structure of knowledge theory.

History

There have been six previous versions of the Learning Style Inventory published over the last 50 years. Through this time attempts have been made to openly share information about the inventory, its scoring, and technical characteristics with other interested researchers. The results of their research have been instrumental in the continuous improvement of the inventory.

Learning Style Inventory—Version 1 (Kolb 1971, Kolb 1976).

The original Learning Style Inventory (LSI 1) was created in 1969 as part of a MIT curriculum development project that resulted in the first management textbook based on experiential learning (Kolb, Rubin and McIntyre 1971). It was originally developed as an experiential educational exercise designed to help learners understand the process of experiential learning and their unique individual style of learning from experience. The term "learning style" was coined to describe these individual differences in how people learn.

Items for the inventory were selected from a longer list of words and phrases developed for each learning mode by a panel of four behavioral scientists familiar with experiential learning theory. This list was given to a group of 20 graduate students asking them to rate each word or phrase for social desirability. Attempting to select words that were of equal social desirability, a final set of 12 items including a word or phrase for each learning mode was selected for pre-testing. Analysis showed that 3 of these sets produced nearly random responses and were thus eliminated resulting in a final version of the LSI with 9 items. These items were further refined through item-whole correlation analysis to include six scored items for each learning mode.

Research with the inventory was stimulated by classroom discussions with students who found the LSI to be helpful to them in understanding the process of experiential learning and how they learn. From 1971 until it was revised in 1985 there were over 350 published research studies using the LSI. Validity for the LSI 1 was established in a number of fields including education, management, psychology, computer science, medicine, and nursing (Hickcox 1990, Iliff 1994). The results of this research with LSI 1 provided empirical support for the most complete and systematic statement of ELT, *Experiential Learning: Experience as the Source of Learning and Development* (Kolb 1984, 2015). There were several studies of the LSI 1 that identified psychometric weaknesses in the instrument, particularly low internal consistency reliability and test-retest reliability.

Learning Style Inventory—Version 2 (Kolb 1985)

Low reliability coefficients and other concerns about the LSI 1 led to a revision of the inventory in 1985 (LSI 2). Six new items chosen to increase internal reliability (alpha) were added to each scale making 12 scored items on each scale. These changes increased scale alphas to an average of .81 ranging from .73 to .88. Wording of all items was simplified to a 7th grade reading level and the format was changed to include sentence stems (e.g. "When I learn"). Correlations between the LSI 1 and LSI 2 scales averaged .91 and ranged from .87 to .93. A new more diverse normative reference group of 1446 men and women was created.

Research with the LSI 2 continued to establish validity for the instrument. From 1985 until the publication of the LSI 3 1999 over 630 studies were published most using the

LSI 2. While internal reliability estimates for the LSI 2 remained high in independent studies, test-retest reliability remained low.

Learning Style Inventory—Version 2a (Kolb 1993).

In 1991 Veres, Sims and Locklear published a reliability study of a randomized version of the LSI 2 that showed a small decrease in internal reliability but a dramatic increase in test-retest reliability with the random scoring format. To study this format a research version of the random format inventory (LSI 2a) was published in 1993.

Kolb Learning Style Inventory—Version 3 (Kolb 1999).

In 1999 the randomized format was adopted in a revised self scoring and interpretation booklet (KLSI 3) that included a color-coded scoring sheet to simplify scoring. The new booklet was organized to follow the learning cycle emphasizing the LSI as an "experience in learning how you learn". New application information on teamwork, managing conflict, personal and professional communication and career choice and development were added. The KLSI 3 continued to use the LSI 2 normative reference group until norms for the randomized version could be created.

Kolb Learning Style Inventory—Version 3.1 (Kolb 2005)

The KLSI 3.1 modified the LSI 3 to include a new normative data sample of 6977 LSI users. The format, items, scoring and interpretative booklet remain identical with KLSI 3. The only change in the KLSI 3.1 is in the norm charts used to convert raw LSI scores.

Kolb Learning Style Inventory—Version 3.2 (Kolb and Kolb 2013)

The KLSI 3.2 was created in 2013 to incorporate the new nine learning style typology of the KLSI 4.0 in a paper version. The instrument and normative sample are identical to the KLSI 3.1. The self-scoring and Interpretation booklet was changed to explain the nine learning styles and their application to problem solving, relationships, etc.

Kolb Learning Style Inventory—Version 4.0 (Kolb and Kolb 2011)

The Kolb Learning Style Inventory 4.0 was the first major revision of the KLSI since 1999 and the third since the original LSI was published in 1971. Based on many years of research involving scholars around the world and data from many thousands of respondents, the KLSI 4.0 included three major additions:

A new 9 Learning Style Typology. Data from empirical and clinical studies over the years has shown that the original 4 learning style types—Accommodating, Assimilating , Converging and Diverging— can be refined further into a 9 style typology that better defines the unique patterns of individual learning styles and reduces the confusions introduced by borderline cases in the old 4 style typology. The new nine styles are

Initiating, Experiencing, Imagining, Reflecting, Analyzing, Thinking, Deciding, Acting and Balancing.

Assessment of Learning Flexibility. The experiential learning styles are not fixed traits but dynamic states that can "flex" to meet the demands of different learning situations. For the first time the KLSI 4.0 includes a personal assessment of the degree to which a person changes their style in different learning contexts. The flexibility score also shows "back-up" styles, the learning style types the individual uses in addition to their dominant learning style type. This information can help individuals improve their ability to move freely around the learning cycle with full cycle learning and improve their learning effectiveness

I*mproved Psychometrics.* This revision included a revision and addition of items and a new scoring system with norms that are based on a larger, more diverse and representative sample of 10423 LSI users. In spite of scoring system changes, The scoring system of the KLSI 4.0 is highly correlated with the previous KLSI 3.1 scoring system thus maintaining the external validity that the instrument has shown over the years. The KLSI 4.0 maintains the high scale reliability of the KLSI 3.1 while showing higher internal validity.

Format

The Learning Style Inventory is designed to measure the degree to which individuals display the different learning styles derived from experiential learning theory. The form of the inventory is determined by three design parameters. First, the test is brief and straightforward, making it useful both for research and for discussing the learning process with individuals and providing feedback. Second, the test is constructed in such a way that individuals respond to it as they would respond to a learning situation: it requires them to resolve the tensions between the abstract-concrete and active-reflective orientations. For this reason, the LSI format requires them to rank order their preferences for the abstract, concrete, active and reflective orientations. Third, and most obviously, it was hoped that the measures of learning styles would predict behavior in a way consistent with the theory of experiential learning.

All previous versions of the LSI have had the same format—a short questionnaire (9 items for LSI 1 and 12 items for subsequent versions) that asks respondents to rank four sentence endings that correspond to the four learning modes – Concrete Experience (e.g., experiencing), Reflective Observation (reflecting), Abstract Conceptualization (thinking), and Active Experimentation (doing). The KLSI 4.0 has 20 items in this format—12 that are similar to the items in the 3.1and 8 additional items that are about learning in different contexts. These 8 items are used to assess learning flexibility. The KLSI 4.0 is only available online due to the complex scoring formula for learning flexibility.

Items in the LSI are geared to a 7th grade reading level. The inventory is intended for use by teens and adults. It is not intended for use by younger children. The LSI has been translated into many languages, including, Arabic, Chinese, French, Japanese, Italian, Portuguese,

Spanish, Swedish and Thai; and there have been many cross cultural studies using it (Yamazaki 2002).

The Forced-choice Format of the LSI. The format of the LSI is a forced choice format that ranks an individual's relative choice preferences among the four modes of the learning cycle. This is in contrast the more common normative or free choice format, such as the widely used Likert scale, that rates absolute preferences on independent dimensions. The forced choice format of the LSI was dictated by the theory of experiential learning and by the primary purpose of the instrument.

ELT is a holistic, dynamic and dialectic theory of learning. Because it is holistic the four modes that comprise the experiential learning cycle, CE, RO, AC, and AE are conceived as interdependent. Learning involves resolving the creative tension among these learning modes in response to the specific learning situation. Since the two learning dimensions, AC-CE and AE-RO are related dialectically, the choice of one pole involves not choosing the opposite pole. Therefore, because ELT postulates that learning in life situations requires the resolution of conflicts among interdependent learning modes; to be ecologically valid the learning style assessment process should require a similar process of conflict resolution in the choice of ones preferred learning approach.

The primary purpose of the LSI is to provide learners with information about their preferred approach to learning. The most relevant information for the learner is about intra-individual differences, his or her relative preference for the four learning modes, not inter-individual comparisons. Ranking relative preferences among the four modes in a forced choice format is the most direct way to provide this information. While individuals who take the inventory sometimes report difficulty in making these ranking choices, they report that the feedback they get from the LSI gives them more insight than has been the case when we use a normative Likert rating scale version. This is because the social desirability response bias in the rating scales fails to define a clear learning style, i.e. they say they prefer all learning modes. This is supported by Harland's (2002) finding that feedback from a forced choice test format was perceived as more accurate, valuable and useful than feedback from a normative version.

The adoption of the forced choice method for the LSI has at times placed it in the center of an ongoing debate in the research literature about the merits of forced choice instruments between what might be called "rigorous statisticians" and "pragmatic empiricists". Statisticians have questioned the use of the forced choice format because of statistical limitations, called ipsativity, that are the result of the ranking procedure. Since ipsative scores represent the relative strength of a variable compared to others in the ranked set the resulting dependence among scores produces method induced negative correlations among variables and violates a fundamental assumption of classical test theory required for use of techniques such as analysis of variance and factor analysis—independence of error variance. Cornwell and Dunlap (1994) stated that ipsative scores cannot be factored and that correlation-based analysis of ipsative data produced uninterpretable and invalid results (c.f. Hicks 1970, Johnson et al. 1988). Other criticisms include the point that ipsative scores are technically ordinal, not the interval scales required for parametric statistical analysis; that they produce lower internal reliability estimates and lower validity coefficients (Barron

1996). While critics of forced choice instruments acknowledge that these criticisms do not take away from the validity of intra-individual comparisons (LSI purpose one), they argue that ipsative scores are not appropriate for inter-individual comparisons since inter-individual comparisons on a ranked variable are not independent absolute preferences but preferences that are relative to the other ranked variables in the set (Barron 1996, Karpatschof and Elkjaer 2000). However, since ELT argues that a given learning mode preference is relative to the other three modes, it is the comparison of relative not absolute preferences that the theory seeks to assess.

The "pragmatic empiricists" argue that in spite of theoretical statistical arguments, normative and forced choice variations of the same instrument can produce empirically comparable results. Karpatschof and Elkjaer (2000) advance this case in their metaphorically titled paper "Yet the Bumblebee Flies". With theory, simulation and empirical data they present evidence for the comparability of ipsative and normative data. Saville and Wilson (1991) found a high correspondence between ipsative and normative scores when forced choice involved a large number of alternative dimensions.

Normative tests also have serious limitations which the forced choice format was originally created to deal with (Sisson 1948). Normative scales are subject to numerous response biases—central tendency bias where respondents avoid extreme responses, acquiescence response, and social desirability responding—and are easy to fake. Forced choice instruments are designed to avoid these biases by forcing choice among alternatives in a way that reflects real live choice making (Hicks 1970, Barron 1996). Matthews and Oddy found large bias in the extremeness of positive and negative responses in normative tests and conclude that when sources of artifact are controlled "individual differences in ipsative scores can be used to rank individuals meaningfully" (1997: 179). Pickworth and Shoeman (2000) found significant response bias in two normative LSI formats developed by Marshall and Merritt (1986) and Geiger et al. (1993). Conversely, Beutell and Kressel (1984) found that social desirability contributed less than 4% of the variance in LSI scores in spite of the fact that individual LSI items all had very high social desirability.

In addition, ipsative tests can provide external validity evidence comparable to normative data (Barron 1996) or in some cases even better (Hicks 1970). For example, attempts to use normative rating versions of the LSI report reliability and internal validity data but little or no external validity (Pickworth and Shoeman 2000, Geiger et al. 1993, Romero et al. 1992, Marshall and Merritt 1986, Merritt and Marshall 1984). Jamieson2010 also found no external validity in her study comparing the LSI 3.1 with semantic differential and Likert scale versions of the instrument. Her results suggest caution in comparing research results from the LSI and these other formats since she found only a 47% match between style classifications with the three instruments and learning mode correlations "only explained 13% to 16% of the variance and the bi-polar dimensions explained 24% to 41% of the variance" between instruments (p 73).

Characteristics of the LSI Scales. The LSI assesses six variables, four primary scores that measure an individual's relative emphasis on the four learning orientations –**Concrete Experience (CE), Reflective Observation (RO), Abstract Conceptualization (AC), and**

Active Experimentation (AE) and two combination scores measure an individual's preference for abstractness over concreteness (AC-CE) and action over reflection (AE-RO). The four primary scales of the LSI are ipsative because of the forced choice format of the instrument. This results in negative correlations among the four scales the mean magnitude of which can be estimated (assuming no underlying correlations among them) by the formula $-1/(m-1)$ where m is the number of variables (Johnson et al. 1988). This results in a predicted average method induced correlation of -.33 among the four primary LSI scales.

The combination scores AC-CE and AE-RO, however, are not ipsative. Forced choice instruments can produce scales which are not ipsative (Hicks 1970, Pathi, Manning and Kolb 1989). To demonstrate the independence of the combination scores and interdependence of the primary scores, Pathi, Manning and Kolb (1989) had SPSS-X randomly fill out and analyze 1000 LSI's according to the ranking instructions. While the mean inter-correlation among the primary scales was -.33 as predicted; the correlation between AC-CE and AE-RO was +.038.

In addition, if AC-CE and AE-RO were ipsative scales the correlation between the two scales would be -1.0 according to the above formula. Observed empirical relationships are always much smaller, e.g. +.13 for a sample of 1591 graduate students (Freedman and Stumpf 1978), -.09 for the LSI 2 normative sample of 1446 respondents (Kolb 1999b), -.19 for a sample of 1296 MBA students (Boyatzis and Mainemelis 2000) and -.21 for the normative sample of 6977 LSI for the KLSI 3.1 described below.

The independence of the two combination scores can be seen by examining some example scoring results. For example, when AC-CE or AE-RO on a given item takes a value of +2 (from, say, AC = 4 and CE = 2 or AC = 3 and CE = 1) the other score can take a value of +2 or -2. Similarly, when either score takes a value of +1 (from 4 -3, 3-2 or 2-1) the other can take the values of +3, +1, -1, or -3. In other words, when AC-CE takes a particular value, AE-RO can take two to four different values, and the score on one dimension does not determine the score on the other.

In the new KLSI 4.0 we introduce two new non-ipsative continuous combination scores in addition to the primary learning cycle dialectics of AC-CE and AE-RO. These scores assess the combination dialectics of Assimilation – Accommodation and Converging – Diverging assessed by the four learning style types in previous LSI versions:

Assimilation - Accommodation = (AC+RO) - (AE+CE)

A high score on this dimension indicates a learning preference for assimilation or generalized, conceptual learning, while a low score indicates a learning preference for accommodation or active contextual learning. The concepts of assimilation and accommodation are central to Piaget's (1952) definition of intelligence as the balance of adapting concepts to fit the external world (accommodation) and the process of fitting observations of the external world into existing concepts (assimilation). This measure was used in the validation of the Learning Flexibility Index (Sharma & Kolb 2010—see chapter

6) and has been used by other researchers in previous studies (Wiersta, and de Jong 2002, Allison and Hayes 1996).

Converging – Diverging = (AC+AE) – (CE+RO)

A high score on this dimension indicates a learning preference for converging or evaluative decision making that closes down on the best solution to a problem versus diverging to open up new imaginative possibilities and alternatives. The concepts of converging and diverging originated in Guilford's (1988) structure of intellect model as the central dialectic of the creative process. This dialectic concept has been used in research on ELT by Gemmell (2012) and Kolb (1983).

Continuous Balance Scores

Some studies have used continuous balance scores for ACCE and AERO to assess balanced learning style scores (Mainemelis, Boyatzis and Kolb 2002, Sharma and Kolb 2010). These variables compute the absolute values of the ACCE and AERO scores adjusted to center on the 50^{th} percentile of the KELP normative comparison group.

BALANCE ACCE = ABS [AC – (CE + 10)]

BALANCE AERO = ABS [AE – (RO + 4)]

3. Norms for The Kolb Experiential Learning Profile

New norms for the KELP were created from responses by several groups of users who completed the instrument online. These norms are used to convert LSI raw scale scores to percentile scores (See Appendix 1). The purpose of percentile conversions is to achieve scale comparability among an individual's LSI scores (Barron 1996) and to define cut-points for defining the learning style types. Table 1 shows the means and standard deviations for KELP scale scores for the normative group.

Table 1. KELP Scores for the Normative Sample

	N	Minimum	Maximum	Mean	Std. Deviation
Experiencing (CETOT)	26353	11.00	44.00	19.2602	6.29818
Reflecting (ROTOT)	26353	11.00	44.00	26.9444	7.19347
Thinking (ACTOT)	26353	11.00	44.00	29.0263	6.70015
Acting (AETOT)	26353	11.00	44.00	31.1422	6.16477
Thinking-Experiencing (ACCE)	26352	-31.00	33.00	9.7661	10.83657
Acting-Reflecting (AERO)	26353	-31.00	32.00	4.1978	11.19965
Learning Flexibility (LFI)	26353	.04	1.00	.7236	.17427

Normative percentile scores for the KELP are based on a total sample of 26,356 valid LSI scores from users who took the instrument online. It is made up primarily of US residents (48.5%) with the remaining users residing in 164 different countries.

The norm group is composed of 56% women and 44% men.

Their ages range as follows: <19 = 3.7%, 19-24 = 22.5%, 25-34 = 31.4%, 35-44 = 20.5%, 45-54 = 14.0%, 55-64 =3.9 %, >64 = 1.3%.

Their educational level is as follows: primary school graduate = 3.2%, secondary school degree= 15.3%, university degree= 43.6%, master's degree = 22.5% and doctoral degree = 13.5%.

The sample includes students and working adults in a wide variety of fields as shown in Table 2.

Table 2. KELP Norm Group Specialization

	Frequency	Percent
Accounting	534	2.0
Agriculture	46	.2
Architecture	33	.1
Business	2673	10.1
Communications	522	2.0
Computer science and information systems	466	1.8
Education	909	3.4
Engineering	800	3.0
Fine and applied arts	371	1.4
Health	826	3.1
Humanities	413	1.6
Languages	227	.9
Law	910	3.5
Literature	156	.6
Medicine	1100	4.2
NULL	10211	38.7
Nursing	357	1.4
Physical Education	50	.2
Psychology	732	2.8
Science and mathematics	1367	5.2
Social sciences	1028	3.9
Other	2364	9.0
Total	26356	100.0

Table 3. Inter-correlation of KELP Norm Scales

		CETOT	ROTOT	ACTOT	AETOT	ACCE	AERO	LFI
CETOT	Pearson Correlation	1	-.207**	-.389**	-.088**	-.822**	.084**	.253**
	Sig. (2-tailed)		.000	.000	.000	.000	.000	.000
	N	26353	26353	26352	26353	26352	26353	26352
ROTOT	Pearson Correlation	-.207**	1	-.202**	-.402**	-.005	-.864**	-.137**
	Sig. (2-tailed)	.000		.000	.000	.413	.000	.000
	N	26353	26353	26352	26353	26352	26353	26352
ACTOT	Pearson Correlation	-.389**	-.202**	1	-.450**	.845**	-.118**	-.216**
	Sig. (2-tailed)	.000	.000		.000	.000	.000	.000

	N	26352	26352	26353	26352	26352	26352	26351
AETOT	Pearson Correlation	-.088**	-.402**	-.450**	1	-.227**	.809**	.131**
	Sig. (2-tailed)	.000	.000	.000		.000	.000	.000
	N	26353	26353	26352	26353	26352	26353	26352
ACCE	Pearson Correlation	-.822**	-.005	.845**	-.227**	1	-.122**	-.281**
	Sig. (2-tailed)	.000	.413	.000	.000		.000	.000
	N	26352	26352	26352	26352	26352	26352	26351
AERO	Pearson Correlation	.084**	-.864**	-.118**	.809**	-.122**	1	.160**
	Sig. (2-tailed)	.000	.000	.000	.000	.000		.000
	N	26353	26353	26352	26353	26352	26353	26352
LFI	Pearson Correlation	.253**	-.137**	-.216**	.131**	-.281**	.160**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	
	N	26352	26352	26351	26352	26351	26352	26353

**. Correlation is significant at the 0.01 level (2-tailed).

Cut Points for Creating Learning Style Types

Earlier theoretical and empirical work showed that the original four learning styles defined in KLSI 1- 3.1 can be refined to show nine distinct styles (Eichmann, Kolb & Kolb 2004, Kolb & Kolb 2005a, Boyatzis & Mainemelis 2000). David Hunt and his associates (Abby, Hunt and Weiser 1985, Hunt 1987) identified four additional learning styles which they identified as Northerner, Easterner, Southerner, and Westerner. In addition, a Balancing learning style has been identified by Mainemelis, Boyatzis and Kolb (2002) that balances AC and CE and AE and RO. These nine learning styles can be defined by placing them on the Learning Style Type Grid (See Figure 4). Instead of dividing the grid at the 50th percentiles of the 4 style LSI's normative distributions for AC-CE and AE-RO, the nine styles are defined by dividing the two normative distributions into thirds.

On the AE-RO dimension the active regions are defined by percentiles greater than 66.67% (raw scores > 9) while the reflective regions are defined by percentiles less than 33.33% (< -1). On the AC-CE dimension the concrete regions are defined by < 6 and the abstract regions by >14. For example, the Initiating region would be defined by AC-CE raw scores < 6 and AE-RO scores >9. The resulting 9 styles are thus defined as follows:

Initiating—ACCE <6, AERO >9
Experiencing—ACCE <6, AERO >-2 & < 10
Imagining—ACCE <6, AERO <-1
Reflecting—ACCE > 5 & < 15, AERO <-1
Analyzing—ACCE >14, AERO <-1
Thinking—ACCE >14, AERO >-2 & < 10
Deciding—ACCE >14, AERO >9
Acting—ACCE > 5 & < 15, AERO >9
Balancing—ACCE > 5 & < 15, AERO >-2 & < 10

4. Reliability Studies

This section reports internal consistency reliability studies using Cronbach's alpha and test-retest reliability studies for the randomized KLSI 3.1.

Internal Consistency Reliability

The KLSI 4.0 maintains the high scale reliability of the KLSI 3.1 with an average scale reliability (Cronbach Alpha) = .81 (4.0) vs .80 (3.1). Table 4 shows the alpha coefficients for the normative grop and sub-groups.

Table 4. Internal Consistency Alphas for the Scale Scores of the KLSI 4.0

	N	CE	RO	AC	AE
TOTAL NORM GROUP	10423	.83	.83	*.83*	.76
Medical students	670	.82	.83	.85	.77
Nursing students	38	.84	.88	.88	.86
Law students	166	.79	.78	.84	.73
University Undergrad	500	.82	.83	.80	.73
University Graduate	1478	.83	.83	.81	.76
Adult HE E-learning	663	.84	.80	.78	.72
Managers	1724	.84	.84	.82	.78

Test-Retest Reliability

There have been no studies to date of test-retest reliability of the KLSI 4.0. Two test-retest reliability studies of the randomized format KLSI 3.1 have been published. Veres et al. (1991) administered the LSI three times at 8 week intervals to initial (N = 711) and

replication (N =1042) groups of business employees and students and found test-retest correlations well above .9 in all cases. Kappa coefficients indicated that very few students changed their learning style type from administration to administration (See Table 5). Ruble and Stout (1991) administered the LSI twice to 253 undergraduate and graduate business students and found test-retest reliabilities that averaged .54 for the six LSI scales. A Kappa coefficient of .36 indicated that 47% of students changed their learning style classification on re-test. In these studies test-retest correlation coefficients range from moderate to excellent.

Table 5. Test-Retest Reliability for the KLSI 3.1 (Veres *et.al* 1991)

	LSI Scales											
	Concrete			Reflective			Abstract			Active		
Time	1	2	3	1	2	3	1	2	3	1	2	3
					Initial Samples (N=711)							
1	-	.95	.92	-	.96	.93	-	.97	.94	-	.95	.91
2		-	.96		-	.97		-	.97		-	.96
3-												
					Replication Sample (N=1042)							
1	-	.98	.97	-	.98	.97	-	.99	.97	-	.98	.96
2		-	.99		-	.98		-	.99		-	.99
3												

Data source: Veres et al. (1991). Reproduced with permission. Time between tests was 8 weeks
Note: Kappa coefficients for the initial sample were .81 for Time 1-Time2, .71 for time 1-Time 3 and .86 for Time 2-Time 3. These results indicate that very few subjects changed their learning style classification from one administration to another.

Table 6. Test-retest Reliability for KLSI 3.1 (Ruble and Stout 1991)

Sample	N	CE	RO	AC	AE	AC-CE	AE-RO
UG&Grad business majors	253	.37	.59	.61	.58	.48	.60

LSI was randomized but in different order than KLSI 3.1. Time between tests was 5 weeks. Kappa coefficient was .36 placing 53% of respondents in the same category on retest.

The discrepancy between the studies is difficult to explain and there has been a long-standing debate about the meaningfulness of test-retest reliability for the LSI since ELT hypothesizes that learning style is situational, varying in response to environmental demands. Changes in style may be the result of discontinuous intervening experiences between test and retest (Kolb 1981) or individuals' ability to adapt their style to changing environmental demands (Mainemelis, Boyatzis and Kolb 2002, Jones, Reichard, and Mokhtari 2003).

5. Validity Studies

At this point we assess the validity of the new KELP through examination of research on previous KLSIs. This seems reasonable since the basic format and LSI items have seen only small changes through previous versions. That being said, the results reported here would benefit from further research and replication with the KELP.

This chapter reports studies on the validity of the KLSI 4.0, the KLSI 3.1 and the LSI2. It begins with analysis of the relationship between scores on the KLSI 4.0 and the previous KLSI 3.1 followed by other internal validity evidence for the KLSI 4.0 normative group including correlation and factor analysis studies of the LSI scales. The final part is focused on external validity evidence for the KLSI 4.0 and other LSI versions. It begins with demographic relationships of learning style with age, gender and educational level in the KLSI 4.0. This is followed by evidence for the relationship between learning style and educational specialization. Concurrent validity studies of relationships between learning style and other experiential learning assessment inventories are then presented followed by studies relating learning style to performance on aptitude tests and academic performance. Finally, research on ELT and learning style in teams is presented.

Internal Validity Evidence

Correlation of KLSI 4.0 with KLSI 3.1. Table 7 shows that scores on the KLSI 4.0 are highly correlated with scores on the previous KLSI 3.1 thus making validity research with previous LSI versions applicable to the KLSI 4.0 and KELP. maintaining the external validity that the instrument has shown over the years. The average correlation between 3.1 and 4.0 scales equals .92.

Table 7.

CORRELATIONS BETWEEN KLSI 4.0 AND KLSI 3.1 SCALES

		CE4	RO4	AC4	AE4	ACCE4	AERO4
KLSI 3.1 Concrete Experience	Pearson Correlation	.786**	-.454**	-.464**	.067**	-.753**	.329**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000
	N	10423	10423	10423	10423	10423	10423
KLSI 3.1 Reflective Observation	Pearson Correlation	-.230**	.965**	-.166**	-.476**	.034**	-.879**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000
	N	10423	10423	10423	10423	10423	10423
KLSI 3.1 Abstract Conceptualization	Pearson Correlation	-.372**	-.179**	.990**	-.431**	.829**	-.118**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000
	N	10423	10423	10423	10423	10423	10423
KLSI 3.1 Active Experimentation	Pearson Correlation	-.126**	-.432**	-.428**	.938**	-.187**	.787**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000
	N	10423	10423	10423	10423	10423	10423

KLSI 3.1 AC-CE	Pearson Correlation	-.663**	.144**	.857**	-.297**	.920**	-.254**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000
	N	10423	10423	10423	10423	10423	10423
KLSI 3.1 AE-RO	Pearson Correlation	.072**	-.825**	-.131**	.801**	-.123**	.965**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000
	N	10423	10423	10423	10423	10423	10423

Correlation Studies of the LSI Scales. Several predictions can be made from ELT about the relationship among the scales of the Learning Style Inventory. These relationships have been empirically examined in two ways—through a first order correlation matrix of the six LSI scales and through factor analysis of the four primary LSI scales and/or inventory items.

ELT proposes that the four primary modes of the learning cycle—CE, RO, AC & AE--are composed of two independent dialectics (bi-polar) dimensions--a "grasping" dimension measured by the combination score AC-CE and a "transformation" dimension measured by the AE-RO combination score. Thus, the prediction is that AC-CE and AE-RO should be uncorrelated. Also, the CE and AC scales should not correlate with AE-RO and the AE and RO scales should not correlate with AC-CE. In addition the dialectic poles of both combination dimensions should be negatively correlated, though not perfectly since the dialectic relationship predicts the possibility of developmental integration of the opposite poles. Finally, the cross dimensional scales—CE/RO, AC/AE, CE/AE & AC/RO--should not be correlated as highly as the within dimension scales.

Table 8 shows these critical scale inter-correlations for the total normative sample of 10423. The correlations between AC-CE and AE-RO are significant but low. The 4.0 increases internal validity by increasing the statistical independence of the grasping (AC-CE) and transforming (AE-RO) dimensions of the learning cycle. Independence of AC-CE & AE-RO dimensions has increased reducing the negative correlation from -.27 in the 3.1 to -.09 in the 4.0 RO is unrelated with AC-CE as ELT predicts, but correlations of AE with AC-CE is correlated negatively with AC-CE (-.169). Correlations of AC and CE with AE-RO are both very low as they should be. As predicted both AC & CE (-.369) and AE & RO (-.418) are highly negatively correlated. The cross dimensional scales, CE/AE, CE/RO and AC/RO have low correlations as predicted, but AC/AE has a higher negative correlation (-.407) than predicted. Overall, with the exception of the negative correlation between AC and AE, the scale inter-correlations demonstrate internal validity by showing excellent correspondence with ELT predictions.

Table 8

INTER-CORRELATION OF KLSI 4 SCALES

		CE4	RO4	AC4	AE4	ACCE4	AERO4
CE4	Pearson Correlation	1					
	Sig. (2-tailed)						
	N	10423					
RO4	Pearson Correlation	-.225**	1				

	Sig. (2-tailed)	.000					
	N	10423	10423				
AC4	Pearson Correlation	-.369**	-.210**	1			
	Sig. (2-tailed)	.000	.000				
	N	10423	10423	10423			
AE4	Pearson Correlation	-.137**	-.418**	-.407**	1		
	(2-tailed)	.000	.000	.000			
	N	10423	10423	10423	10423		
ACCE4	Pearson Correlation	-.822**	.006	.833**	-.169**	1	
	Sig. (2-tailed)	.000	.566	.000	.000		
	N	10423	10423	10423	10423	10423	
AERO4	Pearson Correlation	.071**	-.870**	-.086**	.812**	-.095**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	
	N	10423	10423	10423	10423	10423	10423

**. Correlation is significant at the 0.01 level (2-tailed).

Factor Analysis Studies. We have identified 17 published studies that used factor analysis to study the internal structure of the LSI. Most of these studies have focused on the LSI 2, have studied different kinds of samples and have used a number of different factor extraction and rotation methods and criteria for the interpretation of results. Seven of these studies supported the predicted internal structure of the LSI (Merritt & Marshall 1984, Marshall & Merritt 1985, Marshall & Merritt1986, Katz 1986, Brew 1996, Yaha 1998, and Kayes 2005), four studies found mixed support (Loo 1996 & 1999, Willcoxson & Prosser 1996 and Brew 2002), and six studies found no support (Manfredo 1989, Newstead 1992, Cornwell, Manfredo & Dunlop 1991, Geiger, Boyle & Pinto 1992, Ruble & Stout 1990 and Wierstra & de Jong 2002).

Factor analysis of the KLSI 4.0 total normative sample and sub-groups follows recommendations by Yaha (1998). Principal components analysis with varimax rotation was used to extract 2 factors using the 4 primary LSI scales. Analysis at the item level was not done since it is not the item scores, but the scale scores that are proposed as operational measures of the ELT learning mode constructs. Also, the -.33 correlation among the four items in a set (resulting from the ipsative forced choice format) makes the interpretation of item factor loadings difficult. Loo argues that the analysis by scale scores alleviates this problem. "It should be noted that factoring scale scores (i.e. Yaha 1998) rather than item scores bypasses the issue of ipsative measures when testing for the two bi-polar dimensions (1999: 216).

ELT would predict that this factor analysis procedure would produce two bipolar factors, one with AC & CE as poles and the other with AE and RO as poles, representing the grasping and transforming dimensions of the learning cycle (See Figure 2). This is the result for the total norm group, adult e-learning, managers, university undergraduates and graduates.

However, the medical, nursing and law student groups show a more mixed result with the AC scale as one pole and a combination of CE and AE as the other in factor one. Medicine and nursing show a clear AE-RO factor 2, while factor 2 in the law group has RO as the dominant pole with AE only slightly higher than CE and AC. The percent of variance explained by the two factors was about the same in all eight analyses with the total being between 70 & 75%, factor one 36-41% and factor two 29-35%.

Table 9. Norm Group Factor Analysis of KLSI 4.0 Scales

Sample	Factor	CE	RO	AC	AE
TOTAL	1	-.011	.855	.062	-.826
NORM	2	.674	.151	-.928	.254
Medical	1	.343	.310	-.982	.446
students	2	-.009	.868	-.033	-.780
Nursing	1	.669	.062	-.961	.429
students	2	.225	-.966	.042	.723
Law	1	.572	-.079	-.942	.684
students	2	-.199	.982	-.250	-.389
University	1	.668	.158	-.937	.278
undergrad	2	-.057	.879	.012	-.794
University	1	.015	.844	.090	-.859
graduate	2	.737	.105	-.901	.191
Adult	1	.710	.125	-.923	.267
e-learning	2	-.061	.883	.034	-.804
Managers	1	-.004	.863	.083	-.836
	2	.668	.145	-.925	.269

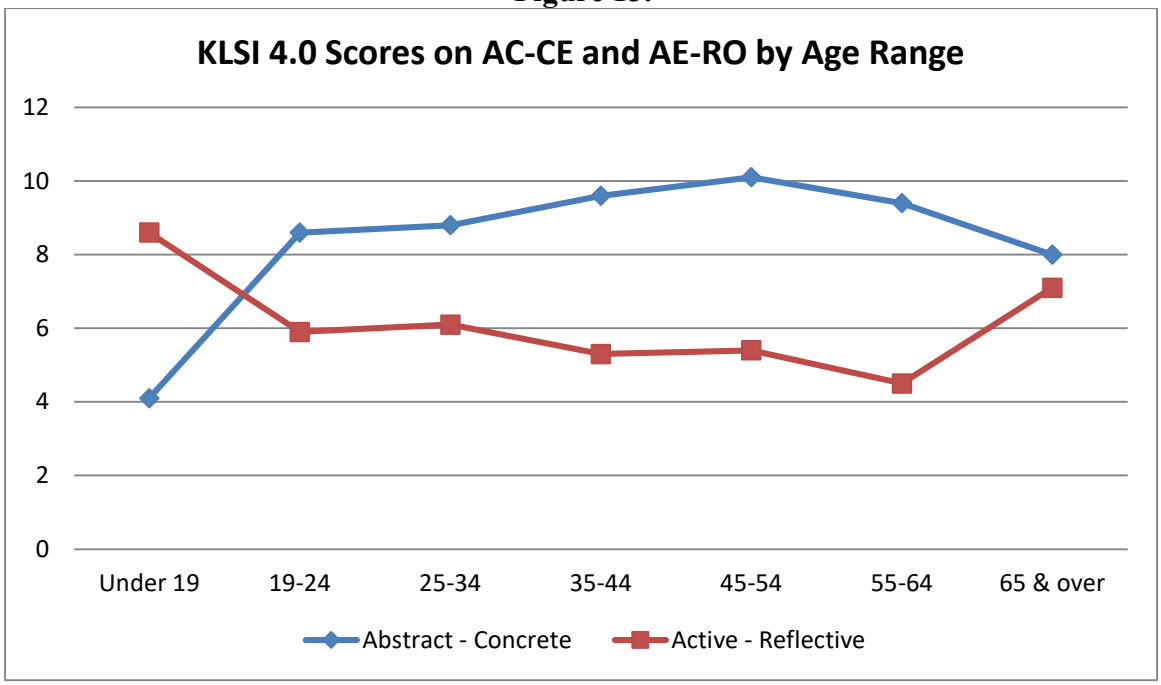
Overall the results of correlation and factor analysis studies show similar results. As Loo notes, "…with only four scale scores, factoring may be unnecessary because the factor pattern structure can be accurately estimated from an inspection of the correlation pattern among the four scales" (1999: 216). These data are better than previous versions of the LSI (Kolb 1976b, 1985b) and give support for the ELT basis for the inventories.

External Validity Evidence

Age. Previous research with the LSI showed a linear increase in preference for learning by abstraction with age as measured by the AC-CE scale and a curvilinear relationship with learning by action as measured by AE-RO with middle age being the most active period of life (Kolb 1976b, Kolb & Kolb 2005b). Results from the KLSI 4.0 normative sample with much larger age cohort sample sizes than the LSI 1 norm group show a similar linear relationship between AC-CE and seven age ranges--<19, 19-24, 25-34, 35-44, 45-54, 55-64 & >65. The AE-RO dimension shows a different pattern than previously with a decrease in active orientation from the under 19 group to the 19-24 group (Similar to the increase in reflection seen in college students over their four years (Mentkowski , M. and Associates 2000). AE-RO scores hold relatively constant through the adult years with a movement

toward action in the >65 group. See Figure 13 and Appendix 2 for complete descriptive statistics.

Figure 13.

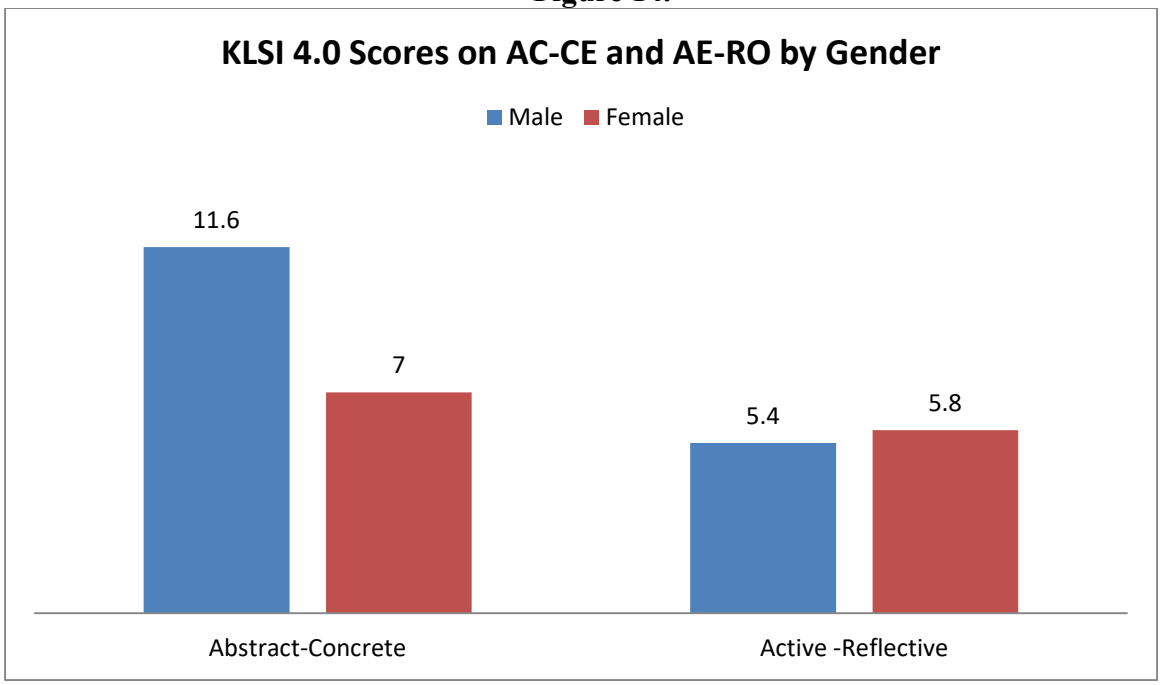


Gender. Research with the previous LSI versions showed that males were more abstract that females on the AC-CE scale and no significant gender differences on the AE-RO dimension (Kolb 1976b, 1985b, Kolb & Kolb 2005b). Results from the KLSI 4.0 normative sample show similar results. See Figure 4 and Appendix 3 for complete descriptive statistics. These results need to be interpreted carefully since educational specialization and career choices often interact with gender differences making it difficult to sort out how much variance in LSI scores can be attributed to gender alone and how much is a function of one's educational background and career (Willcoxson and Prosser 1996). Also, statements like "Women are concrete and men are abstract" are unwarranted stereotypical generalizations since mean differences are statistically significant but there is considerable overlap between male and female distributions on AC-CE and AE-RO.

These consistent differences by gender on the LSI AC-CE scale provide a theoretical link between ELT and the classic work by Belenky et al., *Womens Ways of Knowing* (1986). They used gender as a marker to identify two different epistemological orientations, connected knowing and separate knowing which their research suggested characterized women and men respectively. Connected knowing is empathetic and interpersonal and theoretically related to CE and separate knowing emphasizes distance from others and relies on challenge and doubt, related to AC. Knight et al. (1997) tested this hypothesized relationship by developing a Knowing Styles Inventory and correlating separate and connected learning with the AC and CE scales of the LSI. They found no relationship between AC and their measure of separate knowing for men or women and no relationship

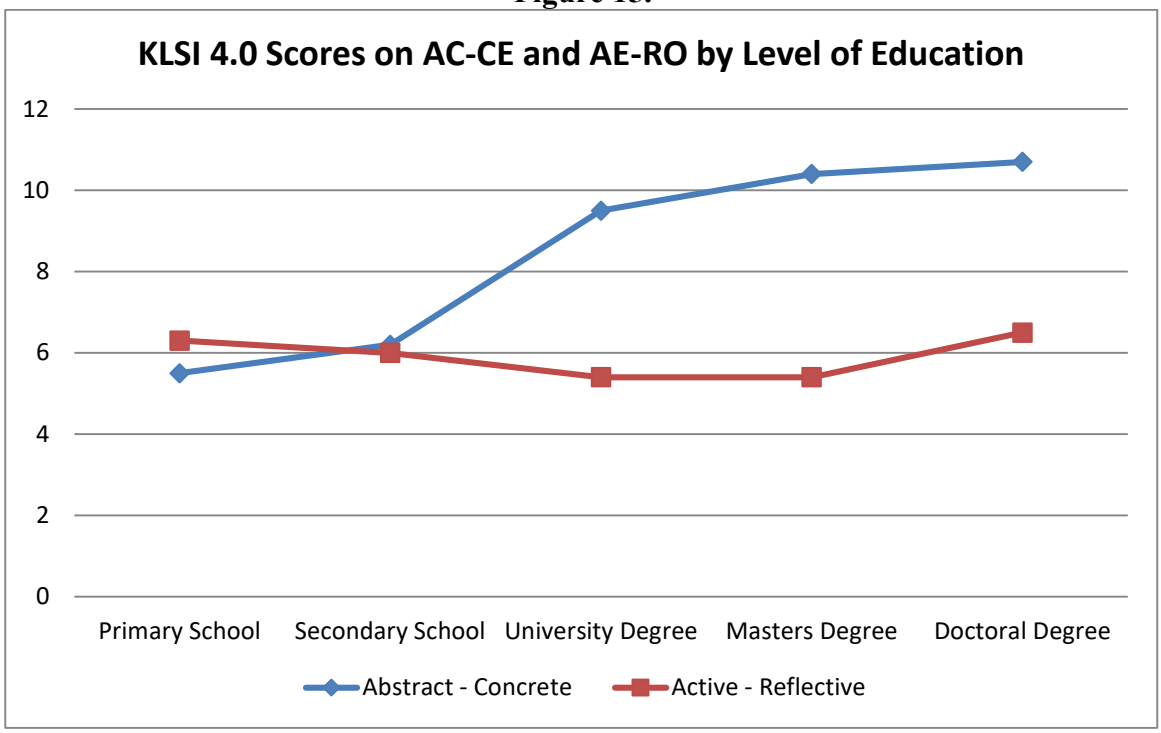
between CE and connected knowing for women. However, they did find a significant correlation between CE and connected knowing for men.

Figure 14.



Educational Level. ELT defines two forms of knowledge. *Social knowledge* is based on abstract knowledge that is culturally codified in language, symbols and artifacts. An individual's personal knowledge is based on direct uncodified concrete experience plus the level of acquired social knowledge that he or she has acquired. Hence, the theory predicts that abstractness in learning style is related to an individual's level of participation in formal education. Research relating educational level to learning style in the LSI 1 normative sample (Kolb 1976b) showed the predicted linear relationship between amount of education and abstractness. Data from the KLSI 4.0 normative sample show the same linear relationship between abstractness and highest degree obtained—from Elementary to High School to University to Graduate degrees. Differences among degree groups on the AE-RO dimension are smaller indicating relatively little influence of educational level on orientation toward action or reflection. See Figure 15 and Appendix 4 for complete descriptive statistics.

Figure 15.



Educational Specialization. A corollary of the ELT definition of learning as the creation of knowledge through the transformation of experience is that different learning styles are related to different forms of knowledge. Academic disciplines differ in their knowledge structure, technologies and products, criteria for academic excellence and productivity, teaching methods, research methods, and methods for recording and portraying knowledge. Disciplines even show socio-cultural variation- differences in faculty and student demographics, personality and aptitudes, as well as differences in values and group norms. For students, education in an academic field is a continuing process of selection and socialization to the pivotal norms of the field governing criteria for truth and how it is to be achieved, communicated, and used. The resulting educational system emphasizes specialized learning and development through the accentuation of the student's skills and interests. The student's developmental process is a product of the interaction between his or her choices and socialization experiences in academic disciplines. That is, the student's dispositions lead to the choice of educational experiences that match those dispositions. And the resulting experiences further reinforce the same choice dispositions for later experiences. Over time the socialization and specialization pressures combine to produce increasingly impermeable and homogeneous disciplinary culture and correspondingly specialized student orientations to learning.

ELT (Kolb 1981b, 1984) provides a typology of specialized fields of study, learning styles, and forms of knowledge and based on Pepper's (1942) "world hypotheses" framework. Social professions such as education and social work are typified by the accommodating learning style, a way of knowing that is based on contextualism. The science based professions such as medicine and engineering are characterized by the converging learning

style which is based on formism. The humanities and social sciences are typified by the diverging learning style and are based on the world hypothesis of organicism. Mathematics and the natural sciences are characterized by the assimilating learning style and the world hypothesis of mechanism.

Overall, previous research with the LSI shows that student learning style distributions differ significantly by academic fields as predicted by ELT. For example, Willcoxson and Prosser in their review of research on learning style and educational specialization using the LSI 1 conclude that there is "some measure of agreement amongst researchers regarding the learning style preferences typically found in specified disciplines and more agreement if disciplines are subsumed under descriptions such as social sciences or humanities. It also appears as specified by experiential learning theory that learning styles may be influenced by environmental demands and thus results obtained for professionals and students in a specified discipline may be dissimilar…in all studies the reporting of a numerical majority as the predominant learning style obscures the range of styles found." (1996: 249)

Their last point is important since ELT does not predict that a match between an individual's learning style and the general knowledge structure of their chosen field is necessary for effectiveness; since learning is essential in all fields and therefore, all learning perspectives are valuable. For example, a person in marketing with an assimilating style of learning doesn't match the typical accommodating style of marketing but, because of his or her assimilating style may be more effective in communicating with research and development scientists (Kolb 1976).

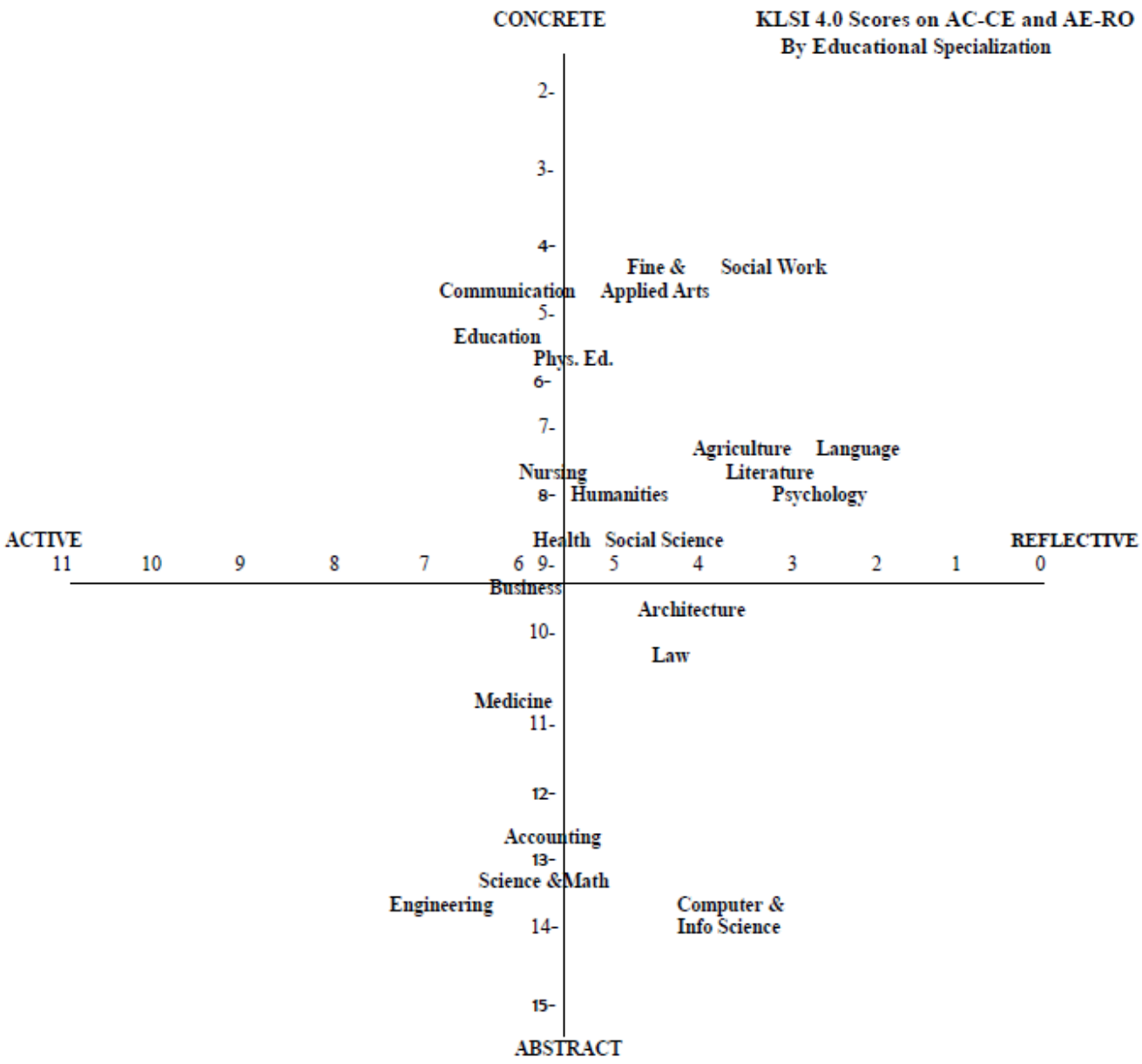
There is considerable variation in inquiry norms and knowledge structures within some fields. Professions such as management (Loo 2002a, 2002b, Brown & Burke 1987) and medicine (Sadler et al. 1978, Plovnick 1975) are multi-disciplinary including specialties that emphasize different learning styles. Social sciences can vary greatly in their basic inquiry paradigms. In addition, fields can show variation within a given academic department, from undergraduate to graduate levels and so on. For example, Nulty and Trigwell (1996) caution that the learning style grouping should not be taken as absolute representation of a particular student population, because different teaching strategies and discourse mode may be adopted which are non-traditional to that discipline. Their study also suggests that learning styles are related to the stage the students are in their studies. While students in the first third of their studies adopted learning styles that were similar to each other irrespective of the disciplines, learning styles of students in the final third of their studies tended to be related to the learning requirement of their academic major.

The distinct value systems and educational goals of each educational institution also exert significant influence on differences in students' learning styles. To investigate the relationship between the way a major is structured and student outcomes, Ishiyama and Hartlaub (2003) conducted a comparative study of student learning styles in two different political science curricular models at two Universities. The results indicate that while there was no statistically significant relationship between student learning styles in underclass students, there was a significant difference in mean AC-CE scores among upper class students between the two universities. Students taking the highly structured, concept-

centered political science curriculum at Truman State University demonstrated higher abstract reasoning skills than did students enrolled in the flexible, more content-oriented major at Frostburg State University. The authors suggest that Truman State program better facilitates the academic requirements recommended by Association of American College and University (AACU) to promote abstract reasoning skills and critical thinking skills necessary for the rigors of professional and graduate education than the flexible curriculum structure at Frostburg State. Other researchers and educators also contend that understanding of the distribution of learning styles in one's field of discipline and sub-specialty is crucial for the improvement of the quality of instructional strategies that respond to the individual need of the learner as well as the optimal level of competency and performance requirement of each profession (Baker, Simon, and Bazeli 1986, Bostrom, Olfman, & Sein 1990, Drew and Ottewill 1998; Fox and Ronkowski,1997; Kreber, 2001; Laschinger, 1986; McMurray,1998; Rosenthal, 1999; Sandmire, Vroman, & Sanders 2000; Sims, 1983).

Results from the KLSI 4.0 normative group show similar results to earlier research on the relationship between learning style and educational specialization. Figure 16 plots the mean scores on AC-CE and AE-RO for respondents who reported different educational specializations on the KLSI 4.0 and Appendix 5 shows the distribution of learning style types for each educational specialty.

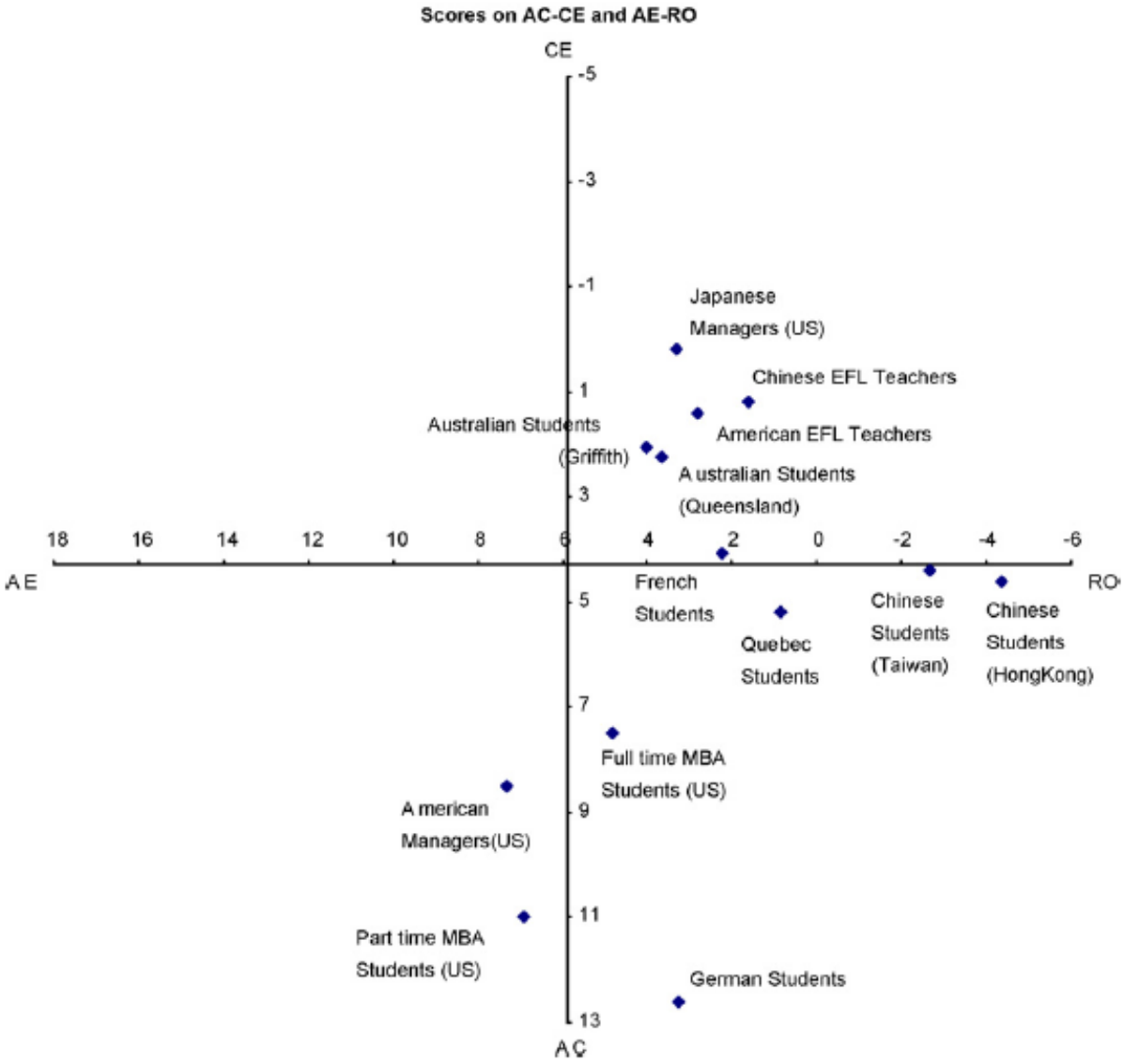
Figure 16



Culture. A number of comparative studies using KLSI found significant differences in the learning style preferences among the samples from different countries. Yamazaki's (2005) meta-analysis provides a summary of some of these studies. He compiled Yamazaki's and Kayes' (2005) study on Japanese and American mangers, Fridland's (2002) study of Chinese and American teachers, Barmeyer's (2004) study of students from France, Quebec and Germany, Auyeung's and Sand's (1996) study of accounting students from Australia and Hong Kong, and Hoppe's (1990) study of managers from 19 countries. Fig. 17 is a graphic representation of the

mean scores on AC-CE and AE-RO of the samples from these studies. The cut-off point for AC-CE was 4.3 and for AE-RO 5.9 following the KLSI 2.0 norms that were used in the reported studies.

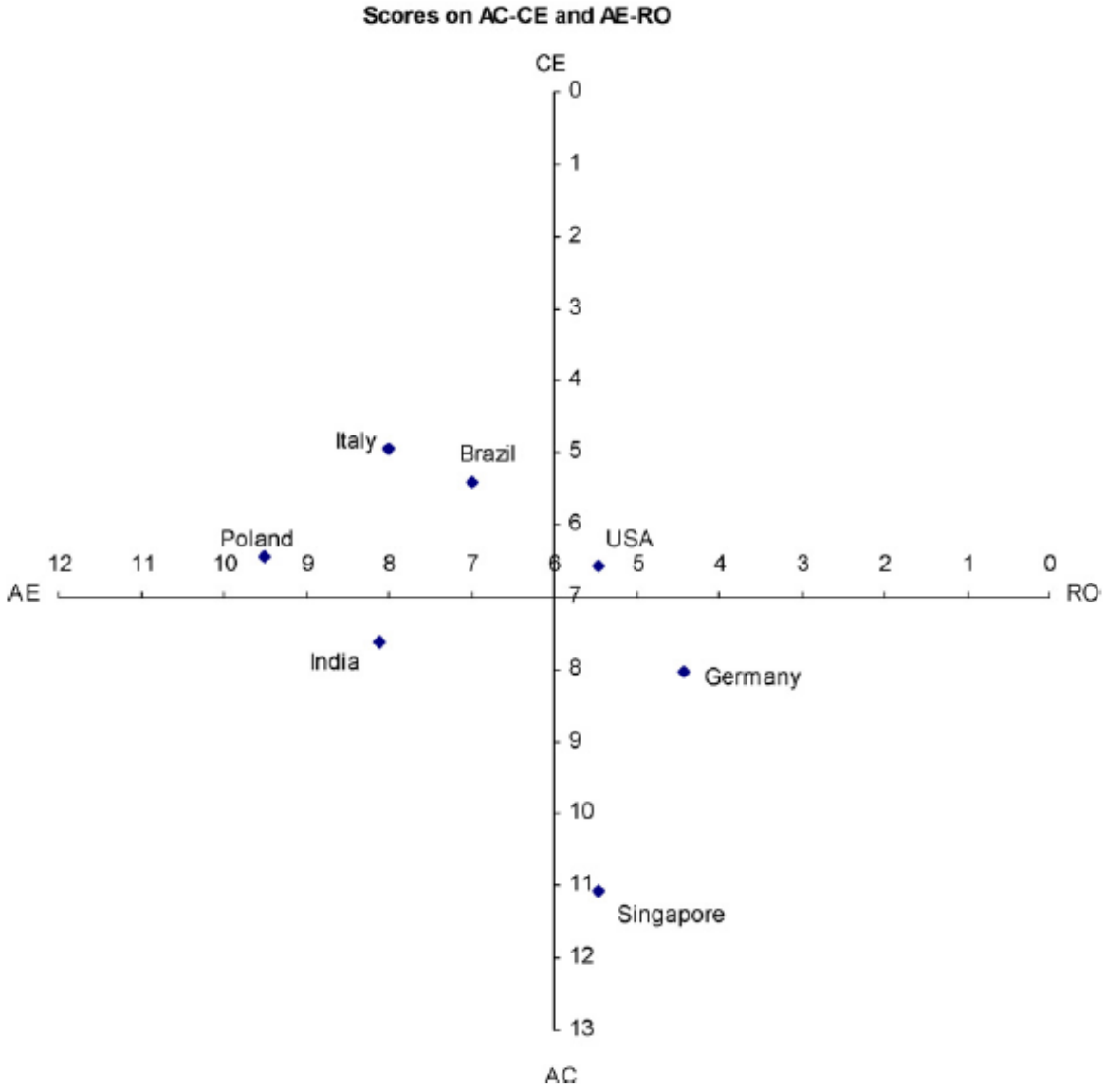
Figure 17. Yamazaki's Meta-analysis of Learning Style and Culture Studies



Joy and Kolb (2009) examined the role that culture plays in the way individuals learn using the KLSI 3.1 to assess differences in how individuals learn and the framework for categorizing cultural differences from the Global Leadership and Organizational Effectiveness (GLOBE) study where national cultures are examined by cultural clusters and individual cultural dimensions. The first part of the study assesses the relative influence of culture in comparison to gender, age, level of education and area of specialization of 533 respondents

born in and currently residing in 7 nations. Figure 18 shows the KLSI 3.1 scores for the seven nations.

Figure 19. Learning Styles of Respondents in Poland, Italy, Brazil, USA, India, Germany and Singapore



This study to examine the influence of culture on learning style while examining some of the other factors known to influence an individual's approach to learning. Results of the study indicate that culture as measured by the GLOBE country clusters and by representative countries from each cluster does indeed significantly influence learning style, particularly the extent to which individuals rely on concrete experiences versus abstract concepts in the way

they learn. On the AC-CE dimension of the KLSI, culture in the cluster sample accounted for 22% of the explained variance as compared with 17% for gender and 39% for educational specialization while in the country sample the percentages of explained variance were 28% for culture, 8.6 % for gender, 18% for level of education and 32 % for educational specialization. Thus, in both samples while educational specialization accounted for the most variance in AC-CE, culture ranked second ahead of gender, educational level, and age. Analysis of the GLOBE country ratings on individual cultural dimensions suggests that individuals tend to have abstract learning styles in countries that are high in uncertainty avoidance, future orientation, performance orientation and institutional collectivism. Individuals from Italy and Brazil had the most concrete learning styles and those from Singapore and Germany had the most abstract learning styles.

On the AE-RO dimension of the KLSI, in the cluster sample only age had a significant influence on individuals' emphasis on action versus reflection in learning, accounting for 45% of the explained variance. In the country sample age accounted for 36% of the explained variance and educational specialization accounted for 23%. The influence of culture was marginally significant ($p<.07$) and accounted for 34% of explained variance. Analysis of the GLOBE country ratings on individual cultural dimensions suggests that individuals tend to have reflective learning styles in countries that are high in uncertainty avoidance and active learning styles in countries that are high in in-group collectivism, Individuals from Germany had the most reflective learning styles and those from Poland had the most active learning styles.

Other Experiential Learning Assessment Instruments.

The Learning Skills Profile. The Learning Skills Profile (LSP, Boyatzis and Kolb 1991a, 1991b, 1995) was developed to assess systematically the adaptive competencies associated with learning style (Kolb 1984). The LSP uses a modified Q-sort method to assess level of skill development in four skill areas that are related to the four learning modes--Interpersonal Skills (CE), Perceptual/Information Skills (RO), Analytical Skills (AC) and Behavioral Skills (AE). Several studies have used the LSP in program evaluation (Ballou, Bowers, Boyatzis, & Kolb, 1999; Boyatzis, Cowen, & Kolb, 1995) and learning needs assessment (Rainey, Hekelman, Glazka, & Kolb, 1993; Smith 1990). Yamazaki et al. (2003) studied the relationship between LSP and LSI 3.1 scores in a sample of 288 research university freshmen. AC-CE was negatively related to the interpersonal skills of leadership, relationship and help and positively related to the analytic skills of theory building, quantitative analysis and technology as predicted. The AE-RO dimension did not relate to the perceptual/information skills of sense making, information gathering and information analysis but did relate to the behavioral skills of goal setting and initiative as predicted (See Table 10). In another study of 198 MBA students, Mainemelis et al. (2002) found similar relationships between LSI 2 scores and the LSI clusters of Interpersonal, Information, Analytic and Behavioral learning skills (See Table 11).

Table 10. Relationship between Learning Skills Profile scores and KLSI 3.1 AC-CE and AE-RO Scales (Yamazaki et al. 2003)

	Interpersonal learning skills (CE)						Perceptual learning skills (RO)						Analytical learning skills (AC)						Behavioral learning skills (AE)					
Variables	Leadership		Relationship		Help & understanding		Sense making		Information gathering		Information analysis		Theory building		Quantitative analysis		Technology & computer		Goal setting		Action		Initiative	
	β	R^2	β	R^2	β	R^2	β	R^2	β	R^2	β	R^2	β	R^2	β	R^2	β	R^2	β	R^2	β	R^2	β	R^2
AC-CE	-.14*	.06	-.22***	.06	-.24***	.06	.06	.01	-.01	.00	.20***	.04	.30***	.10	.33***	.11	.21***	.04	.16**	.04	.03	.01	-.15**	.07
AE -RO	.19***		.08		.07		.10		.04		.07		.10		-.01		.02		.13*		.09		.22***	
F	8.27***		8.26***		9.54***		1.92		.26		6.58**		15.12***		17.18***		6.36**		6.39**		.89		11.08***	
df	2, 285		2, 285		2, 285		2, 285		2, 285		2, 285		2, 285		2, 285		2, 285		2, 285		2, 285		2, 285	

N = 288
* p < .05
** p < .01
*** p < .001

Table 11. Correlations between LSI 2 and The Learning Skills Profile (Mainemelis et al. 2002)

N	Interpersonal /CE	Information /RO	Analytic /AC	Behavior /AE	Anal.-Interp. /AC-CE	Behav.-Info. /AE-RO
198	.31	-.14	.54	.12	.57	.23

r's> .14 p< .05, r's>.24 p<.001 two-tailed

The Adaptive Style Inventor. The Adaptive Style Inventory (ASI) was developed to assess situational variability in learning style in response to different kinds of learning task demands (Kolb 1984). It uses a paired comparison method to rank learning preferences for the four learning modes in eight personalized learning contexts. It measures adaptive flexibility in learning, the degree to which one systematically changes learning style to respond to different learning situations in their life. Earlier studies found that adaptive flexibility is positively related to higher levels of ego development on Loevinger's instrument (Kolb & Wolfe, 1981). Individuals with high adaptive flexibility are more self-directed, have richer life structures, and experience less conflict in their lives (Kolb, 1984).

Mainemelis, Boyatzis and Kolb (2002) employed the LSI 2, the Adaptive Style Inventory (Boyatzis and Kolb 1993), and the Learning Skills Profile (LSP, Boyatzis and Kolb 1991, 1995, 1997) to test a fundamental ELT hypothesis: The more balanced people are in their learning orientation on the LSI, the greater will be their adaptive flexibility on the ASI. To assess a balanced LSI profile two different indicators of a balanced learning profile using

absolute LSI scores on the Abstract/Concrete and Active/Reflective dimensions were developed. The results supported the hypotheses showing that people with balanced learning profiles in both dimensions of the LSI are more adaptively flexible learners as measured by the ASI. The relationship was stronger for the profile balanced on the Abstract/Concrete dimension than the active/reflective dimension. Other results showed that individuals with specialized LSI learning styles have a greater level of skill development in the commensurate skill quadrant of the LSP. The study also produced some unexpected results. For example, while it was predicted that specialized learning styles would show less adaptive flexibility on the ASI, the results showed that this is true for the abstract learning styles but not for the concrete styles.

The ASI also produces total scores for the sum of the eight different learning contexts on the four basic learning modes. Table shows the correlations between these total ASI scores and the scales of the LSI 2 indicating high concurrent validity between the two instruments.

Table 12. Correlations between LSI 2 and Adaptive Style Inventory Scale Scores

Source	N	CE	RO	AC	AE	AC-CE	AE-RO
Mainemelis *et.al.* (2002)	198	.43	.37	.49	.42	.53	.44

r's>.28 p< .001 two-tailed

The Honey-Mumford Learning Styles Questionnaire. Honey and Mumford (1982, 1992) developed the Learning Styles Questionnaire (LSQ) based on ELT with the aim to create an instrument that was phrased in the language of UK managers and of pragmatic value to them, not "something that was academically respectable" (1986: 5). While they base their learning styles on the learning cycle they define the four learning modes somewhat differently. Three of the learning modes on the face of it appear similar to ELT; Reflector and RO, Theorist and AC and Pragmatist and AE; but the fourth mode Activist and CE is not, confusing concrete experience and active experimentation. This appearance is supported by a cluster analysis and factor analysis of the LSQ by Swailes and Senior (1999) who found a three stage learning cycle of action, reflection and planning instead of the ELT four stage cycle. Honey and Mumford's (1982) correlation of the LSI 1 and the LSQ is also consistent although the sample is quite small. In a larger study of undergraduate students by Sims Veres and Shake (1989) there was very little relationship between any of the LSI 2 and LSQ scales. Another study by Goldstein et al. (1992) of 44 students and faculty found similar small correlations between the LSQ and LSI 1 and LSI 2 scales (See Table 13). They argued with some justification that the proper correspondence between the LSQ and LSI is between the LSQ scales and the LSI learning style types (eg. Activist = Accommodating) but found little evidence to support it. Only 41% were correctly classified with the LSI 1 and 29% with LSI 2. In addition, a factor analysis of the LSQ by De Ciantis and Kirton (1996) failed to support the two bipolar dimensions, AC-CE and AE-RO predicted by ELT; as did a study by Duff and Duffy (2002). Finally, Mumford in Swailes and Senior (2001:215) stated, "the LSQ is not based upon Kolb's bi-polar structure as the academic community seems to think". Given these results, caution

should be used in equating scores from the LSI and LSQ and in interpreting LSQ research as either confirming or disconfirming ELT.

Table 13. Correlations of the Honey-Mumford Learning Styles Questionnaire with the LSI 1 and LSI 2

Source	N	LSI version	Activist-CE	Reflector-RO	Theorist-AC	Pragmatist-AE
Honey & Mumford 1982	29	LSI 1	.23	.73	.54	.68
Sims,et.*al.* 1989	279	LSI 2	.22***	.28***	.11*	.01
Goldstein et al. 1992	44	LSI 1 LSI 2	.23 .43**	.09 .14	.36* .23	.38* .38*

*** p < .001, ** p<.01,* p < .05 No sig. levels reported by Honey & Mumford

Multiple Intelligences. Narli, S., Ozgen, K., & Alkan, H. (2011) examined the relationship between individuals' multiple intelligence areas and their learning styles using the mathematical concept of rough sets. Multiple intelligence areas and learning styles of 243 mathematics prospective teachers studying at a state university were identified using the "Multiple Intelligence Inventory for Educators" developed by Armstrong (2000) and the KLSI 3.1. The authors conclude, “Given that the data analysis of this study revealed that intelligence areas together could explain learning styles at 0.794 level, we tend to take the position that it is unacceptable to believe that learning styles and intelligence areas are totally different from and irrelevant of each other…On the contrary, the findings of this study could be argued to present results in line with the researchers…who believe that multiple intelligence and learning styles should be explored together. These results also largely overlap with Gardner's approach that ‘learning styles and multiple intelligence types are different and a learning style could be related to more than one intelligence area’.”

Epistemological Beliefs Questionnaire. Tumkaya, S. (2012) investigated the epistemological beliefs of university students according to their genders, classes, fields of Study, academic success and learning styles. This study was carried out with 246 females and 242 males university students using the Epistemological Beliefs Questionnaire. (Shommer 1990, EBQ)and the Kolb Learning Style Inventory 2.0 translated into Turkish. The EBQ had a structure of three factors and consisted of 34 items. There were 17 items in the first factor named “the belief concerning that earning depends on effort”, 9 items in the second factor named “the belief concerning that learning depends on ability” (Range 9-45) and 8 items in the third factor named “the belief concerning that there is one unchanging truth” Results indicated that students who have *diverging* learning styles believe more strongly that learning depends on ability and that there is one unchanging truth more strongly than students who have *assimilating, accommodating* and *converging* learning styles.

Aptitude Test Performance

Studies of the relationship between learning style and aptitude test performance have consistently found that individuals with abstract, and sometimes active, learning styles perform best on tests of this type. Boyatzis and Mainemelis (2000) found significant correlations ($p<.001$) between the total GMAT scores of MBA students and their LSI 2 scores on AC-CE (.16 for 576 full time students and .19 for part time students) and on AC (.23 FT and. 21 PT). Data from the research university freshmen normative sample shows significant correlations ($p<.001$) between their total SAT scores and the KLSI 3.1 AC-CE (.32) and AC (.37) scales. Kolb (1976b) reported significant correlations between the LSI 1 and the LSAT for a sample of 43 law students for RO (-.29 $p< .05$) and for AC (.30 $p<.05$)

Two studies have examined the relationship between the Wonderlic test of general mental ability and the LSI. Kolb (1976b) reported data from 311 industrial managers indicating significant positive relationships between the LSI 1 AC-CE (.18 $p<.01$) and AE- RO (.24 $p<.001$) scales and Wonderlic scores. Cornwall and Manfredo (1994) studied the relationship between learning style and the Wonderlic in a group of 74 students and young working professionals. They scored the LSI 2 using a nominal scoring method and found that those whose primary learning mode was AC score significantly higher than those with the other primary learning modes.

While some have concluded that these relationships between AC and aptitude test performance indicate that abstract persons have greater mental ability (e.g. Cornwall and Manfredo 1994) it is also possible that the one best answer format of tests of this type is biased toward the converging learning style (See below).

Assessment of Academic Performance.

A number of studies have examined the relationship between learning style, assessment method and academic performance. While some studies show relationships between grades and the converging learning style (Rutz 2003, Mainemelis et al. 2000), other studies indicate that these learning style differences in student performance may be a function of the assessment technique used.

Tucker (2009) found that design students in architecture change towards the learning styles of design teachers as they progress through their studies, producing a statistically significant relationship between learning styles and academic performance in design assignments. They found that successful architecture students' learning styles were located in a southerly direction or south of the AE-RO bi-polar dimension or in the converging and assimilating quadrants as the skill sets and ways of thinking about implementing architecture reflect these two learning styles. Weaker students had learning styles north of the AE-RO bi-polar dimension or in the accommodating and diverging quadrants.

Lynch, Woelfl, Steele, & Hanssen explored the relationship between learning style and three different academic performance measures in a third-year surgery clerkship in a medical school. Two cohorts of third-year medical students took the United States Medical Licensing Examination step1 (USMLE 1), the National Board of Medical Examiners (NBME), and

NBME computer-based case simulations (CBX). The USMLE 1 and NBME subject examination rely on a single best answer, multiple-choice question format to assess performance, whereas CBX is a complex computer simulation intended to measure clinical management skills: The CBX consists of eight patient management simulations, each involving a patient with an unknown surgical problem. The simulation allows the student to obtain results of the history and physical examination, to order laboratory studies, to request radiology procedures, and to perform invasive/interventional procedures of surgeries. Beyond the presenting complaint, management is unprompted, and the student must balance the clinical evaluation with the acuity and progression of the clinical problem. Time advances during the simulation in proportion to the time necessary to perform each examination, laboratory study, or intervention. (1998: 63). Of the 227 participants in the study, 102(45%) were converging learners, 59(26%) assimilating, 48(21%) accommodating, and 18(8%) were diverging learners. The result indicated that converging and assimilating learners scored significantly higher on the two multiple choice performance measures, while no learning style difference was found on the CBX computer simulation. The authors concluded that the results support the Kolb (1984) and Newland (1992) assertions that converging and assimilating learners may have a performance advantage on objective, single-best answer multiple choice examination. They also concluded that the absence of relationships between learning style and CBX simulation suggests that multiple choice examination and clinical case simulations measure different capabilities and achievements. Clinical management may require not only an abstract orientation supporting the acquisition, organization, and synthesis of preclinical basic science data, but also a concrete orientation involving pattern recognition and instinct. The data demonstrate the importance of evaluating learning outcomes by applying more than one type of examination format. Multiple-choice examinations favor abstract learners, however, clinical performance requires additional cognitive skills and abilities, and behaviors that are not adequately reflected in objective measures of performance.

Oughton & Reed (2000) measured the relationship between graduate students' learning styles and performance outcome in a hypermedia environment in which students are required to structurally map out their acquired knowledge and grasp the interrelationships among various ideas and concepts. The dependent measures included the number of concepts, number of nodes, number of links, number of bidirectional links, number of multiple concept nodes, number of nodes with multiple links, levels of depth, preserved concepts, omitted concepts, and added concepts on each student's map. The results show that assimilating and diverging learners were the most productive on their concept maps. The authors concluded that this result can be attributed to the common traits shared by the two learning styles: the ability to see many perspectives and the ability to generate many ideas.

Holley & Jenkins (1993) examined the impact of learning style on four different accounting exam question formats: multiple-choice theory (MCT), multiple-choice quantitative (MCQ), open-ended theory (OET), and open-ended quantitative (OEQ). Their results indicated that there was a significant performance difference by learning style for all but the multiple – choice quantitative format. On the active-reflective learning style continuum, there was a significant difference in students' performance on the multiple choice theory format ($p < .01$) and the open-ended quantitative format ($p < .05$) with active students performing better. On

the abstract-concrete learning style continuum, abstract students performed better on the open-ended theory format ($p < .062$). The authors concluded that students with different learning styles perform differently depending on the examination format, and that performance cannot be generalized for similar subjects if the testing format varies.

This research suggests that educators need to exercise caution in evaluating performance based on a single outcome measure. Diverse assessment strategies are required to adequately measure student overall competence and performance.

Experiential Learning in Teams

Current research, involving different methodologies and different educational and workplace populations, has shown that ELT is useful for understanding team learning and performance (Adams, Kayes & Kolb 2005a). A number of studies support the proposition that a team is more effective if it learns from experience and emphasizes all four learning modes. Summarized below are studies of team member learning style, team roles, and team norms.

Team member learning style. In the first experimental study of the effect of learning styles on team performance, Wolfe (1977) examined how homogeneous three-person teams of accommodators, divergers, assimilators, or convergers performed on a complex computer business simulation compared with heterogeneous teams. The four groups of homogeneous teams had similar performance results. However, the teams that had members with diverse learning styles performed significantly better, earning nearly twice the amount of money of the homogeneous learning style teams. Similarly, Kayes (2001) found that teams made up of members whose learning styles were balanced among the four learning modes performed at a higher level on a critical thinking task than teams whose members had specialized learning styles.

Sandmire and Boyce (2004) investigated the performance of two-person collaborative problem-solving teams in an allied health education anatomy, physiology, and pathology course. They compared a group of high abstract/high concrete student pairs with a group of abstract pairs and a group of concrete pairs. The abstract/concrete pairs performed significantly better on a simulated clinical case than the abstract pairs and slightly better than the concrete pairs, indicating the value of integrating the abstract and concrete dialectics of the learning cycle. However, a similar study by Sandmire, Vroman, and Sanders (2000) investigating pairs formed on the action/reflection dialectic showed no significant performance differences.

Halstead and Martin (2002) found that engineering student teams that were formed randomly to include all learning styles performed better that self-selected teams. Furthermore, in her studies of engineering students, Sharp stated, “Classroom experience shows that students can improve teamwork skills with Kolb theory by recognizing and capitalizing on their strengths, respecting all styles, sending messages in various ways, and analyzing style differences to resolve conflict and communicate effectively with team members” (2001, F2C-2). In his study of a 6-week teambuilding program, Hall (1996) reported difficulty with self-selected teams that tended to group on the basis of friendship. He advocated random team assignment,

concluding, “If we had taken this approach there would have been more disagreement to work through, personality clashes to cope with and conflict to resolve. The stress would have been greater, but the *learning* probably more profound” (1996, p. 30).

Using another approach, Jackson studied the learning styles of ongoing workgroup team members who participated in a paired team competition. The exercise was designed to require teamwork skills. Results showed that teams with a balanced learning styles performed better. In 17 of the 18 team pairs, the winning team average score was higher than that of the losing team. Jackson concluded, “Designing teams that reflect the dynamic nature of team activities has great appeal in that it gives all team members a more equal opportunity to contribute and a more equal opportunity to be valued. . . . The process model advocates that different team members lead in different team activities or learning situations” (2002, p. 11).

Kyprianidou, Demetriadis, Tsiatsos& Pombortsis (2012) explored the impact of teacher-led heterogeneous group formation on students' teamwork, based on students' learning styles. Fifty senior university students participated in a project-based course with two key organizational features: first, a web system (PEGASUS) was developed to help students identify their learning styles and distribute them to heterogeneous groups. Second, group facilitation meetings were introduced as a technique to help students reflect on their weak/strong traits and employ appropriate roles in their group. Evaluation data revealed that students gradually overcame their initial reservations for the innovative group formation method and were highly benefited since styles heterogeneity within the group emphasized complementarities and pluralism in students' ways of thinking. They conclude “Overall, this work provides evidence that the adoption of learning styles theories in practice can be facilitated by systems for automated group formation and supportive group facilitation meetings that help avoiding the trivial and discouraging approach of using learning styles to simply label students.”

Lau, Beckman & Agogino (2012) examined how diversity in learning styles affect the dynamics and success of a design team. Data was gathered over two semesters of a multidisciplinary, project-based graduate level design course offered at the University of California at Berkeley. The results offer insights into how students with different learning styles appear to contribute to design team performance and provide recommendations that will help inform design educators on how to enhance overall team performance and innovation, with an understanding of learning style differences.

A study by Jules (2007) examined the influence of both learning style diversity and experiential learning team norms on team performance in a survey of 33 work teams from 6 different industries. Overall both team member learning style diversity and experiential learning work norms were positively related to a team’s ability to make decisions, to achieve its goals and to overall team performance. However, learning style diversity was not related to team experiential learning norms suggesting that other factors than member composition such as team leadership, team task or organization culture influence team norms. This was supported by the fact that learning style diversity was positively related to performance in teams with routine tasks and unrelated to performance in teams with non-routine tasks and

experiential team norms were more strongly related to performance in teams with non-routine tasks.

Team roles. Park and Bang (2002) studied the performance of 52 Korean industrial work teams using the Belbin team role model, which is conceptually linked to ELT (Jackson, 2002). They found that the best-performing teams were those whose members adopted at a high level all nine of Belbin's roles covering all stages of the learning cycle. They also found that teams with roles that matched the particular stage of a team's work/learning process performed best.

McMurray (1998) organized his English as a foreign language classroom using ELT principles. He divided his Japanese students into four-person teams with maximally diverse learning styles. Students were assigned to one of four roles that matched their strongest learning mode: leader (concrete experience), artist (reflective observation), writer (abstract conceptualization), and speaker (active experimentation). The leader's role was to direct classmates in completing assignments; the artist's, to create ideas for presentations; and the writer's, to compose messages for speakers to read. Class lessons were organized to include all four stages of the learning cycle. Classroom observations supported the idea that students benefited from the team role assignment and from accounting for learning style in the course design.

Gardner and Korth used ELT, learning styles, and the learning cycle to develop a course for human resource development graduate students that focused on learning to work in teams. They found strong relationships between learning styles and preference for learning methods—assimilators preferred lectures, reading, writing, and individual work, while accommodators and often divergers and convergers preferred partner and group work. They advocated providing different student roles during team learning activities to develop appreciation for, and skill in, all learning styles. "Part of the class could actively participate in a role play (accommodating), while a second group observes and provides feedback to the participants (diverging), a third group develops a model/theory from what they have seen and shares it with the class (assimilating) and the fourth group develops a plan for applying what they have seen to a new situation and shares it with the class (converging)" (1999, p. 32).

Team norms. Carlsson, Keane, and Martin used the ELT learning cycle framework to analyze the bi-weekly reports of research and development project teams in a large consumer products corporation. Successful project teams had work process norms that supported a recursive cycling through the experiential learning cycle. Projects that deviated from this work process by skipping stages or being stuck in a stage "indicated problems deserving of management attention" (1976, p. 38).

Gardner and Korth used ELT to design a course in group dynamics, group development, and group effectiveness. They taught student learning teams to use the experiential learning cycle to improve the transfer of learning. They concluded, "The use of learning groups in conjunction with the experiential learning model enhances the learning process, reinforces the link between theory and practice, and facilitates the transfer of learning to the workplace" (1997, p. 51).

Pauleen, Marshall, & Ergort used ELT to construct and implement web-based team learning assignments in a graduate-level course in knowledge management. Students worked on projects in virtual teams. Follow-up student evaluations indicated that 75% "agreed or strongly agreed that experiential learning was a valuable way of experiencing and learning about a variety of communication channels in a team environment" (2004, p. 95); 99% found experiential learning to be more valuable than simply reading about something.

Two studies have explicitly examined team conversational learning spaces with norms that support the experiential learning cycle. Wyss-Flamm (2002) selected from a management assessment and development course three multicultural student teams who rated themselves as high in psychological safety, defined as the ability of the team to bring up and talk about difficult or potentially psychologically uncomfortable issues. Three of the teams rated themselves as low in psychological safety. Through intensive individual and team interviews, she analyzed the teams' semester-long experience. In teams with high psychological safety, the conversations followed a recursive experiential learning cycle: differences were experienced among team members, examined through reflective juxtaposition that articulated learning, and culminated in either an integration of the differences or an affirmation of the contrast. Teams with low psychological safety tended to have early disturbing incidents that limited conversation and made the conversational flow more turbulent and conflict filled. Lingham (2004) developed a questionnaire to assess the norms of conversational space in a sample of 49 educational and work teams. He found that the more the teams supported the experiential learning cycle through norms that focused their conversation on interpersonal diverging (concrete experience and reflective observation) and task-oriented converging (abstract conceptualization and active experimentation), the better they performed, the more satisfied they were with their membership on the team, and the more they felt psychologically safe to take risks on the team.

6. Learning Flexibility

For the first time the KLSI 4.0 includes a personal assessment of the degree to which a person changes their style in different learning contexts. It gives an overall measure of learning style flexibility called the Learning Flexibility Index and a specific analysis of which "backup" learning styles they use, showing which learning style types the individual uses in addition to their dominant learning style type. This information can help individuals improve their ability to move freely around the learning cycle and improve their learning effectiveness.

The Learning Flexibility Index.

The LFI is comprised of 8 items that describe 8 different learning contexts chosen to represent learning situations that emphasize different modes around the learning cycle. The situations "starting something new" and "influencing someone" emphasize AE & CE. "getting to know someone" and "learning in a group" emphasize CE & RO. "planning something" and "analyzing something" emphasize RO & AC and "evaluating an opportunity" and "choosing between alternatives" emphasize AC &AE. The items are revisions of the original ASI in a ranking format similar to the KLSI. Respondents are asked to think of an example of each situation in their life and then to rank which of the four learning mode responses to the learning situation they tend to use. For example, for the item "When I start something new", the endings are "I rely on my feelings to guide me" (CE); "I imagine different possibilities" (RO); "I analyze the situation" (AC); and "I try to be practical and realistic" (AE).

Learning Flexibility Index Formula.

The measure for calculating learning flexibility is based on the Kendall's Coefficient of Concordance or W (Legendre, 2005), a non-parametric statistic typically used to measure the degree of agreement among judges ranking objects.

In the LFI, W is calculated *for each individual* by assessing the degree of agreement in their ranking of the four learning modes (the objects) across the 8 different learning contexts (8 "judging" situations). A low W score for an individual indicates that the learner varies their ranking of learning modes across learning contexts thus showing high learning flexibility.

W finds the deviation between the mean response ranking (by learning mode) and the grand mean of the ranking. This deviation is divided by the maximum possible sum of squares deviation. The coefficient varies from 0 to 1 with 1 denoting complete agreement (Sigler, & Tallent-Runnels, 2006).

We thus define Learning Flexibility Index (LFI) as: LFI= 1-W. The modified formula for W is:

$$W = (12S - 3p^2n(n+1)^2))/p^2(n^3 - n)$$

Where, $s = \sum_{i=1}^{n} R_i^2$

p= number of learning contexts (=8)

n= number of learning modes (=4)

R= row sum of ranks for the 8 contexts

Table 14 shows the LFI scores for the KLSI 4.0 normative sample and sub-samples and Appendix 7 shows the Learning Flexibility Index percentile scores for the normative sample.

Table 14. Learning Flexibility Index Scores for Normative Sample and Sub-samples

	N	LFI Mean	S. D.	Minimum	Maximum
TOTAL NORM GROUP	10423	.73	.17	.07	1.00
Medical students	670	.72	.17	.18	.99
Nursing students	38	.75	.14	.43	.98
Law students	166	.76	.16	.29	.99
University Undergrad	500	.76	.16	.29	.99
University Graduate	1478	.73	.16	.12	1.00
Adult HE E-learning	663	.73	.16	.18	.99
Managers	1724	.72	.17	.09	1.00

Previous ELT Research on Learning Flexibility

Previous research on learning flexibility (previously named adaptive flexibility) was conducted with the Adaptive Style Inventory (ASI—Boyatzis & Kolb, 1993). The ASI was originally developed to assess individuals' level of integrative complexity as they progressed from the specialized to integrated stage of the ELT developmental model (Kolb, 1984). The instrument assessed adaptive flexibility by measuring how individuals change their learning style in response to different situational demands. It was based on the theory that if people show systematic variability in their response to different contextual learning demands, one

could infer a higher level of integrative development because systematic variation would imply higher order decision rules or meta-cognitive processes (Kolb & Kolb, 2009) for guiding behavior.

A number of researchers have found evidence to support the link between learning flexibility and integrative development. Early studies found that adaptive flexibility is positively related to higher levels of ego development on Loevinger's sentence completion instrument (Kolb & Wolfe, 1981; Kolb, 1984). Individuals with higher levels of adaptive flexibility perceived themselves to be more self-directed in their current life situation and to have greater flexibility. They had higher levels of differentiation in their personal relationships, and used more constructs to describe their life structure. In addition, they experienced less conflict and stress in their life despite experiencing their life to be more complex. Subsequent research on learning flexibility has replicated some of these findings. Perlmutter (1990) studied 51 medical professionals and found significant relationships between Loevinger's ego development instrument and adaptive flexibility. Thompson (1999) in a sample of 50 professionals from various fields found that self-directed learners had higher levels of adaptive flexibility than learners who were not self-directed.

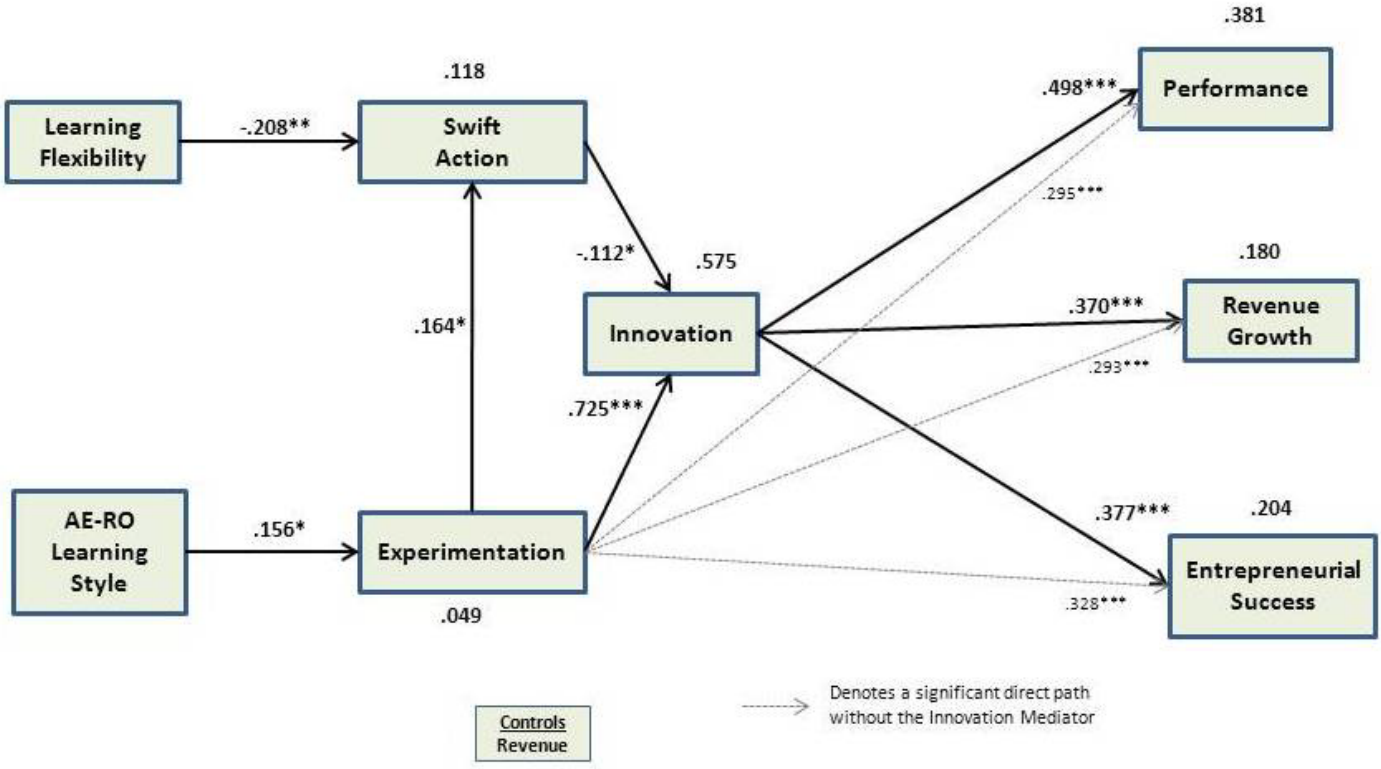
Another study by Mainemalis, Boyatzis, and Kolb (2002) examined the relationship between learning style as measured by the Kolb Learning Style Inventory (KLSI—Kolb 1999, 2005) and ASI adaptive flexibility. They tested the hypothesis that learners with equal preferences for dialectically opposed learning modes would be better able to integrate them into a flexible learning process. They proposed that a balanced learning style (as given by the absolute value for the dialectics of experiencing/ conceptualizing and acting/reflecting adjusted for population mean) would be related to learning flexibility. In other words, the more an individual is balanced on the conceptualizing/experiencing and acting/reflecting dialectics the more will he or she exhibit learning flexibility. This was supported for the dialectic of conceptualizing/experiencing. No significant result was found for the dialectic of acting/reflecting. However, they also found an equally strong relationship between learning flexibility and a preference for concreteness over abstraction, the KLSI AC-CE score. This raises the question whether learning flexibility is a function of balancing opposing learning modes or a function of contextual sensitivity, which is being more concrete in learning style.

In her comprehensive review of ASI research, Bell (2005) reported other construct validity evidence but suggested a need for revision of the original instrument and the creation of new measures of adaptive flexibility. Using an earlier version of the current LFI instrument, Akrivou (2008) found a relationship between learning flexibility and integrative development as measured by her Integrative Development Scale (IDS). She created this scale by identifying items that describe the integrative stage of adult development as defined in the works of Loevinger (1966, 1976, 1998), Rogers (1961), Perry (1999), Kegan (1982, 1994) and Kolb (1984, 1988, 1991). Another study by Moon (2008) using the early LFI examined sales performance in financial services, finding that learning flexibility influenced sales success as measured by monthly volume of sales.

Gemmell (2012) studied 172 technology entrepreneurs who were founders/CEO's of their current company. He examined the relationship between their KLSI and LFI 4.0 scores and

their company's innovation and performance. Results shown in Figure 19 display a positive relationship between Active Experimentation (AE-RO) and experimentation which in turn influenced innovation and performance. Entrepreneurs with high learning flexibility were more likely to take longer to make key strategic decisions; however, in the process of doing so, they were more innovative. "Technology entrepreneurs who are flexible learners—in spite of the enormous environmental pressures—appear to achieve greater innovation by taking slightly longer to consider more alternatives, to reflect upon those alternatives and to ultimately converge to a solution and take action." (p 90)

Figure 19. The Influence of Entrepreneur's Learning Style and Learning Flexibility on their Company Innovation and Performance



Validation of the KLSI 4.0 LFI

The validity of the LFI in the KLSI 4.0 was examined in an online diverse sample of 7536 with diversity in gender, age, education, profession, country of residence and birth and learning styles, and a second sample from Akrivou's (2008) study; consisting of 169 individuals 75% of whom are middle and senior level managers in three multinational companies and medium sized organizations based in the Midwestern United States (Sharma & Kolb 2010).

Six hypotheses were tested about the relationship of the LFI to variables comprising a nomological net of construct validity—the demographic variables of age, gender, educational level and educational specialization as well as learning style and integrative development:

Demographic variables.

Hypothesis 1: Learning flexibility will decrease with age.
Hypothesis 2: Women will exhibit higher learning flexibility than men.
Hypothesis 3: Higher levels of education will result in lower learning flexibility.
Hypothesis 4: Learning flexibility will be lower for individuals in educational specializations that emphasize abstraction.

Learning Style. ELT predicts relationships between learning style and learning flexibility. Specifically, it draws on Piaget's theory that learning requires a balance or equilibrium between accommodation, external adaptation through active involvement in experience (CE & AE) and assimilation, internal cognitive organization through reflective abstraction (RO & AC). "The 'accord of thought with things' and the 'accord of thought with itself' expresses this dual functional invariant of adaptation and organization" (Piaget 1952:8). Accommodative adaptation, therefore, incorporates novelty and variability while assimilative organization promotes stability and consistency. Learning flexibility is the result of the integration of these two processes. The Mainemalis et al. (2002) study mentioned above found some support (significant only on the AC/CE dimension) for the hypothesis that learning flexibility is related to a balance between these two processes but also found equal support for the hypothesis that accommodative learning styles were more flexible than assimilative learning styles. Thus we propose to test two conflicting hypotheses to determine the relationship between assimilative and accommodative learning styles and learning flexibility:

Hypothesis 5a: A balance between an assimilative and accommodative learning style will be related to higher learning flexibility.
Hypothesis 5b: A preference for the assimilative vs. the accommodative learning style will be related to lower learning flexibility.

Integrative Development. Finally, as described above, learning flexibility is thought to be indicative of the higher order process oriented thinking related to higher stages of adult development. This hypothesis will be tested by examining the relationship between learning flexibility and Akrivou's Integrative Development Scale.

Hypothesis 6: Learning Flexibility is positively related to integrative development.

Table 14 gives the means and standard deviations for all variables and their inter-correlations. As predicted in Hypotheses 1-4 we see significant negative correlations of age, gender, educational level and educational specialization with learning flexibility. Correlations of other variables with learning flexibility are also significant and in the hypothesized direction. The accommodative learning orientation and integrative development are positively related to learning flexibility. In addition, the correlation between age and integrative development in sample 2 (row 7 of Table 15) was significantly positive (.16, $p < .05$); the opposite of the relationship between age and learning flexibility in sample 1 (-.05, $p < .01$).

Table 15. Means, Standard Deviations and Correlations

Variable	*M*	*SD*	1	2	3	4	5	6	7
1. Learning Flexibility Index	0.71	0.17	-						
2. Age	3.73	1.13	-0.05**	-					
3. Gender	0.47	0.50	-0.08**	0.08**	-				
4. Education	3.28	0.86	-0.06**	0.22**	0.06**	-			
5. Specialization	10.72	4.50	-0.05**	-0.02	0.21**	0.10**	-		
6. Acc-Assm	0.29	18.23	0.25**	-0.04**	-0.16**	-0.07**	-0.13**	-	
7. Integrative Development	19.42	3.48	0.23**	0.16*	-0.14	-0.00	-0.07	0.07	-

N = 7536 for Learning Flexibility Index; *N* = 169 for Integrative Development. For age 1=Under 19, 2=19-24, 3=25-34, 4=35-44, 5=45-54, 6=55-64, 7=65 and over; for education 1=Primary School, 2=Secondary School, 3=University Degree, 4=Master's Degree, and 5=Doctoral Degree; for Gender 1= Male, and 0=Female; for specialization in the increasing order of abstract conceptualization and decreasing order of concrete experience 1=Fine and Applied Arts, Humanities=2, Literature=3, Languages=4, Social Work=5, Nursing=6, Physical Education=7, Communications=8, Business=9, Social Sciences=10, Psychology=11, Medicine=12, Law=13, Agriculture=14, Accounting=15, Engineering=16, Computer Science and Information Science=17, Science and Mathematics=18; Acc-Assm = Accommodation-Assimilation = (AE+CE)-(AC+RO)
** $p < .01$, *$p<.05$

Table16. Regression for Learning Flexibility Index

Variable	Learning Flexibility Index			Integrative Development
	Hyp1-4	*Hyp 5b*	*Hyp 5a*	*Hyp 6*
	Model 1	Model 2	Model 3	Model 1
Age	-0.03*	-0.02*	-0.02	0.18*
Gender	-0.07**	-0.04**	-0.04**	-0.18*
Education	-0.05**	-0.04**	-0.03**	0.00
Specialization	-0.03*	-0.01	-0.02	-0.03
Acc-Assm	---	0.24**	0.23**	0.01

Square of Acc-Assm	---	---	-0.14**	---
Learning Flexibility Index				0.25**
R	0.11	0.25	0.29	0.36
R^2	0.01	0.07	0.09	0.13
Adj. R^2	0.01	0.06	0.08	0.10
$R^2\Delta$	0.01**	0.05**	0.02**	0.06**

N=7536 for Learning Flexibility Index as the dependent variable. For integrative development as the dependent variable N=169. Values are standardized regression coefficients. Dashes indicate that the variable was not entered in the regression equation. Acc-Assm= Accommodation -Assimilation= (AE+CE)-(AC+RO)
***p<.001, *p<.05*

Hypotheses 1 to 5 focused on the impact of age, gender, education, educational specialization, and accommodating/assimilating learning style on learning flexibility. To test hypotheses 1-5 we ran hierarchical multiple regression (for the online sample with N=7536) in which age, gender, education and educational specialization were entered in the first step, the KLSI variable accommodation/assimilation was entered in the second step and the square of this variable was entered as the last step. Step 2 was added to test hypothesis 5b that states that a preference for accommodation over assimilation will lead to higher learning flexibility. The square of this variable was entered to test hypothesis 5a which states that a balance between assimilation and accommodation will lead to higher learning flexibility. The square term gives the equation an inverted-U form where as one moves from accommodation to assimilation learning flexibility increases, peaking at the balance point and then decreases afterwards. Thus, the linear term is entered to test hypothesis 5b while square term tests hypothesis 5a. These are entered in steps 2 and 3 of the regression to see their incremental effect in explaining learning flexibility (See Table 15). When we enter the linear variable for accommodation-assimilation in model 2 it significantly explains an additional 5% variance in learning flexibility ($F\Delta$ (7,530) = 104.48, $p < .001$) after that explained by age, gender, education and professional specialization. Accommodation- assimilation is positively related to learning flexibility (β=0.24, p<.01) implying that as preference for the assimilative learning style increases learning flexibility decreases. This supports hypothesis 5b.

In the model 3 in the regression we enter the square term for accommodation /assimilation. This variable significantly explains an additional 2% variance in learning flexibility ($F\Delta$ (7,529) =116.60, $p < .001$) after accounting for the other variables. The significant and negative coefficient for this variable (β=-0.14, p<.01) indicates an inverted U shape between

accommodation-assimilation and learning flexibility consistent with the balancing hypothesis 5a.

To understand the findings in model 2 and 3 we plotted the regression predicted value of learning flexibility controlling for the demographic variables against the variable accommodation- assimilation (See Figure 21). The conflicting linear and curvilinear relationships between accommodative-assimilative learning style and learning flexibility found by Mainemalis, et al. (2002) are resolved by splitting the difference at the accommodative end of the learning style continuum. Both hypotheses agree at the assimilative end of the learning style continuum (that is balanced learning style is related to higher learning flexibility and assimilative learning style results in lower learning flexibility) and are confirmed in the result shown in Figure 20. At the accommodative end the relationship is neither linear nor curvilinear declining from the balance point only slightly. This suggests that inflexibility in learning occurs primarily when the assimilative process of internally organizing thought is not counter balanced by some external accommodative orientation. In other words, it is the assimilative learning style that is the most inflexible.

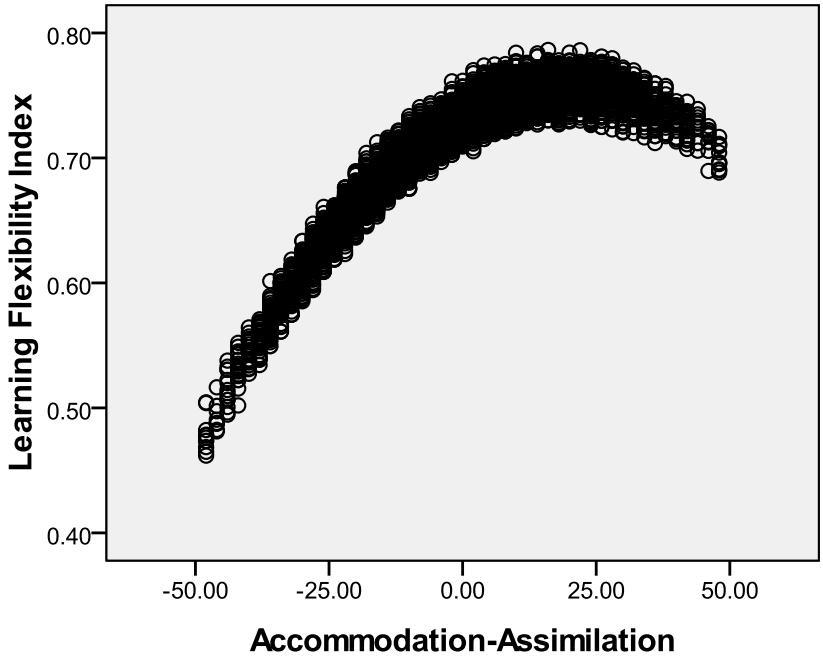


Figure 20. Graph of Predicted Value of LFI from the regression and the variable for accommodation-assimilation

To test hypothesis 6, we ran a separate regression (on the sample with N=166). Hypothesis 6 predicted a positive relationship between learning flexibility and integrative development. Under the column for Integrative Development in Table 2 we see the results for this regression. After controlling for the other variables learning flexibility is significantly and positively related to integrative development (β=0.25, $p<.01$) explaining 6% of the variance in integrative development, supporting hypothesis 6.

To test for discriminant validity of the LFI, we calculated Kendall's W using items from KLSI (items 1-12 that measure learning style). We then correlated integrative development variable with both LFI and 1-Kendall's W from the KLSI items. LFI will have discriminant validity if the correlation of LFI with integrative development is significant while that of 1-Kendall's W from the LSI items is not. LFI and integrative development show a significant correlation ($\rho = 0.23$, $p < .01$) while 1-Kendall's W from the KLSI items does not show a significant correlation with integrative development ($\rho = .09$, $p > .01$). What these results show is that the LFI variability in response to different learning contexts that is hypothesized to relate to higher order decision rules for learning is related to integrative development; but the variability in response to general descriptions of oneself as a learner on the KLSI is not related to integrative development.

While the first order correlations and regressions showed statistical confirmation of the hypothesized nomological net of construct validation for the LFI, effect sizes for the demographic variables are negligible explaining less than 1% of the variance in each case. Effect sizes for the learning style variable and the LFI were somewhat larger but still small (explaining 6% of the variance for the correlations and 8% for the model 3 regression). For the correlation between LFI and IDS 5.3% of the variance was explained and the R square for the regression indicated 10% of the variance explained. These small effect sizes indicate little utility of the results for such practical applications as using the LFI to predict levels of adult development, although they are still of value for confirming construct validity of the LFI. Construct validation is not focused on an outcome criterion, but on the theory or construct the test measures. Here the emphasis is on the pattern of convergent and discriminant theoretical predictions made by the theory. Failure to confirm predictions calls into question the test and the theory. "However, even if each of the correlations proved to be quite low, their cumulative effect would be to support the validity of the test and the underlying theory" (Selltiz, Jahoda, Deutsch, & Cook, 1959, p. 160).

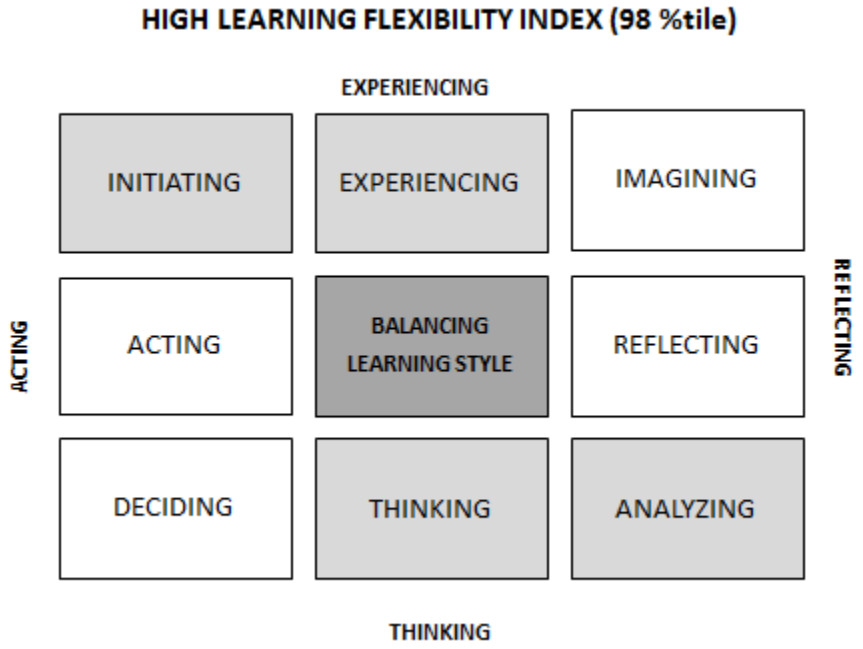
Using the LFI for Personal Development.

In the preceding analysis we have shown nomothetic construct validation for the LFI across a large sample of diverse individuals. The LFI also provides an idiographic profile describing each individual's unique way of responding to the different learning contexts. By scoring a person's learning style in each of the eight learning contexts, we can create a picture of how flexibly they move around the regions of the ELT learning space. This information coupled with one's learning style can provide a fuller picture of how one learns in different life situations and identify developmental needs for flexible adaptation to different learning demands.

To illustrate a profile of a person with a high LFI score along with excerpts from his self-analysis of how he learns is shown below (This report was written to describe the learning style results he was given and did not include his LFI score feedback). This is followed by the profile of another person with a low LFI score and excerpts from his self-analysis of how he learns. Figure 21 shows the LFI contextual learning style results for Mark, a mid-forties executive for an international non-profit organization, who had a high LFI score at the 98th percentile. Mark's learning style on the KLSI was Balancing but his high learning flexibility

is shown by his use of Initiating, Experiencing, Thinking and Analyzing styles in different contexts. Thus Mark shows flexibility in all four learning modes in response to the learning demands of different situations.

Figure 21.



Mark's self-analysis provides support for this portrait of his learning flexibility. He mentions how taking the KLSI was difficult because his preference for all of the learning modes made ranking choices difficult:

> *I had a difficult time answering the LSI questions. I have had a difficult time with other types of indicators in the past, including the MBTI. I have wondered at times if maybe I don't know myself very well, but I prefer to think that I am a well-balanced person.*

He then describes how his educational experiences have shaped his ability to operate flexibly in all of the learning regions:

> *As I look back at my educational experience, I can see how I have grown toward the Balancing style. My exposure to a wide variety of learning experiences strengthened my skills in the different learning styles over the years. I majored in civil engineering in college. While I discovered that I didn't like engineering very much, the education strengthened my Deciding skills. Throughout college, I was heavily involved in the campus retreat program and other faith-related activities, which placed a strong emphasis on reflection and finding meaning in concrete personal experience. I believe these experiences strengthened my Imagining skills. After college I volunteered for a year with a Habitat for Humanity affiliate in Alabama. I began the year with almost no construction knowledge but learned to build houses exclusively*

through hands-on experience. This bolstered my Initiating skills and strengthened my confidence that I could learn through hands-on experience. After practicing engineering for a year and determining that it wasn't for me, I earned a master's degree in Religion and Religious Education. This required a good deal of reading and research, which helped to develop my Assimilating skills. In my career experience since, I have used all of the learning styles at different times and to varying degrees.

In his current career and personal life Mark prefers variety rather than specialized mastery in one area:

I am most interested in a career that involves a variety of activities. I have a number of different functions in my current job, from one-on-one coaching to creating informational resources and developing training programs to facilitating trainings and planning meetings. I primarily work alone but also have a good deal of involvement with virtual teams. It is the variety of tasks and the balance of individual and group work that keeps me engaged. There is nothing I do that I would want to spend the majority of my time doing. I think I would become bored quickly. I need a career with variety.

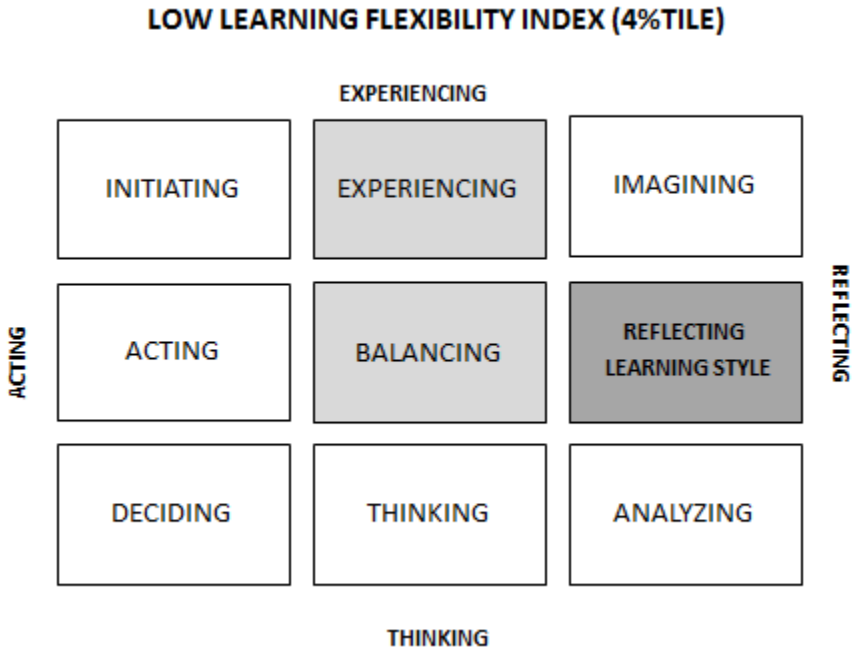
In my life outside of work, I have numerous hobbies and interests. I run, play piano and guitar, enjoy traveling, photography and cooking. All of these activities seem to primarily involve learning through active experimentation. I also enjoy reflective activities like art viewing and meditation. I enjoy reading and "thinking" activities like sodoku, brain teasers and math problems. I enjoy personal time but also need interpersonal contact, so I spend a good deal of time with friends, going on dates, and attending social events. As in my work life, I need a wide variety of activities to keep me stimulated. I love learning new things, and I look for new challenges, but it is the variety of activities that I enjoy. I'm not striving for mastery of particular activities. In the past I've wondered why I seem to lack the drive that others have to be the absolute best at one thing. Now I realize that my drive is just as strong, but different. I'm driven to pursue many different interests and learn in a variety of ways.

The skills that Mark has developed in the different regions of the learning space enable him to adapt to different learning contexts and tasks:

I find that I am able to adapt my learning style to meet the demands of the task at hand. Because I am comfortable learning in a variety of ways, I am adaptable to different situations and contexts, which makes me a versatile team member. I am generally able to do whatever is needed to get the job done. In addition, I tend to pick up new skills or concepts quickly. I have learned that if I give conscious thought to my learning processes and am deliberate about moving through the stages, from experience to reflection to thinking to acting, I will become a more proficient learner. I am able to take different perspectives and bridge differences between people with different styles. In group settings, I can relate to those who want to jump right into action, as well as those who want to spend time processing and planning. I am fairly creative, and in the professional environment often come up with new ideas and solutions to common problems. This skill has earned me the appreciation of colleagues and supervisors. I do at times have difficulty making decisions because my

ability to understand different perspectives often makes it challenging to commit to one of my own.

Figure 22.



In contrast, Figure 22 provides an example of someone with a Low LFI score at the 4th percentile. Jason is a minister in his late thirties who recently became the head of a small congregation. His learning style on the KLSI is Reflecting and indifferent contexts he used the Experiencing and Balancing learning style. Jason's emphasis on reflection is important in all learning situations and there is no flexibility in abstraction and only moderate flexibility in action indicated.

In Jason's self-analysis he describes his reflecting learning style:

I have both a strong inter-personal orientation and a deep interest in increasing my understanding of the world by way of exposure to models and theories, the more abstract the better. I feel it's also important to note that despite my high level of attraction to both the interpersonal dimension of life and to abstract thinking, I have experienced a stronger sense of competence in the interpersonal arena whereas I have tended to see others who think well in the abstract as possessing a talent that I very much wanted, but did not come by so naturally .Another striking feature of my LSI report is the absolute absence of any preference for the AE side of the transforming experience spectrum. On one level, I think this is accurate in the sense that it reflects very much how I started out in life and who I am at my core. On the other hand, I feel that as I have grown into adulthood, I have made choices that have both grown out of a desire to be more AE oriented and have forced me to live on that side of the spectrum more frequently...when I am confronted with a challenge, my

instinctive response remains to attend to lines of relationship and to gather information long before I feel ready to set a goal or take action. It also occurs to me that the more I feel grounded in an understanding on the level of theory or idea, the greater my comfort level with moving into active experimentation.

Throughout his career, Jason has experienced challenge and stress in dealing with the action demands of his work. His reflective style requires more time for reflection than these situations allow:

In terms of implications for my career path, I began my professional journey as an educator working as a teacher and administrator of a pre-K through 8th grade school. Because it was my first real full time position, I didn't have much of a basis for comparing it to anything else. However, I did notice that I was constantly feeling a higher level of stress and anxiety than I had ever remembered feeling in my life. Looking back on that experience in light of the LSI, it strikes me that a position in a school requires a fairly high degree of AE focus. Eight and a half years ago, I made the switch from the school environment to the modest congregation I currently serve. While I have not eliminated stress from my work life, the ratio of moments that feel barely under control to moments when I feel I am making a solid and worthwhile contribution has undergone a profound shift in a positive direction. I have much more time now for both internal and interpersonal reflection which is much better suited to how I most comfortably function in the world. I have probably learned most of what I know about the "Initiating" style through my family experience and it has continued to feel like a stretch to me. As a "Imagining type", I think it would be helpful if in my family we could set aside some regularly scheduled time for a family meeting so that I could get beyond the constant sense that millions of decisions need to be made on the fly.

The challenge here feels like more than mere lack of preference for or experience with the particular skill set involved. It feels like a deeper psycho-emotional discomfort with the experience of being at the center of things and of seeing myself as a or "the" driving force for an event or an organization. In meetings, I tend to sit back and listen and often even wait for someone to ask me a question before I open my mouth, but I have repeatedly received feedback from my lay leadership that they would like to hear more from me outside of the formal context of sermons and service leading.

Rather than moving into the acting region of the learning space to deal with the action demands of his job, Jason uses his learning style strengths of reflection and abstraction to plan and set priorities in order to reduce the stress he feels in action and leadership positions.

I will begin to incorporate a weekly template of tasks and appointments into my planning process. Having this template will help to keep me from over scheduling myself, and it will also help to mitigate my tendency to allow meetings to last until the person I'm meeting with decides that it's time for them to go. Additionally, this template will contain built in time for stress reduction instead of going straight from one thing to the next and it will have time clearly set aside for preparation processes so that I do not find myself preparing for so many things at the last minute. Even

though I actually fly fairly well by the seat of my pants, I usually feel less good about the job I do compared to when I give myself adequate time to prepare beforehand.

The above cases illustrate how the LFI contextual learning style analysis relates to the lives of a high and low flexibility person. Coupled with learning style results the LFI can give learners a rich portrait of how they learn in the many contexts of their life. By using the examples that they created to answer the LFI questions, individuals can plan strategies to deal with these real learning situations.

Conclusion and Implications

We have described the development of the Learning Flexibility Index and a measure of learning flexibility based on the Kendall's W statistic. We have shown construct validity for the LFI measure by testing six hypotheses about the place of the LFI in a nomological net. The LFI is negatively related to age and educational level. Women and those in concrete professions tend to be more flexible. Individuals with an assimilating learning style tend to be less flexible. Learning flexibility is positively related to Akrivou's Integrative Development Scale. Finally, the case study of an individual with a high LFI score illustrates how learning style and learning flexibility can combine to produce unique patterns of adaptation to different learning contexts.

From a practical perspective, the results portray an interesting pattern. Individuals who are men, older, highly educated, and specialists in abstract, paradigmatic fields are more assimilative in learning style and have less learning flexibility. The results further suggest that it is the orientation toward abstraction and reflection characteristic of the assimilative learning style that lead to inflexibility. Since it is the assimilative style that is the most favored and most developed in formal education systems, we might ask if this abstract approach is producing the unintended negative consequence of learning inflexibility. Emphasis on conceptual learning at the expense of contextual learning may lead to dogmatic adherence to ideas without testing them in experience, what Whitehead called "the fallacy of misplaced concreteness". Contextual learning approaches like experiential learning (Kolb, 1984), and situated learning (Lave, & Wenger, 1991) may help education to nurture integrated learners who are as sensitive to context as they are to abstract concepts.

A related issue concerns the priority placed on specialized over integrative learning in education. Specialization in subject matter and the learning style most suited to learning it may well produce higher levels of specialized mastery. Mainemalis et al. (2002) found that specialized learning styles led to greater development of learning skills related to the specialization than did balanced learning styles. We saw how Mark in the above case study was concerned that his balance and flexibility in learning kept him from achieving mastery in one particular area. However, learning flexibility leads to integrative development and perhaps greater personal fulfillment, better work-life balance and a broader, more tolerant and holistic perspective on the world. These too are important aims of education.

The concept of learning flexibility shifts the focus from specialized development to the process of movement through all modes of the learning cycle. This holistic process oriented

approach that combines a matching strategy with a corresponding emphasis on increasing learning skills in non-dominant learning styles may well prove to be the most effective educational strategy. Teachers can respond to the diversity of learning styles present in nearly every classroom by teaching around the cycle using approaches that fit with all four learning modes.

The Learning Flexibility Index provides a validated tool for investigating the important role that learning flexibility plays in education, management and personal development. Even the most specialized educational program has a curriculum that requires learning subject matter with different learning style demands. When we consider liberal education and multidisciplinary programs there are even greater demands for learning flexibility. In the contemporary management and leadership literature there are consistent calls for adaptability and flexibility in coping with the continually changing dynamics of the global community. Similarly, individuals throughout their lives face a multitude of learning and problem solving tasks that require a flexible approach in learning how to deal with them. The LFI can provide a self-development tool for individuals to understand their learning flexibility in order to become more effective learners and progress from specialization to integration in adult development.

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Appendices 1-7

Appendix 1
KELP Raw Score to Percentile Conversion

A. Learning Cycle Norms for Concrete Experience (CETOT), Reflective Observation (ROTOT), Abstract Conceptualization (ACTOT) and Active Experimentation (AETOT)

CETOT		Frequency	Cumulative Percent
Valid	11.00	657	2.5
	12.00	1714	9.0
	13.00	2126	17.1
	14.00	2286	25.7
	15.00	2257	34.3
	16.00	2014	41.9
	17.00	1831	48.9
	18.00	1689	55.3
	19.00	1481	60.9
	20.00	1264	65.7
	21.00	1225	70.4
	22.00	1012	74.2
	23.00	934	77.8
	24.00	833	80.9
	25.00	730	83.7
	26.00	665	86.2
	27.00	595	88.5
	28.00	473	90.3
	29.00	424	91.9
	30.00	389	93.3
	31.00	283	94.4
	32.00	268	95.4
	33.00	227	96.3
	34.00	195	97.0
	35.00	169	97.7
	36.00	146	98.2
	37.00	128	98.7
	38.00	109	99.1

	39.00	69	99.4	
	40.00	56	99.6	
	41.00	45	99.8	
	42.00	22	99.9	
	43.00	24	100.0	
	44.00	13	100.0	
	Total	26353		

ROTOT

		Frequency	Cumulative Percent
Valid	11.00	127	.5
	12.00	171	1.1
	13.00	259	2.1
	14.00	334	3.4
	15.00	448	5.1
	16.00	592	7.3
	17.00	667	9.9
	18.00	796	12.9
	19.00	922	16.4
	20.00	1031	20.3
	21.00	1155	24.7
	22.00	1200	29.2
	23.00	1249	34.0
	24.00	1260	38.7
	25.00	1354	43.9
	26.00	1388	49.2
	27.00	1322	54.2
	28.00	1283	59.0
	29.00	1252	63.8
	30.00	1169	68.2
	31.00	1089	72.4
	32.00	1030	76.3
	33.00	977	80.0
	34.00	894	83.4
	35.00	814	86.5
	36.00	740	89.3
	37.00	649	91.7
	38.00	512	93.7

	39.00	460	95.4
	40.00	367	96.8
	41.00	314	98.0
	42.00	252	99.0
	43.00	157	99.5
	44.00	119	100.0
	Total	26353	

ACTOT

		Frequency	Cumulative Percent
Valid	11.00	11	.0
	12.00	32	.2
	13.00	68	.4
	14.00	97	.8
	15.00	184	1.5
	16.00	254	2.5
	17.00	356	3.8
	18.00	444	5.5
	19.00	579	7.7
	20.00	684	10.3
	21.00	895	13.7
	22.00	1046	17.6
	23.00	1121	21.9
	24.00	1281	26.8
	25.00	1393	32.0
	26.00	1413	37.4
	27.00	1420	42.8
	28.00	1439	48.3
	29.00	1414	53.6
	30.00	1398	58.9
	31.00	1395	64.2
	32.00	1271	69.0
	33.00	1182	73.5
	34.00	1147	77.9
	35.00	995	81.7
	36.00	888	85.0
	37.00	789	88.0
	38.00	701	90.7

	39.00	580	92.9
	40.00	526	94.9
	41.00	456	96.6
	42.00	404	98.1
	43.00	269	99.2
	44.00	221	100.0
	Total	26353	
Missing	System	3	
Total		26356	

AETOT

		Frequency	Cumulative Percent
Valid	11.00	5	.0
	12.00	20	.1
	13.00	48	.3
	14.00	36	.4
	15.00	77	.7
	16.00	134	1.2
	17.00	166	1.8
	18.00	206	2.6
	19.00	288	3.7
	20.00	416	5.3
	21.00	517	7.3
	22.00	649	9.7
	23.00	723	12.5
	24.00	776	15.4
	25.00	981	19.1
	26.00	1049	23.1
	27.00	1191	27.6
	28.00	1309	32.6
	29.00	1436	38.0
	30.00	1457	43.6
	31.00	1518	49.3
	32.00	1559	55.3
	33.00	1625	61.4
	34.00	1536	67.2
	35.00	1569	73.2
	36.00	1465	78.8

	37.00	1373	84.0
	38.00	1141	88.3
	39.00	990	92.1
	40.00	807	95.1
	41.00	595	97.4
	42.00	389	98.9
	43.00	224	99.7
	44.00	78	100.0
	Total	26353	
Missing	System	3	
Total		26356	

B. Learning Style Type Norms for Abstract Conceptualization-Concrete Experience (AC-CETOT) and Active Experimentation-Reflective Observation (AE-ROTOT)

AC-CETOT		Frequency	Cumulative Percent
Valid	-31.00	1	.0
	-30.00	3	.0
	-29.00	4	.0
	-28.00	4	.0
	-27.00	5	.1
	-26.00	12	.1
	-25.00	20	.2
	-24.00	28	.3
	-23.00	28	.4
	-22.00	29	.5
	-21.00	37	.6
	-20.00	61	.9
	-19.00	58	1.1
	-18.00	63	1.3
	-17.00	87	1.7
	-16.00	116	2.1
	-15.00	118	2.6
	-14.00	109	3.0
	-13.00	145	3.5
	-12.00	148	4.1
	-11.00	186	4.8
	-10.00	207	5.6

-9.00	188	6.3
-8.00	251	7.2
-7.00	304	8.4
-6.00	286	9.5
-5.00	335	10.8
-4.00	365	12.1
-3.00	404	13.7
-2.00	464	15.4
-1.00	514	17.4
.00	511	19.3
1.00	564	21.5
2.00	620	23.8
3.00	647	26.3
4.00	723	29.0
5.00	750	31.9
6.00	760	34.7
7.00	840	37.9
8.00	896	41.3
9.00	937	44.9
10.00	976	48.6
11.00	953	52.2
12.00	1040	56.2
13.00	1001	59.9
14.00	954	63.6
15.00	966	67.2
16.00	940	70.8
17.00	969	74.5
18.00	880	77.8
19.00	847	81.0
20.00	748	83.9
21.00	718	86.6
22.00	651	89.1
23.00	547	91.1
24.00	470	92.9
25.00	458	94.7
26.00	365	96.0
27.00	281	97.1
28.00	265	98.1

	29.00	171	98.8
	30.00	148	99.3
	31.00	97	99.7
	32.00	57	99.9
	33.00	22	100.0
	Total	26352	
Missing	System	4	
Total		26356	

AE-ROTOT

		Frequency	Cumulative Percent
Valid	-31.00	1	.0
	-30.00	5	.0
	-29.00	4	.0
	-28.00	6	.1
	-27.00	14	.1
	-26.00	23	.2
	-25.00	26	.3
	-24.00	30	.4
	-23.00	53	.6
	-22.00	75	.9
	-21.00	103	1.3
	-20.00	118	1.7
	-19.00	128	2.2
	-18.00	168	2.9
	-17.00	205	3.6
	-16.00	255	4.6
	-15.00	245	5.5
	-14.00	306	6.7
	-13.00	355	8.0
	-12.00	406	9.6
	-11.00	420	11.2
	-10.00	456	12.9
	-9.00	511	14.8
	-8.00	530	16.9
	-7.00	549	18.9
	-6.00	610	21.3
	-5.00	593	23.5

-4.00	658	26.0
-3.00	690	28.6
-2.00	660	31.1
-1.00	694	33.8
.00	745	36.6
1.00	750	39.4
2.00	878	42.8
3.00	762	45.7
4.00	829	48.8
5.00	844	52.0
6.00	836	55.2
7.00	841	58.4
8.00	879	61.7
9.00	872	65.0
10.00	835	68.2
11.00	832	71.3
12.00	790	74.3
13.00	809	77.4
14.00	750	80.3
15.00	700	82.9
16.00	676	85.5
17.00	618	87.8
18.00	540	89.9
19.00	522	91.8
20.00	430	93.5
21.00	375	94.9
22.00	372	96.3
23.00	279	97.4
24.00	211	98.2
25.00	169	98.8
26.00	105	99.2
27.00	89	99.6
28.00	48	99.7
29.00	35	99.9
30.00	20	99.9
31.00	9	100.0
32.00	6	100.0
Total	26353	

Missing	System	3	
Total		26356	

The KELP Learning Style Types are defined by the following cut points:

Initiating—ACCE <6, AERO >9
Experiencing—ACCE <6, AERO >-2 & < 10
Imagining—ACCE <6, AERO <-1
Reflecting—ACCE > 5 & < 15, AERO <-1
Analyzing—ACCE >14, AERO <-1
Thinking—ACCE >14, AERO >-2 & < 10
Deciding—ACCE >14, AERO >9
Acting—ACCE > 5 & < 15, AERO >9
Balancing—ACCE > 5 & < 15, AERO >-2 & < 10

Appendix 2. Learning Style and Age

KLSI 4.0 SCALE SCORES

Age		CE4	RO4	AC4	AE4	AERO4	ACCE4
19-24	Mean	19.6670	26.8736	28.2309	32.7477	5.8741	8.5639
	N	2057	2057	2057	2057	2057	2057
	Std. Deviation	6.21036	6.83744	6.86201	5.55272	10.42932	10.88344
25-34	Mean	19.8305	26.1407	28.6559	32.1984	6.0577	8.8254
	N	2979	2979	2979	2979	2979	2979
35-44	Mean	19.8343	26.1389	29.4503	31.4017	5.2628	9.6160
	N	2656	2656	2656	2656	2656	2656
	Std. Deviation	6.52196	7.18729	6.54388	6.10555	11.39608	10.82858
45-54	Mean	19.6384	25.7983	29.7368	31.1876	5.3893	10.0984
	N	1839	1839	1839	1839	1839	1839
	Std. Deviation	6.40136	6.81786	6.49812	5.93821	10.77834	10.71820
55-64	Mean	20.2731	26.1827	29.6661	30.6790	4.4963	9.3930
	N	542	542	542	542	542	542
	Std. Deviation	6.85600	7.13313	6.71448	6.00495	10.97986	11.12285
65 and o	Mean	22.0400	23.7000	30.0000	30.8200	7.1200	7.9600
	N	50	50	50	50	50	50
	Std. Deviation	6.98091	6.05502	6.99854	6.11686	9.83671	11.79581
Under 19	Mean	21.6917	26.0301	25.7444	34.6241	8.5940	4.0526
	N	133	133	133	133	133	133

	Std. Deviation	6.55187	6.46546	6.25185	4.85643	9.19489	10.89295
Total	Mean	19.8380	26.2234	28.9954	31.8452	5.6218	9.1574
	N	10423	10423	10423	10423	10423	10423
	Std. Deviation	6.46673	7.02489	6.66492	5.92756	10.92400	10.86578

ANOVA Table

		Sum of Squares	df	Mean Square	F	Sig.
CE4 * Age	Between Groups	1085.279	7	155.040	3.714	.001
	Within Groups	434748.026	10415	41.742		
	Total	435833.305	10422			
RO4 * Age	Between Groups	1613.781	7	230.540	4.683	.000
	Within Groups	512702.809	10415	49.227		
	Total	514316.589	10422			
AC4 * Age	Between Groups	4811.611	7	687.373	15.626	.000
	Within Groups	458146.168	10415	43.989		
	Total	462957.779	10422			
AE4 * Age	Between Groups	5438.309	7	776.901	22.430	.000
	Within Groups	360749.073	10415	34.637		
	Total	366187.382	10422			
ACCE4 * Age	Between Groups	6904.336	7	986.334	8.396	.000
	Within Groups	1223570.304	10415	117.482		
	Total	1230474.641	10422			
AERO4 * Age	Between Groups	3640.074	7	520.011	4.367	.000
	Within Groups	1240057.054	10415	119.065		
	Total	1243697.128	10422			

Appendix 3. Learning Style and Gender

KLSI 4.0 SCALE SCORES

Gender		CE4	RO4	AC4	AE4	ACCE4	AERO4
F	Mean	20.5441	26.3570	27.5652	32.1763	7.0211	5.8193
	N	5361	5361	5361	5361	5361	5361
	Std. Deviation	6.63567	7.21230	6.42519	5.90472	10.75635	11.07936
M	Mean	19.0114	26.0705	30.5741	31.5219	11.5627	5.4514
	N	4809	4809	4809	4809	4809	4809
	Std. Deviation	6.15493	6.83601	6.56067	5.92739	10.47187	10.78587

Total	Mean	19.8380	26.2234	28.9954	31.8452	9.1574	5.6218
	N	10423	10423	10423	10423	10423	10423
	Std. Deviation	6.46673	7.02489	6.66492	5.92756	10.86578	10.92400

ANOVA Table

		Sum of Squares	df	Mean Square	F	Sig.
CE4 * Gender	Between Groups	6214.497	4	1553.624	37.674	.000
	Within Groups	429618.808	10418	41.238		
	Total	435833.305	10422			
RO4 * Gender	Between Groups	274.365	4	68.591	1.390	.235
	Within Groups	514042.224	10418	49.342		
	Total	514316.589	10422			
AC4 * Gender	Between Groups	22984.303	4	5746.076	136.060	.000
	Within Groups	439973.476	10418	42.232		
	Total	462957.779	10422			
AE4 * Gender	Between Groups	1311.870	4	327.968	9.364	.000
	Within Groups	364875.512	10418	35.024		
	Total	366187.382	10422			
ACCE4 * Gender	Between Groups	52408.458	4	13102.115	115.866	.000
	Within Groups	1178066.182	10418	113.080		
	Total	1230474.641	10422			
AERO4 * Gender	Between Groups	619.546	4	154.886	1.298	.268
	Within Groups	1243077.582	10418	119.320		
	Total	1243697.128	10422			

Appendix 4. Learning Style and Educational Level

KLSI 4.0 SCALE SCORES							
Highest Degree Completed		CE4	RO4	AC4	AE4	AERO4	ACCE4
Doctoral Degree	Mean	19.5295	25.3618	30.2352	31.8257	6.4639	10.7057
	N	1067	1067	1067	1067	1067	1067
	Std. Deviation	6.54812	7.17971	6.66189	6.41904	11.47488	10.65666
Master's Degree	Mean	19.8306	25.4564	30.2128	30.9153	5.4588	10.3822
	N	2101	2101	2101	2101	2101	2101
	Std. Deviation	6.80713	6.98895	6.62901	6.04574	10.94810	11.14951
Primary school	Mean	20.3983	27.2754	25.8856	33.6144	6.3390	5.4873

	N	236	236	236	236	236	236
	Std. Deviation	6.14594	6.78079	5.76708	5.21777	10.25025	9.89196
Secondary school	Mean	20.8345	26.7888	27.0268	32.7414	5.9526	6.1924
	N	1752	1752	1752	1752	1752	1752
	Std. Deviation	6.42960	7.03284	6.39762	5.58276	10.72801	10.60797
University Degree	Mean	19.5319	26.4502	29.0597	31.8753	5.4251	9.5278
	N	5142	5142	5142	5142	5142	5142
	Std. Deviation	6.28513	6.98601	6.61341	5.85411	10.90564	10.69631
Total	Mean	19.8380	26.2234	28.9954	31.8452	5.6218	9.1574
	N	10423	10423	10423	10423	10423	10423
	Std. Deviation	6.46673	7.02489	6.66492	5.92756	10.92400	10.86578

ANOVA Table

		Sum of Squares	df	Mean Square	F	Sig.
CE4 * Highest Degree Completed	Between Groups	2410.180	5	482.036	11.585	.000
	Within Groups	433423.125	10417	41.607		
	Total	435833.305	10422			
RO4 * Highest Degree Completed	Between Groups	3240.979	5	648.196	13.212	.000
	Within Groups	511075.610	10417	49.062		
	Total	514316.589	10422			
AC4 * Highest Degree Completed	Between Groups	13853.333	5	2770.667	64.266	.000
	Within Groups	449104.446	10417	43.113		
	Total	462957.779	10422			
AE4 * Highest Degree Completed	Between Groups	4192.762	5	838.552	24.131	.000
	Within Groups	361994.620	10417	34.750		
	Total	366187.382	10422			
ACCE4 * Highest Degree Completed	Between Groups	25034.497	5	5006.899	43.268	.000
	Within Groups	1205440.144	10417	115.719		
	Total	1230474.641	10422			
AERO4 * Highest Degree Completed	Between Groups	2014.703	5	402.941	3.380	.005
	Within Groups	1241682.424	10417	119.198		
	Total	1243697.128	10422			

Appendix 5. Learning Style and Educational Specialization

KLSI 4.0 SCALE SCORES							
Educational Specialization		CE4	RO4	AC4	AE4	ACCE4	AERO4
Accounting	Mean	18.2197	25.9377	30.8393	31.8131	12.6197	5.8754
	N	305	305	305	305	305	305
	Std. Deviation	5.55424	6.55087	5.76432	5.75210	9.10066	10.44775
Agriculture	Mean	19.9333	28.2000	27.1333	31.8000	7.2000	3.6000
	N	30	30	30	30	30	30
	Std. Deviation	5.59515	6.56742	5.72191	5.70783	9.74998	10.63047
Architecture	Mean	21.2500	25.9375	31.1250	30.2500	9.8750	4.3125
	N	32	32	32	32	32	32
	Std. Deviation	6.60889	7.08446	6.42952	4.64897	10.51190	9.56620
Business	Mean	20.0299	25.6335	29.0141	31.7594	8.9842	6.1259
	N	1708	1708	1708	1708	1708	1708
	Std. Deviation	6.22134	6.77397	6.42462	6.00303	10.47055	10.97085
Communications	Mean	22.3243	25.6802	27.1036	31.5631	4.7793	5.8829
	N	222	222	222	222	222	222
	Std. Deviation	6.74441	7.49368	6.50743	5.89294	10.95573	11.23564
Computer Science and Information Science	Mean	17.2414	27.7586	30.8276	31.7586	13.5862	4.0000
	N	58	58	58	58	58	58
	Std. Deviation	5.82587	6.25289	7.07637	6.36137	10.95611	10.88376
Education	Mean	22.0237	25.6303	27.3720	31.9739	5.3483	6.3436
	N	422	422	422	422	422	422
	Std. Deviation	7.13923	7.26138	6.91938	6.21215	11.71756	11.18928
Engineering	Mean	17.7769	25.2870	31.3195	32.2055	13.5426	6.9185
	N	798	798	798	798	798	798
	Std. Deviation	5.55257	6.58706	6.26831	5.58928	9.42540	10.09526
Fine and Applied Arts	Mean	22.2786	27.2000	26.6643	31.5643	4.3857	4.3643
	N	140	140	140	140	140	140
	Std. Deviation	7.35930	7.69864	7.57277	5.75421	12.78634	11.30557
Health	Mean	19.2761	26.8993	27.8134	32.6045	8.5373	5.7052
	N	268	268	268	268	268	268
	Std. Deviation	5.97422	7.72085	5.96076	5.88596	9.52124	11.58032
Humanities	Mean	21.3696	25.5598	29.2500	30.7826	7.8804	5.2228
	N	184	184	184	184	184	184

	Std. Deviation	7.20992	7.54054	7.66601	6.17562	13.01604	11.69369
Languages	Mean	21.2449	28.0714	28.3469	30.8673	7.1020	2.7959
	N	98	98	98	98	98	98
	Std. Deviation	6.90295	7.41168	6.81130	6.42585	10.71706	11.78673
Law	Mean	19.6405	26.6240	29.8182	30.8843	10.1777	4.2603
	N	242	242	242	242	242	242
	Std. Deviation	6.33888	6.58830	6.65261	6.15928	10.42805	10.22214
Literature	Mean	22.1687	25.8193	29.4940	29.3133	7.3253	3.4940
	N	83	83	83	83	83	83
	Std. Deviation	7.42576	7.12971	6.80813	6.94741	11.31490	11.67066
Medicine	Mean	18.9333	26.1324	29.6247	32.2932	10.6915	6.1608
	N	914	914	914	914	914	914
	Std. Deviation	6.44727	7.10421	6.66966	6.05591	10.76255	11.18643
Nursing	Mean	19.6926	26.8402	27.1557	32.3238	7.4631	5.4836
	N	244	244	244	244	244	244
	Std. Deviation	5.93447	7.37886	6.27494	5.64426	10.02110	10.72878
	N	1995	1995	1995	1995	1995	1995
	Std. Deviation	6.59044	6.96979	6.51528	5.69686	10.91876	10.75465
Physical Education	Mean	20.7105	27.6579	26.1053	33.3947	5.3947	5.7368
	N	38	38	38	38	38	38
	Std. Deviation	6.24243	6.92538	5.44153	4.47540	9.51965	9.93406
Psychology	Mean	20.9723	26.9782	28.5406	30.5921	7.5683	3.6139
	N	505	505	505	505	505	505
	Std. Deviation	7.19314	7.47333	6.78809	6.74683	11.33210	12.16762
Science and Mathematics	Mean	17.8937	26.0537	31.3463	32.1788	13.4525	6.1250
	N	800	800	800	800	800	800
	Std. Deviation	5.27088	6.81296	6.52530	5.67645	9.53790	10.57836
Social Sciences	Mean	20.4701	26.0124	29.2910	30.7139	8.8209	4.7015
	N	402	402	402	402	402	402
	Std. Deviation	6.74290	7.06559	6.92801	5.93861	11.41018	10.81564
Social Work	Mean	21.8273	27.8489	26.1151	31.0504	4.2878	3.2014
	N	139	139	139	139	139	139
	Std. Deviation	6.68865	7.28599	6.19733	6.26391	10.34845	11.60034
Total	Mean	19.8380	26.2234	28.9954	31.8452	9.1574	5.6218
	N	10423	10423	10423	10423	10423	10423

	Std. Deviation	6.46673	7.02489	6.66492	5.92756	10.86578	10.92400

ANOVA Table

		Sum of Squares	df	Mean Square	F	Sig.
CE4 *Ed. Spec.	Between Groups	15842.101	22	720.095	17.831	.000
	Within Groups	419991.205	10400	40.384		
	Total	435833.305	10422			
RO4 * Ed. Spec.	Between Groups	4351.499	22	197.795	4.034	.000
	Within Groups	509965.090	10400	49.035		
	Total	514316.589	10422			
AC4 * Ed. Spec.	Between Groups	21214.945	22	964.316	22.703	.000
	Within Groups	441742.833	10400	42.475		
	Total	462957.779	10422			
AE4 *Ed. Spec.	Between Groups	3925.383	22	178.426	5.122	.000
	Within Groups	362261.999	10400	34.833		
	Total	366187.382	10422			
ACCE4 *Ed. Spec.	Between Groups	67187.265	22	3053.967	27.303	.000
	Within Groups	1163287.376	10400	111.855		
	Total	1230474.641	10422			
AERO4 *Ed. Spec.	Between Groups	7919.681	22	359.986	3.030	.000
	Within Groups	1235777.446	10400	118.825		
	Total	1243697.128	10422			

Appendix 6. Learning Style Type and Educational Specialization

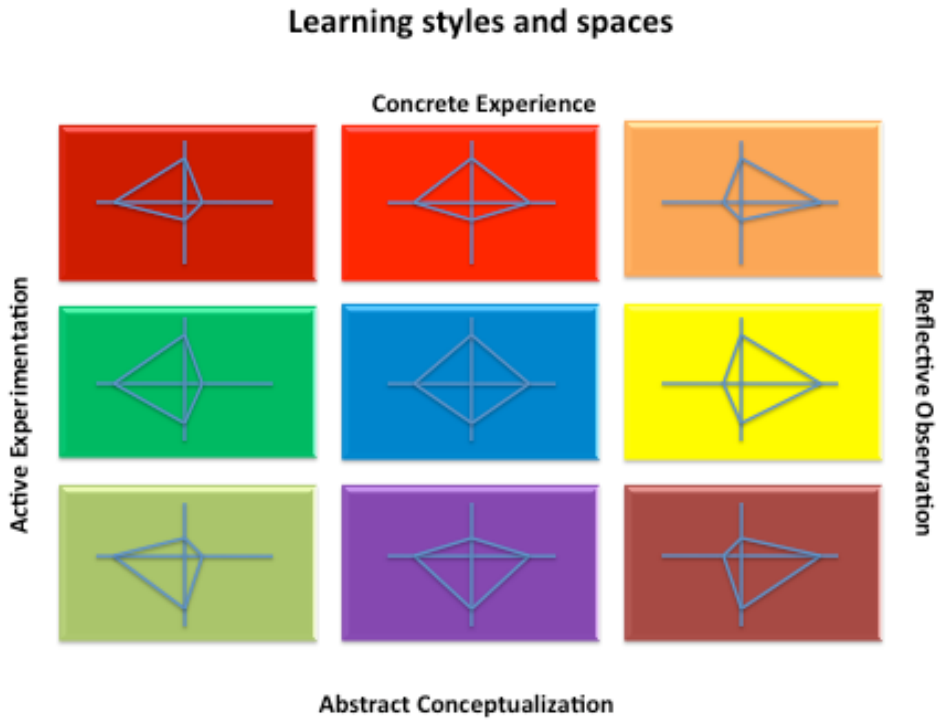
	KLSI 4.0 LEARNING STYLE TYPE									Total
	INIT	EXP	IMAG	REF	ANAL	THINK	DECID	ACT	BAL	
Accounting	24	23	16	36	46	47	45	33	35	305
	7.9%	7.5%	5.2%	11.8%	15.1%	15.4%	14.8%	10.8%	11.5%	100.0%
Agriculture	4	4	4	5	3	3	0	4	3	30
	13.3%	13.3%	13.3%	16.7%	10.0%	10.0%	0.0%	13.3%	10.0%	100.0%
Architecture	3	4	3	4	3	4	3	2	6	32
	9.4%	12.5%	9.4%	12.5%	9.4%	12.5%	9.4%	6.2%	18.8%	100.0%
Business	260	190	183	179	194	206	149	188	159	1708
	15.2%	11.1%	10.7%	10.5%	11.4%	12.1%	8.7%	11.0%	9.3%	100.0%
Communications	45	44	40	15	18	16	15	16	13	222
	20.3%	19.8%	18.0%	6.8%	8.1%	7.2%	6.8%	7.2%	5.9%	100.0%
Computer Science/IS	5	6	4	5	10	11	7	3	7	58
	8.6%	10.3%	6.9%	8.6%	17.2%	19.0%	12.1%	5.2%	12.1%	100.0%
Education	77	68	65	39	38	32	24	41	38	422
	18.2%	16.1%	15.4%	9.2%	9.0%	7.6%	5.7%	9.7%	9.0%	100.0%
Engineering	80	42	36	58	127	153	136	77	89	798
	10.0%	5.3%	4.5%	7.3%	15.9%	19.2%	17.0%	9.6%	11.2%	100.0%
Fine and Applied Arts	28	19	32	11	12	13	12	8	5	140
	20.0%	13.6%	22.9%	7.9%	8.6%	9.3%	8.6%	5.7%	3.6%	100.0%
Health	39	30	30	35	34	25	24	31	20	268
	14.6%	11.2%	11.2%	13.1%	12.7%	9.3%	9.0%	11.6%	7.5%	100.0%
Humanities	24	23	28	14	27	22	10	24	12	184
	13.0%	12.5%	15.2%	7.6%	14.7%	12.0%	5.4%	13.0%	6.5%	100.0%
Languages	9	14	19	15	9	6	9	7	10	98
	9.2%	14.3%	19.4%	15.3%	9.2%	6.1%	9.2%	7.1%	10.2%	100.0%
Law	28	33	22	33	37	31	21	20	17	242
	11.6%	13.6%	9.1%	13.6%	15.3%	12.8%	8.7%	8.3%	7.0%	100.0%
Literature	11	8	17	7	11	8	3	9	9	83
	13.3%	9.6%	20.5%	8.4%	13.3%	9.6%	3.6%	10.8%	10.8%	100.0%
Medicine	117	74	94	76	128	135	103	106	81	914
	12.8%	8.1%	10.3%	8.3%	14.0%	14.8%	11.3%	11.6%	8.9%	100.0%

Nursing	36	34	36	27	21	23	19	25	23	244
	14.8%	13.9%	14.8%	11.1%	8.6%	9.4%	7.8%	10.2%	9.4%	100.0%
Physical Education	5	9	4	5	2	3	0	3	7	38
	13.2%	23.7%	10.5%	13.2%	5.3%	7.9%	0.0%	7.9%	18.4%	100.0%
Psychology	72	64	74	67	71	41	35	42	39	505
	14.3%	12.7%	14.7%	13.3%	14.1%	8.1%	6.9%	8.3%	7.7%	100.0%
Science and Mathematics	65	54	49	76	147	134	111	90	74	800
	8.1%	6.8%	6.1%	9.5%	18.4%	16.8%	13.9%	11.2%	9.2%	100.0%
Social Sciences	50	52	47	46	60	37	39	33	38	402
	12.4%	12.9%	11.7%	11.4%	14.9%	9.2%	9.7%	8.2%	9.5%	100.0%
Social Work	22	27	31	19	13	3	6	11	7	139
	15.8%	19.4%	22.3%	13.7%	9.4%	2.2%	4.3%	7.9%	5.0%	100.0%
Total	1410	1188	1206	1043	1355	1219	972	1057	973	10423
	13.5%	11.4%	11.6%	10.0%	13.0%	11.7%	9.3%	10.1%	9.3%	100.0%

Appendix 7.

The KELP Nine Style Typology Descriptions and Case Studies

On the Cycle of Learning target scores form a "kite" shape defined by the combination of preferences for the four modes of the learning cycle. Because each person's learning style is unique; everyone's kite shape is a little different. Years of research on the learning styles of many thousands of individuals have led to the identification of nine distinct kite types or clusters of learning styles in the KELP. These learning style types can be systematically arranged on a two dimensional learning space defined by Abstract Conceptualization – Concrete Experience and Active Experimentation – Reflective Observation.



Previous versions of the KLSI divided this learning space into four regions defining four learning style types—accommodating, diverging, assimilating, and converging. Research and feedback from individual users indicated that the division of the space into four regions was problematic for some and categorized their learning style in a way that was misleading. Individuals who scored near the middle of the space reported that their style description was inaccurate while those who scored near the line between two styles were not comfortable with being typed into just one of the two styles. Further investigation revealed that these borderline cases were actually distinct styles in themselves resulting in the creation of the following nine style typology.

- The **Initiating** style is distinguished by the ability to initiate action to deal with experiences and situations.

- The **Experiencing** style is distinguished by the ability to find meaning from deep involvement in experience.

- The **Creating** style is distinguished by the ability to create meaning by observing and reflecting on experiences.

- The **Reflecting** style is distinguished by the ability to connect experience and ideas through sustained reflection.

- The **Analyzing** style is distinguished by the ability to integrate and systematize ideas through reflection.

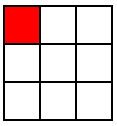
- The **Thinking** style is distinguished by the capacity for disciplined involvement in abstract reasoning, mathematics and logic.

- The **Deciding** style is distinguished by the ability to use theories and models to decide on problem solutions and courses of action.

- The **Acting** style is distinguished by a strong motivation for goal directed action that integrates people and tasks.

- The **Balancing** style is distinguished by the ability to flexibly adapt by weighing the pros and cons of acting vs. reflecting and experiencing vs. thinking.

These nine style types are described in detail below. Each description shows the characteristics of the style type and its learning space region based on previous research and clinical observation. Learning strengths and challenges for individuals with the style type are summarized. Finally, individuals with the style type describe themselves in their own words.



The Initiating Learning Style

Emphasizes the learning modes of **Active Experimentation (AE)** and **Concrete Experience (CE).** The Initiating style is distinguished by the ability to initiate action in order to deal with experiences and situations.

If your learning style is **Initiating,** you prefer to learn from "hands-on" experience and real life situations. You are willing to jump in and try out new and challenging experiences and will volunteer for leadership on tasks. You are able to act quickly and decisively in a changing environment without being caught in excessive deliberations. Because of your style you are comfortable thinkng on your feet. Because you are willing to take risks, you are able to identify new opportunities and generate possibilities for success at work and in life in general. You have the ability to take initiative to start new projects, put ideas into practice, and identify a course of action.

You learn best by tuning into the present circumstances and less from reflections about past events or planning for future actions. Your tendency may be to act on "gut" feelings rather than on logical analysis. In solving problems, you may rely more heavily on people for information than on your own technical analysis.

Others may see you as spontaneous, energetic, persuasive, and courageous.

Preferred Learning Space

You thrive in dynamic learning spaces where you can work with others to get assignments done, to set goals and to try out different approaches to completing a project. You prefer teachers who take the role of coach or mentor in helping you learn from your life experiences.

Learning Strengths

Committing yourself to objectives

Seeking new opportunities

Influencing and leading others

Learning Challenges

Controlling the impulse to act

Listening to others views

Impatience

Initiating—In their own Words

Jodie— College student

I can see why my learning style is "Initiating" because I do have strong preference for action over reflection. For example, I enjoy lab courses but do not like lectures. I love my calculus course because we do problems as we go through class, enabling me to be actively involved with the material I am learning. On the other hand, my lecture chemistry course is less pleasant because there are a million people in a room and the professor is just saying things. Such circumstances do not allow many opportunities for the hands-on style of learning that I prefer.

Rosalyn— Human resources manager

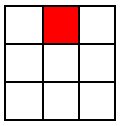
In one simple word…yes, I agree with the label "Initiator" for my learning style. My peers, leaders, family members and friends would all be able to quickly identify me as action oriented. I tend to be impatient with waiting for decisions and more than likely will jump in with a plan to take action. In my work as a human resources manager this bias for action has served me extremely well. The retail business is constantly changing. Amidst that change some people can be caught spinning with indecisiveness and an inability to act based on the excessive speed in which the business is moving. I, on the other hand, make decisions quickly. A day without action is extremely rare. The ability to identify needs, and act on those needs quickly is essential to my success in the corporate environment. My manager has mentioned how I have an amazing ability to seek out new information and apply it. I think this relates to my curiosity and willingness to take risks.

Ginny— College student

I am most effective in learning by having the opportunity to "learn by doing". Whether learning a new sport, a new activity, or new information, in order to retain what I have learned, it is important that I apply new learning quickly to real life situations. For example, when learning how to tie knots for sailing or climbing, I must have the opportunity to repeat the action while watching the instructor do it. Without the immediate application of the action, my retention is painfully low.
In classroom situations, it is challenging for me to learn just from lectures or books. Connecting with my classmates to discuss and debate about a reading or a lecture helps my retention.

Julie— School administrator

I really enjoy and get a lot out of hands-on experiences. Sharing in an experience, working in a team and setting goals together with my colleagues are concrete ways I prefer to learn. Feedback from colleagues and friends would echo these statements. They find me a strong and engaged team member that has good instincts and is a "doer."
I love my job, but also realize that it has helped create an imbalance in my learning style. I realize that I am not a very reflective person. While I always conduct event and program evaluations on *what* I do, I rarely take the time to think about *why* I do what I do. This can also said of my personal life. I react quickly rather than thinking things through. I prefer people to ideas and will be more influenced by an inspirational speech then by a logical theory.



The Experiencing Learning Style

Emphasizes **Concrete Experience (CE)** while balancing **Active Experimentation (AE)** and **Reflective Observation (RO).** The Experiencing style is distinguished by the ability to find meaning from deep involvement in experience.

If your learning style is **Experiencing**, you learn from your deep involvement in your life experiences and contexts. You rely on your feelings and reactions to people and situations to learn. You are sensitive to other people's feelings and are particularly adept in building meaningful relationships. You are open minded and accepting which can lead to difficulty in making independent judgments.

You can be innovative and unconventional in your approach to problem solving. You approach a problem intuitively rather than logically and later seek validation through reflection and action.

Others may see you as sensitive, empathetic, helpful, and intuitive.

Preferred Learning Space

You prefer learning spaces rich in interactions and ongoing communications with your friends and co-workers. While you may enjoy working in groups, you also need time to work alone to get things done. It is important that you receive constructive feedback on your progress at work and in your personal life. It is important for you to have a personal relationship with your teacher.

Learning Strengths

Building deep personal relationships

Strong intuition focused by reflection and action

Open to new experiences

Learning Challenges

Understanding theory

Systematic planning

Evaluation

Experiencing--In their own words:

Susan—Human resources director

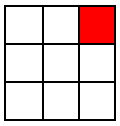
Over the years I have often questioned why I so much enjoyed beginning new relationships and felt exhilaration when brainstorming, planning, and implementing projects. Rarely have I found pleasure in working alone and felt stifled in situations when I must do so. Engaging in conversation, learning about and from others is exciting and sometimes I am surprised when people with whom I've had little involvement expose their soul. I have been told I ask questions of people and engage others in such a way as to generate rich discussion and debate in a non-threatening, thoughtful manner, this may be why they open up so easily.

Camille— College student

Unlike many of my classmates who are more abstract learners, I tend to act and then reflect, instead of the reciprocal, reflecting and then acting. I enjoy working with other students inside and outside of a class setting in order to set goals, to engage in lots of activities and to experiment with different approaches to complete a project. I think I am sensitive and considerate to others, but I also like to influence people and change situations. My career goal is to become an adolescent psychologist because I am good at relating to adolescents with an open-minded approach. I really crave interacting with children; that is why I am working at Children' Museum where I have plenty of opportunity to interact with children.

Marianne— Consultant

I learn through experiencing and this is an accurate description of the way I learn best. I typically reflect on real experiences and think of analogies as I hear about new ideas and theories. I ask others for input versus doing detailed research. Then, I quickly want to actively experiment with a new approach or implementing new solution. The cycle continues, creating many concrete experiences from which I learn.



The Creating Learning Style

Combines the learning steps of **Concrete Experience (CE)** and **Reflective Observation (RO).** The **Creating** style is distinguished by the ability to create meaning by observing and reflecting on experiences.

If your learning style is **Creating**, you learn by stepping back from experiences to observe and reflect on your feelings about what is going on. You have the ability to see things from different perspectives and from many different points of view. Because of your sensitivity to people's feelings you are able to consider diverse opinions and views and bridge the differences. You are comfortable with ambiguity and tend not to see situations in black and white. Your approach to situations is to observe rather than take action.

You are able to recognize patterns in events, relationships and group interactions and make sense of what they mean. You probably have broad cultural interests and like to gather information. You are good at imagining the implication of a particular course of action and creating alternative paths and approaches.

Others may see you as caring, accepting, creative, sensitive, and open-minded.

Preferred Learning Space

You like working in groups where there is open and free flowing conversation where you can gather information, listen with an open mind, and receiving personalized feedback. You may enjoy situations that call for generating a wide range of ideas, such as brainstorming sessions. You like teachers who take a facilitating role and are sensitive and creative.

Learning Strengths

Awareness of people's feelings and values

Listening with an open mind

Imagining the implications of ambiguous situations

Learning Challenges

Decision making

Taking leadership

Timely action

Creating—In their own words:

Annie—Consultant

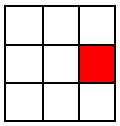
As luck may have it, my Learning Style Inventory (LSI) indicates a strong reliance upon Creating. Having no prior knowledge of learning styles when I took the assessment, I did so with an open mind and no preconceived notion of what type of learning style I favored (which turns out to be a strength of a Imagining learner, by the way). In groups I like to sit back and see how the people fit together before taking action, which reflects both observing and understanding people. I am very sensitive to people's feelings and often can tell you more about the tone of a conversation than what was actually discussed. I like brainstorming and use it whenever possible, whether trying to decide on what to eat for dinner with my family or in a meeting at work. I think outside the box (creative) and I like to get to the root of the issue (problem recognition). Every characteristic rings true with how I see myself.

Lorain—Non- profit organization manager

As a creating learner, I have the ability to take a multiple perspective "helicopter view," allowing me to see "surfacing" of patterns of emotional energy between individuals, and among and within groups, systems, and events. My ability to see the large picture allows me to notice and anticipate the likelihood of what may happen if a particular decision or action is taken. As a result, I am often able to redirect individual, group, system, or event energy in new directions. The downside of my style is that, because of my extreme imaginative tendency, I tend to be distracted by all the possibilities and views that I see. I often received feedback from people around me that I am a " big picture planner," or " have ability to see things globally".

Robin—Consultant/ Trainer

I can understand why I am a creating learner. In group situations such as project teams to which I have been assigned, and classes for religious study at my church, I have received feedback that I am someone who watches and listens first, then participates; that when I do participate, people listen and value my input because they know I have thought through the topic or question; that I can represent multiple views of the same situation or topic; and that I have a bias for action and getting things done. As an example, we attended a private golf lesson together and recognized that my husband's approach to improving his golf swing is to analyze the components of an ideal golf swing, to break it down in his mind and then to tape himself to see if his swing is on the same plane as the model swing. I improve my swing by getting the feel of a good swing, learning to tell the difference between the feel of a good swing or a poor swing, and then repeating it over and over until the feel of a good swing is ingrained in my mind and body.



The Reflecting Learning Style

Emphasizes **Reflective Observation (RO)** while balancing **Concrete Experience (CE)** and **Abstract Conceptualization (AC)**. The **Reflecting** style is distinguished by the ability to connect experience and ideas through sustained reflection.

If your learning style is **Reflecting**, you use observation and reflection as the primary basis for learning. You have the capacity for deep reflection while balancing the ability to engage both in feeling and thinking. You enjoy situations that call for generating different alternatives and perspectives and identifying problems. Because of your keen sense of observation, you are able to make sense of and recognize the deeper meaning that underlies events, facts and people's interactions. You value process and talking about your reflections with others to debrief events.

When you organize information or analyze data, you do it in a manner that is meaningful and orderly. When working with teams and organizations, you excel in ability to create processes that produce healthy communication and effective outcomes. You are good in coming up with creative ideas and solution to problems but prefer to leave the implementation to others. You are sensitive to people's feelings, thoughts and needs and are able to find common ground by bringing together different ideas and perspectives.

People may see you as quiet, insightful, thorough, sensitive, and deep.

Learning Strengths

Understanding others' point of view

Seeing "What's going on" in situations

Converting intuitions into explicit explanations

Gathering information

Learning Challenges

Initiating action

Rumination

Speaking up in groups

Preferred Learning Space

You thrive in learning spaces rich in dialogue and discussions, but you are also comfortable learning from lectures, independent projects, and from readings. Because of your preference for deep reflection, you may also need time to reflect and make sense of your experience on your own. You value teachers who provide opportunities for individual and group reflection and who are open to exploring ideas.

Reflecting—In their own words:

Jerry—Human resources manager

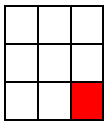
The Reflecting learning style has been particularly well suited to the traditional teaching methods I've experienced in my educational career. I have enjoyed classroom lectures and work well independently. I am able to process a wide variety of information, find patterns and themes, and easily understand the underlying theories. As a result, my academic performance has been strong. I am an avid note-taker. My textbooks and professional reading include numerous margin notes about ideas sparked by the reading. These represent the reflecting, brainstorming, and conceptualizing that accompany my learning. This opportunity to reflect and organize information is critical to my ability to retain what I have learned. To move in to Active Experimentation, I am most successful when I can partner with a colleague who demonstrates that strength. Using observation, I am able to learn from role models whose strengths are different from my own.
I have always had many interests, often more intellectual in nature. As I have grown older, my interests have often related to concepts and theories. My health and fitness goals are more motivated by a commitment to the concept of good health, than by any external or social factor.

Kirk— Organizational development consultant

I can relate very well to the Reflecting style of learning. I see myself as someone that learns best when I can take time to think and reflect on information that I am taking in. I have been told that I "over-process" situations and events in my life. My husband often takes a deep breath when I say "I would really like to talk more about…". Once I process the information and how I feel about the information or situation, then I can take action with greater ease. When considering a situation in my personal life or my professional life, my first response is usually to get as many different ideas and perspectives from as many people as possible before coming to my own conclusions. In my professional life, I have frequently been asked to lead brainstorming sessions as its something that feels very natural to me. I am sensitive to feelings of others and I think this is something I was born with.

Bill—Director of operations

As I reflect on my learning style results, it makes sense that I am a reflective learner. I often received feedback from people around me that I had excellent interpersonal skills. In my job role of Director of Operations, analytical problem-solving skills are valuable in supporting the development of systems, processes, and structures, often involving information management and technology, and strategy, for example. As I reflect, I know that I am excellent at organizing information. For example, some of the most significant contributions I have made include a computer system that serves as a tool for capturing, organizing, tracking and sharing resident information among counselors.
Here are few examples of feedback I have gotten from various people around me and I think they describe well my learning style:
"You're sensitive to feelings and people." –Friend-
"You balance well the intuitive, sensitive, emotional side of things along with the more abstract and analytical; On the other hand, you could do some things faster and less thoroughly." -Co-worker-
"You do first apply logic to ideas, but you are willing to allow persons to pursue them even if the logic cannot be articulated. You know that there are other ways of knowing. " –Wife-



The Analyzing Learning Style

Combines learning modes of **Reflective Observation (RO)** and **Abstract Conceptualization (AC).** The **Analyzing** style is distinguished by the ability to integrate and systematize ideas through reflection.

If **Analyzing** is your learning style, you are best at taking in a wide range of information and putting it into concise, logical form. You probably are less focused on people and more interested in abstract ideas and concepts. Generally, people with this learning style find it more important that a theory has logical soundness than practical value. You like to carefully analyze and assess each step and weigh its relative consequence before taking action. Because you like to plan ahead, you are able to minimize mistakes and anticipate potential problems and pitfalls.

When dealing with people or events, your approach is to rely on your logical and objective understanding of the situation and avoid your feelings to get in the way of your sound judgments.

Others may see you as logical, organized, reliable, careful, and thoughtful.

Preferred Learning Space

You thrive in learning spaces where you can use and develop your analytical and conceptual skills. You may prefer lectures, readings, exploring analytical models, and having time to think things through. You would rather work alone than in groups. You prefer teachers who model their thinking and analysis process in their lectures and interactions with you.

Learning Strengths

Organizing information

Being logical and rational

Building conceptual models

Learning Challenges

Risk taking

Socializing with others

Dealing with lack of structure

Analyzing—In their own words:

Scott—Art student

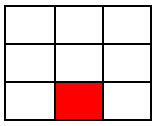
When I came to Art School, I decided to major in graphic design. I was always drawn to the conceptual part of the design process. I can see things in abstract ways and that is the fun part of the graphic design. Now I can see why I am an analytical learner. I like to work on my conceptual skills because it is satisfying to me and I am good at it. One time, our teacher gave us a design assignment. I produced a piece I was pretty proud of and I took it to my teacher for him to critique it. He looked at my work and said: " I like your concept and your drawing skills are excellent. But, I don't feel anything from it. It does not communicate to me what you are experiencing." I was surprised by what he said. But I know now, by looking at my LSI kite, what he meant. I do not use my feeling very much when I learn. I rarely go out in the world to experience things. I like to stay in my studio and work on my projects from my head. If I want to become a good artist, I need to become well rounded by working on my underdeveloped skills.

Jane—Higher education administrator

As a strong analytical learner, I excel in "planning systematically". I am touted as an exceptional planner. In fact, I spend a portion of every day planning the day, week, and month ahead. I do this through lists, spreadsheets, calendars, and even post-it notes, napkins, and e-mails to myself that eventually find their way to another master list. In addition, my current career involves extensive planning of meetings and events. My learning style contributes greatly to my success and positive job performance reviews in this position.
I find that my learning style is an asset in my career and long term career goals but can at times be a detriment in my personal relationships. By rigorously and constantly making sense of ideas and concepts, I do not allow for much spontaneity or chaos. I occasionally miss out on experiences because they do not fit my agenda. By loosening up and going with the flow more often, I will open the doors to new experiences and opportunities for growth and learning.

Michelle—College student

I understand why I enjoy making sense of things. I am able to gather all kinds of data and information and pull it together to make sense. My classmate pointed out to me that although this may be my strength, this is also where one of my weaknesses becomes evident. She told me, " you oftentimes develop great points in your mind during class, but then you don't openly share them." This is because I am more comfortable discussing an idea with a small group of people or one on one and it becomes harder for me to find that same comfort in a large class. I am a very individual thinker. Reflecting and analyzing an idea comes easily to me, but not right away in a classroom. I am better off working alone outside of a crowded and intimidating atmosphere. Along the same line, I prefer to study alone as opposed to studying in groups because I have always been a strong individual learner. I always enjoyed math, because solving math equations is a purely rational exercise which does not require communication.



The Thinking Learning Style

Emphasizes **Abstract Conceptualization (AC)** while balancing **Active Experimentation (AE)** and **Reflective Observation (RO**. The **Thinking** style is distinguished by the capacity for disciplined involvement in abstract reasoning, mathematics and logic.

If **Thinking** is your learning style you learn primarily by deeply involvement in abstraction. You value thinking things through and like to fit wide range of data and information into concise ideas and models. You may enjoy working with numbers and engage in mental activities in general that require abstract reasoning and analytical skills. You may prefer working with quantitative over qualitative information. You like to work by yourself and prefer to deal with technical tasks rather than personal issues.

You are good at planning and goal-setting, but you like to concentrate on the quality of your plan rather than achieving the actual goals. You strive for consistency and accuracy in your worldviews and ideas. You tend to be controlled in your emotional expression and like to speak precisely and concisely. When you act, your action tends to be the result of much thought. You work hard to avoid mistakes.

Others may see you as thorough, precise, reliable, consistent and introspective.

Preferred Learning Space You may learn best in well-structured learning spaces with clear directions and learning agendas. You also thrive in environments in which you can design or conduct experiments or manipulate data. You may prefer to work alone and need time to think things through. A teacher's expertise in their field is of primary importance to you.

Learning Strengths

Logical analysis

Rational decision making

Analyzing quantitative data

Learning Challenges

Working with people

Keeping an open mind about your ideas

"Lost in thought"

Thinking—In their own words:

Jake—College student

I think my learning style descriptions fit the way I like to learn. I do no like to be lectured and would rather want to be working on a lab doing something with the information instead of just sitting and listening to the professor talk. I think that is why I like math so much because I can think things through and solve problems. I prefer to work on mathematics or physics problems much more than working out problems with a friend or family member.

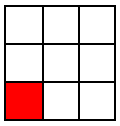
Marianne—Financial analyst

I like to solve problems, make decisions and I have a slight preference towards the technical tasks versus the personal issues. In a learning setting, I need to see the practical application of the topic or a theory. I need time to absorb information and think through it, planning and organizing information. I absolutely want to know exactly what I have to do to meet and exceed the standard. In fact, when I don't have this information or when others in the group move forward without the information, or don't allow me the time I need to assimilate it, I get frustrated. I need to know what success and failure looks like in the eyes of the person who is judging. I need time alone to process information and rejuvenate. I make "to-do" lists for everything from tasks at work, to the grocery store, packing for a trip. Doing this helps me to feel organized and focused. I don't like to be responsible for certain types of decisions for fear that I will make the wrong decision. Decisions, such as, which direction to take when driving, giving advice, or which gift to purchase. Being so centered in thinkingperhaps causes me to struggle between planning and developing options and making the decisions.

Brian – Editor and newsroom manager

It does not come as surprise to me that Learning style assessment shows that I am "thinker." I learn more by thinking, although my preference for acting and watching is also strong.

Often, when I set out to learn something new, my first inclination is to find a "how-to" book on the subject. This is especially true if the subject is technical; for example having to do with computer systems, organization development, sailing or training a puppy. But it's also true in the case of more creative subjects, such as cooking or learning to play the guitar. I'm inclined to want to know the "big picture" – theory, scales, and so on in the case of the guitar – rather than to just sit down and sound out the music. And while I'm aware of people's feelings and am open to varying opinions on a project or problem, I generally prefer to approach things logically rather than emotionally and tend to short-circuit process and "cut to the chase.



The Deciding Learning Style

Combines learning modes of **Abstract Conceptualization (AC)** and **Active Experimentation (AE).** The **Deciding** style is distinguished by the ability to use theories and models to decide on problem solutions and courses of action.

If **Deciding** is your learning style, you are best at finding practical uses for ideas and theories. You have the ability to solve problems and make decisions based on rational evaluation of solutions to questions or problems. You are good at identifying flaws and mistakes in concepts and ideas by testing them in the real world. You like to set clear goals, evaluate and then decide on the best path to achieve them. Because you are efficient and focused, you tend not to be distracted by what you consider to be tangential facts or information. This can sometimes lead to missing important information or solving the wrong problem.

Your focus is on technical problem-solving when working with others. When you work with people, you tend to concentrate on helping them to solve their problems efficiently and effectively rather on feelings and interpersonal issues.

People may see you as focused, pragmatic, rational and decisive.

Learning Strengths

Problem solving

Evaluating ideas and solutions

Setting goals

Making decisions

Learning Challenges

Thinking "out of the box"

Sensitivity to people's feelings

Dealing with ambiguity

Preferred Learning Space

You may learn best in learning spaces where you can experiment with new ideas, simulations, laboratory assignments, and practical applications. You prefer teachers who set clear standards and goals and evaluate with problems and questions that have right or wrong answers.

Deciding—In their own words:

George—Sales manager

My preferred learning style is "deciding" and I believe this to be a good fit in terms of how I see myself. In addition to my regional sales management responsibilities, I also oversee the sales productivity function. My sales productivity team focuses on how to help the organization become

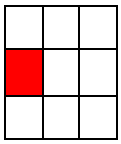
more effective and efficient through the practical application of various tools, technology, and training. Given my preference for a "deciding" learning and working style, I tend to enjoy gathering information, from both internal and external sources to the organization. I like to solve problems and make decisions to help the sales team succeed in creating a competitive advantage. As an example of this, I actively experiment with my sales team, taking the new ideas that are generated by my sales productivity team and finding practical applications related to organization structure, incentive compensation, performance recognition, and enabling tools and technology. But as I am an introvert by nature and therefore prefer to deal with technical tasks and problems versus social and interpersonal issues, I need to understand people better, and being more open-minded. Also, I use little reflection in my work and life in general. In my case I can learn from my wife, who has "imagining" learning style tendencies, and hope to improve our communication knowing now that we approach problems on opposite ends of the spectrum.

Charles—Management consultant

As a "deciding" learner, I have a desire to understand things from a conceptual perspective rather than a concrete one. My preference for models and theories validates why I excel at courses that are more conceptual in nature. I have a natural tendency to communicate conceptually instead of concretely. For example, with my wife being more concrete than conceptual, it validates the tendency to "lose her" when I give a conceptual explanation. It also validates my challenge in learning to understand and communicate with my children at a more concrete level. I have a natural desire to apply and act on what I am learning as opposed to reflecting and pondering. I don't feel I fully understand something till I have an opportunity to experiment and test it out. My deciding style explains the tension I feel when I am with those of other learning styles. When I'm with those with an Initiating style, I feel a need to push for a clearer conceptual understanding of the situation before moving to action and solutions. When I'm with those with an Analyzing style, I feel a need to address the question, "Will this model or theory work?" and "When we will we test it out?" When I'm with those with an Imagining style, I feel the need to bring direction and closure after multiple ideas are expressed and generated.

Amanda—Management consultant

The Deciding learning style suits me for many different reasons. When I first reflected on this definition the first thing that stood out was that I *usually converge on the correct solution.* This is definitely how most situations play out for me. I tend to go into situations, either alone or with people, and come out with a clear concise analysis with data and facts that results in a plan for the future. Throughout my life, people have said to me that I can clear away the garbage to find the truth with ease and wisdom beyond my years. People in my life tend to gravitate to me when they need a solution or for my honesty and clear-headed nature. I tend to arrive at an answer to tough decisions more quickly than others might, but this should not be mistaken for rash or impulsive decision-making. Rather, I am sure of my answer once I have analyzed and arrived at that answer, lending a very decisive and definitive air to my interactions. This has done wonders for me in career and my personal world.



The Acting Learning Style

Emphasizes **Active Experimentation (AE)** while balancing **Concrete Experience (CE)** and **Abstract Conceptualization (AC).** The **Acting** style is distinguished by a strong motivation for goal directed action that integrates people and tasks.

If your learning style is **Acting,** you use action as your primary basis for learning. You are goal oriented and focused on getting things done. You are good at implementing plans or testing ideas by combining your experience of the immediate situation with ideas and concepts for dealing with it. You have the ability to find solutions to questions or problems based on technical analysis while paying attention to the needs of people. You may be equally comfortable in functioning in a practical world that can make use of your feelings and actions as well in a technical world that requires your conceptual abilities. As a result, you excel in identifying and integrating task and people needs.

You are good at improving existing operations and systems and producing results. You can excel in leadership position that calls for coordinating complex operations and systems. Because of your strong preference for action over reflection, you may tend to commit to an idea without considering its consequences and alternative options or solutions.

Others may see you as dynamic, strategic, personable, and responsible.

Preferred Learning Space

You learn best by on the job learning through discussions with colleagues and working in teams. You prefer teachers with practical real world experience that you can emulate.

Learning Strengths

Combining technical knowledge and personal relationships

Focused on getting things done

Leading work teams

Learning Challenges

Taking time to reflect

Solving the right problem

Gathering and analyzing information

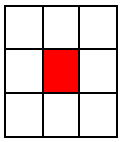
Acting—In their own words:

Elizabeth—Retail store manager

As an Acting learner, I do find that I move easily to the doing stage, and am more comfortable plunging into get things done. When I have a task ahead, I am eager to get started. Usually I will have a strong gut feeling about the best course of action. My next step will be to look for data to validate my intuition. I do think about what and why my intuition is pointing in a certain direction and like to get my conceptual arms around the topic. I look for a few pieces of information to back up my perception using people and other sources. I don't spend enormous time gathering data although if it is an important decision and I am unsure, I will spend time talking to people I respect. Once ready to act, I do. I am comfortable learning by doing and taking risk. On the positive side, I am able to get lots done, moving from one thing to another, switching gears easily. I don't get overwhelmed that easily by work. On the negative side, sometimes I am surprised by something that I haven't researched thoroughly or that when learning- by-doing the results are not as perfect as I might like.

Nancy—Independent consultant

I very much agree that my learning style is Acting. I experience a "need" to act during my learning process. My colleagues, staff, and family all agree that it's my drive for action and the passion in which I move to action, that draws them to me. It's also my Achilles heel, meaning, at times I move to action before I've properly finished gathering all the sources of data, spent time away from the "facts" to consider other options and reflect on other potential ideas. When I'm not careful or when timing is tight and I feel internal pressure to meet deadlines and implement tasks, I will skip over the Reflective Observation component of learning process completely. I hyper-process information, succumbing to deep analysis that is very quick, but gives little time for the data to digest.



The Balancing Learning Style

Balances **Concrete Experience, Abstract Conceptualization, Active Experimentation and Reflective Observation.** The **Balancing** style is distinguished by the ability to adapt flexibly by weighing the pros and cons of acting vs. reflecting and experiencing vs. thinking.

If your learning style is **Balancing,** your primary approach to learning is to switch approaches from feeling to thinking and from reflecting to acting. Because of your ability to navigate through the learning cycle you can change your approach to learning based on the situation. You are open to new experiences and equally adept at identifying and solving problems. You are able to see diverse perspectives on issues and bridge differences between people with different styles. In a team environment you are able to adapt to fill in the missing style needed to get the task done and help the team navigate through the learning cycle.

Because of your balanced worldview, you may find it difficult to make decisions about issues or choose between different alternatives. Your tendency to pursue a variety of interests may lead you to change jobs and careers many times over the course of your life.

People may see you as curious, open, flexible, multi-talented and resourceful.

Preferred Learning Space

You tend to be more satisfied in learning environments where you can use all four learning modes: learning from lectures, discussions groups, brainstorming sessions, labs and on-the-job learning. Because you are able to adapt to the different learning environments, you can learn from teachers with different teaching approaches.

Learning Strengths

Flexibility in moving around the learning cycle

Ability to work with diverse groups of people

Creative insights

Learning Challenges

Indecisiveness

"Jack of all trades, master of none."

Sustained commitment

Balancing—In their own words:

Cloe—College freshman

It makes a lot of sense why I am a balancing learner. I thought I was different from other people but never understood why and in what ways. For example, when I took the test, it was difficult from me to choose one item over others. They all made sense to me and I said to myself, " Well, I do all these things when I am learning!" When I looked at my classmates LSI styles they all had strong preferences one way or the other. I was like, "here I go again. I don't fit anywhere." I can see what I have to do in each different situation. For example, we had a group activity in class the other day. We had to come up with a solution to a case study that the instructor had assigned to us. I can see that some of my classmates like to brainstorm a lot, and others like just to stand back and think. It came to a point where I knew we need to make a decision about what to do and that was the role I took up on myself. Many times I feel like it sucks to be able to see what is going on when nobody else seem to be able to. Now I have a different perspective and appreciation for who I am. I am a balanced learner and I have a lot of strengths as a result of my learning style.

Mary Lou—Art college student

I am not surprised about how I came out in my learning style test. I am a balanced learner for sure. I took a lot of different kind of personality tests in the past and I managed to come out right in the middle in all of them. When people ask me if I am a pro-life or pro-choice, or if I am a liberal or conservative; it is hard for me to take a position because I can see the strengths and weaknesses in both sides of the arguments.

Karen—CEO's chief of staff

"Jack of all trades and master of none". This timeworn phrase is often used to describe journalists, and certainly applied to my two decades in the profession. I covered police, politics, education and child welfare, to name just a few. My friends from college pursued medicine or graduate school; I just kept learning a little bit about a lot.

Jina—Consultant

Because I am comfortable learning in a variety of ways, I am adaptable to different situations and contexts, which makes me a versatile team member. I am generally able to do whatever is needed to get the job done. In addition, I tend to pick up new skills or concepts quickly, which I would attribute to my ability to learn in a variety of ways.