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others; (3) denial of validity and usefulness of the diagnostic phases to an extent that he (a) prevents others from further exploration, (b) compulsively berates others for small but genuine progress and (c) consistently reacts to non-achievement with great guilt or anger.

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Chapter 3

Towards an Applied Theory of Experiential Learning

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The experiential learning model and its practical counterpart, the action-research method, are among the most seminal of the many contributions made by Kurt Lewin and his associates in their early work on group dynamics. From these ideas came the laboratory training method and T-groups, one of the most potent educational innovations in this century. The action-research method has proved a useful approach to planned change interventions not only in small groups but also in large complex organizations and community systems. Today this methodology forms the cornerstone of most organization development efforts.

The underlying insight of experiential learning is deceptively simple, namely that learning, change and growth are best facilitated by an integrated process that begins with (1) here-and-now experience followed by (2) collection of data and observations about that experience. The data are then (3) analysed and the

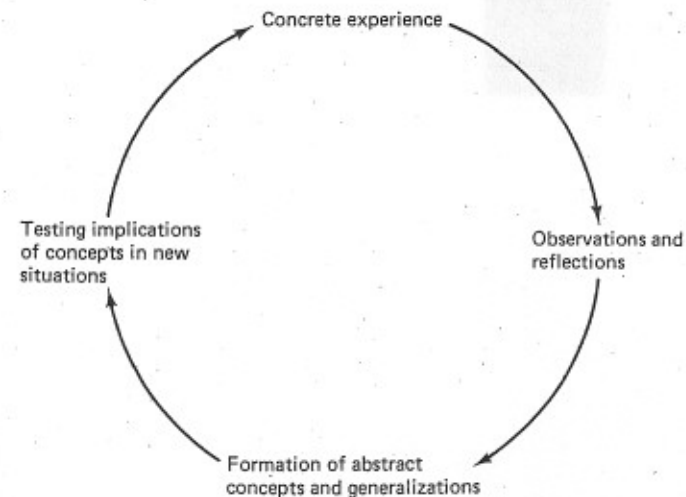


Figure 1. The experiential learning model

conclusions of this analysis are fed back to the actors in the experience for their use in the (4) modification of their behaviour and choice of new experiences. Learning is thus conceived as a four-stage cycle as shown in Figure 1. Immediate concrete experience is the basis for observation and reflection. These observations are assimilated into a 'theory' from which new implications for action can be deduced. These implications or hypotheses then serve as guides in acting to create new experiences.

Perhaps because of the practical face validity of the experiential learning model there has been relatively little serious scientific research directed towards understanding the dynamics of the learning process from this perspective. While the model has become a pivotal tool in training design and consulting practice, there has been little attention given to the exploration of how learning takes place and why experiential learning techniques and action-research methods work. For the past several years we have been engaged in a research programme aimed at answering these questions. In this chapter we will report some of our findings and conclusions from our attempts to explore the scientific implications of the experiential learning model. More specifically, we will seek to elaborate four implications of the experiential learning process:

- (1) The integration of the cognitive and socio-emotional perspectives on learning.
- (2) The role of individual differences in learning style.
- (3) The concept of growth and development inherent in the experiential learning model.
- (4) A model of learning environments that is commensurate with the experiential learning process.

Learning as an integrated cognitive and socio-emotional process

Since its inception and the classic studies by Lewin, Lippitt and White (1939) on leadership, the field of group dynamics has been dominated by a socio-emotional perspective, a perspective generated in a large measure by the insights of Freud and psychoanalysis. As a result the models of learning and change in group theory have tended to greatly emphasize the role of feelings and interpersonal relationships; such factors as trust, identification, inclusion, control, affection, interpersonal perception and communication. Even those specialized areas of group theory concerned with more cognitive activities such as problem-solving and creativity (e.g. Gordon, 1961) have in the end placed great emphasis on emotional, motivational and social factors.

The experiential learning model, however, emphasizes that learning and change result from the integration of concrete emotional experiences with cognitive processes: conceptual analysis and understanding. Thus learning involves the labelling or relabelling of immediate existential experience. Leavitt and Doktor (1970) have used developmental-cognitive terminology to explain (relabel) seemingly 'mystical' existential experience with meaningful results. To understand the learning process we must understand not only the factors which

enable the person to gain contact with his own experience but also the cognitive processes which enable him to make sense of his experience.

This insight is illustrated no better than in the actual historical event that spawned it; the 'discovery' of the T-group (see Marrow, 1969). In the summer of 1946 Lewin and his colleagues, most notably Ronald Lippitt, Leland Bradford and Kenneth Benne set out to design a new approach to leadership and group dynamics training for the Connecticut State Interracial Commission. The two-week training programme began with an experiential emphasis encouraging group discussion and decision making in an atmosphere where staff and participants treated one another as peers. In addition the research and training staff collected extensive observations and recordings of the groups' activities. When the participants went home at night the research staff gathered together to report and analyse the data collected during the day. Most of the staff felt that trainees should not be involved in these analytical sessions where their experiences and behaviour were being discussed for fear that the discussions might be harmful to them. Lewin was receptive, however, when a small group of participants asked to join in these discussions. One of the men who was there, Ronald Lippitt (1949), describes what happened in the discussion meeting that three trainees attended.

'Sometime during the evening, an observer made some remarks about the behavior of one of the three persons who were sitting in—a woman trainee. She broke in to disagree with the observation and described it from her point of view. For a while there was quite an active dialogue between the research observer, the trainer, and the trainee about the interpretation of the event, with Kurt an active prober, obviously enjoying this different source of data that had to be coped with and integrated.'

'At the end of the evening, the trainees asked if they could come back for the next meeting at which their behavior would be evaluated. Kurt, feeling that it has been a valuable contribution rather than an intrusion, enthusiastically agreed to their return. The next night at least half of the fifty or sixty participants were there as a result of the grapevine reporting of the activity by the three delegates.'

'The evening session from then on became the significant learning experience of the day, with the focus on actual behavioral events and with active dialogue about differences of interpretation and observations of the events by those who had participated in them.'

Thus the discovery was made that learning is best facilitated in an environment where there is dialectic tension and conflict between immediate, concrete experience and analytic detachment. By bringing together the immediate experiences of the trainees and the conceptual models of the staff in an open atmosphere where inputs from both perspectives could challenge and stimulate the other, a learning environment occurred with remarkable vitality and creativity.

Of central importance here is the idea that learning is by its very nature a tension and conflict-filled process. New knowledge, skills or attitudes are achieved through confrontation among the four perspectives in the experiential learning model. The learner, if he is to be effective, needs four different kinds of abilities—Concrete Experience abilities (CE), Reflective Observation abilities (RO), Abstract Conceptualization abilities (AC) and Active Experimentation

(AE) abilities. That is, he must be able to involve himself fully, openly and without bias in new experiences (CE), he must be able to reflect on and observe these experiences from many perspectives (RO), he must be able to create concepts that integrate his observations into logically sound theories (AC) and he must be able to use these theories to make decisions and solve problems (AE). Yet this ideal is difficult to achieve. How can one act and reflect at the same time? How can one be concrete and immediate and still be theoretical? Learning requires abilities that are polar opposites and the learner, as a result, must continually choose which set of learning abilities he will bring to bear in any specific learning situation. More specifically, there are two primary dimensions to the learning process. The first dimension represents the concrete experiencing of events at one end and abstract conceptualization at the other. The other dimension has active experimentation at one extreme and reflective observation at the other. Thus, in the process of learning one moves in varying degrees from actor to observer, and from specific involvement to general analytic detachment.

Most cognitive psychologists (e.g., Flavell, 1963; Bruner, 1960, 1966; Harvey, Hunt and Schroder, 1961) see the concrete/abstract dimension as a primary dimension on which cognitive growth and learning occurs. Goldstein and Scheerer (1941, p. 4) suggest that great abstractness results in the development of the following abilities:

- (1) To detach our ego from the outer world and from inner experience.
- (2) To assume a mental set.
- (3) To account for acts to oneself; to verbalize the account.
- (4) To shift reflectively from one aspect of the situation to another.
- (5) To hold in mind simultaneously various aspects.
- (6) To grasp the essential of a given whole: to break up a given whole into parts to isolate and to synthesize them.
- (7) To abstract common properties reflectively; to form hierarchic concepts.
- (8) To plan ahead ideationally, to assume an attitude toward the more possible and to think or perform symbolically.

Concreteness, on the other hand, represents the absence of these abilities—the immersion in and domination by one's immediate experiences. Yet as the circular model of the learning process would imply, abstractness is not exclusively good and concreteness exclusively bad. To be creative requires that one be able to experience anew, freed somewhat from the constraints of previous abstract concepts. In psychoanalytic theory this need for a concrete, childlike perspective in the creative process is referred to as regression in the service of the ego (Kris, 1952). Bruner (1966) in his essay on the conditions for creativity further emphasizes the dialectic tension between abstract detachment and concrete involvement. For him the creative act is a product of detachment and commitment, of passion and decorum, and of a freedom to be dominated by the object of one's inquiry.

The active/reflective dimension is the other major dimension of cognitive

growth and learning. As growth occurs, thought becomes more reflective and internalized, based more on the manipulation of symbols and images than overt actions. The modes of active experimentation and reflection, like abstractness/concreteness, stand in opposition to one another. Reflection tends to inhibit action and vice versa. For example, Singer (1968) has found that children who have active internal fantasy lives are more capable of inhibiting action for long periods of time than are children with little internal fantasy life. Kagan (1964) has found on the other hand that very active orientations toward learning situations inhibit reflection and thereby preclude the development of analytic concepts. Herein lies the second major dialectic in the learning process—the tension between actively testing the implications of one's hypotheses and reflectively interpreting data already collected.

The experiential learning model depicts learning as a process of conflict confrontation and resolution among four basic adaptive modes or ways of relating to the world; Concrete Experience vs Abstract Conceptualization and Active Experimentation vs Reflective Observation. Individuals as a result of their experiences come to develop characteristic styles of resolving these conflicts—consistent preferences for one adaptive mode over another. It is to this question of individual differences in learning styles we now turn.

Individual learning styles and the Learning Style Inventory

As a result of our hereditary equipment, our particular past life experience and the demands of our present environment most people develop learning styles that emphasize some learning abilities over others. Through socialization experiences in family, school and work we each come to resolve the conflicts between being active and reflective and between being immediate and analytical in characteristic ways. Some people develop minds that excell at assimilating disparate facts into coherent theories, yet these same people are incapable of, or uninterested in, deducing hypotheses from their theory. Others are logical geniuses but find it impossible to involve and surrender themselves to an experience. And so on. A mathematician may come to place great emphasis on abstract concepts while a poet may value concrete experience more highly. A manager may primarily concerned with the active application of ideas while a naturalist may develop his observational skills highly. Each of us has, in a unique way, developed a learning style that has some weak and strong points. We have developed a simple self-description inventory, the Learning Style Inventory (LSI), that is designed to measure an individual's strengths and weaknesses as a learner. The LSI measures an individual's relative emphasis on the four learning abilities—Concrete Experience (CE), Reflective Observation (RO), Abstract Conceptualization (AC) and Active Experimentation (AE) by asking him, several different times, to rank-order four words that describe these different abilities. For example, one set of four words is 'Feeling' (CE), 'Watching' (RO), 'Thinking' (AC), 'Doing' (AE). The inventory yields six scores, CE, RO, AC and AE plus two combination scores that indicate the extent to which

an individual emphasizes abstractness over concreteness (AC-CE) and the extent to which an individual emphasizes active experimentation over reflection (AE-RO).

The LSI was administered to 800 practising managers and graduate students in management to obtain norms for the management population. In general these managers tended to emphasize Active Experimentation over Reflective Observation. In addition, managers with graduate degrees tended to rate their abstract (AC) learning skills higher.* While the individuals we tested showed many different patterns of scores on the LSI, we have identified four statistically prevalent types of learning styles. We have called these four styles—the Converger, the Diverger, the Assimilator and the Accommodator.[†] The following is a summary of the characteristics of these types based both on our research and clinical observation of these patterns of LSI scores.

The Converger's dominant learning abilities are Abstract Conceptualization (AC) and Active Experimentation (AE). His greatest strength lies in the practical application of ideas. We have called this learning style the 'Converger' because a person with this style seems to do best in those situations like conventional intelligence tests where there is a single correct answer or solution to a question or problem (*cf.* Torrealba, 1972). His knowledge is organized in such a way that, through hypothetical-deductive reasoning, he can focus it on specific problems. Liam Hudson's (1966) research in this style of learning (using different measures than the LSI) shows that convergers are relatively unemotional, preferring to deal with things rather than people. They tend to have narrow interests, and choose to specialize in the physical sciences. Our research shows that this learning style is characteristic of many engineers (Kolb, 1973).

The Diverger has the opposite learning strength of the converger. He is best at Concrete Experience (CE) and Reflective Observation (RO). His greatest strength lies in his imaginative ability. He excels in the ability to view concrete situations from many perspectives and to organize many relationships into a meaningful 'gestalt'. We have labelled this style 'Diverger' because a person of this type performs better in situations that call for generation of ideas such as a 'brainstorming' idea session. Hudson's (1966) work on this particular learning style shows that divergers are interested in people and tend to be imaginative and emotional. They have broad cultural interests and tend to specialize in arts. Our research shows that this style is characteristic of persons with humanities and liberal arts backgrounds.

The Assimilator's dominant learning abilities are Abstract Conceptualization (AC) and Reflective Observation (RO). His greatest strength lies in his ability to create theoretical models. He excels in inductive reasoning; in assimilating

disparate observations into an integrated explanation (Growchow, 1973). He, like the converger, is less interested in people and more concerned with the practical use of theories. For him it is more important that the theory be logically sound and precise. As a result, this learning style is more characteristic of the basic sciences and mathematics rather than the applied sciences. In organizations this learning style is found most often in the research and planning departments (Kolb, 1973).

The Accommodator has the opposite strength of the Assimilator. He is best at Concrete Experience (CE) and Active Experimentation (AE). His greatest strength lies in doing things; in carrying out plans and experiments and involving himself in new experiences. He tends to be more of a risk-taker than people with the other three learning styles. We have labelled this style 'Accommodator' because he tends to excel in those situations where he must adapt himself to specific immediate circumstances. He tends to solve problems in an intuitive trial and error manner (Growchow, 1973) relying heavily on other people for information rather than his own analytic ability (Stabell, 1973).

These differences in learning styles can be illustrated graphically by the correspondence between their LSI scores and their undergraduate majors. This is done by plotting the average LSI scores for managers in our sample who reported their undergraduate college major (only those majors with more than 10 people responding are included) (see Figure 2). The distribution of undergraduate majors on the learning style grid is quite consistent with our theory.* Undergraduate business majors tend to have accommodative learning styles while engineers on the average fall in the convergent quadrant. History, English, political science and psychology majors all have divergent learning styles. Mathematics and chemistry majors have assimilative learning styles along with economics and sociology. Physics majors are very abstract falling between the convergent and assimilative quadrant. What these data show is that one's undergraduate education is a major factor in the development of this learning style. Whether this is because individuals are shaped by the fields they enter or because of the selection processes that put people into and out of disciplines is an open question at this point. Most probably both factors are operating—people choose fields which are consistent with their learning styles and are further shaped to fit the learning norms of their field once they are in it. When

*Many of these differences in LSI scores among disciplines are highly statistically significant especially when they are grouped into physical sciences, social sciences and the arts (see Kolb, 1973 for details).

Some cautions are in order in interpreting this data. First, it should be remembered that all of the individuals in the sample are managers or managers-to-be. In addition most of these people have completed or are in graduate school. These two facts should produce learning styles that are somewhat more active and abstract than the population at large. (As indicated by total sample mean scores on AC-CE and AE-RO of +4.5 and +2.9 respectively.) The interaction between career, high level of education and undergraduate major may produce distinctive learning styles. For example, physicists who are not in industry may be somewhat more reflective than those in this sample. Secondly, undergraduate majors are described only in the most gross terms. There are many forms of engineering or psychology. A business major at one school can be quite different than that at another.

*The details of the inventory construction along with preliminary reliability and validity studies are described in Kolb (1973). The inventory itself along with management norms appears in Kolb, Rubin and McIntyre (1971) *Organizational Psychology: An Experiential Approach*. Englewood Cliffs, N.J.: Prentice-Hall.

[†]The reason that there are four dominant styles is that AC and CE are highly negatively correlated as are RO and AE. Thus individuals who score high on both AC and CE or on both AE and RO with less frequency than do the other four combinations of LSI scores.

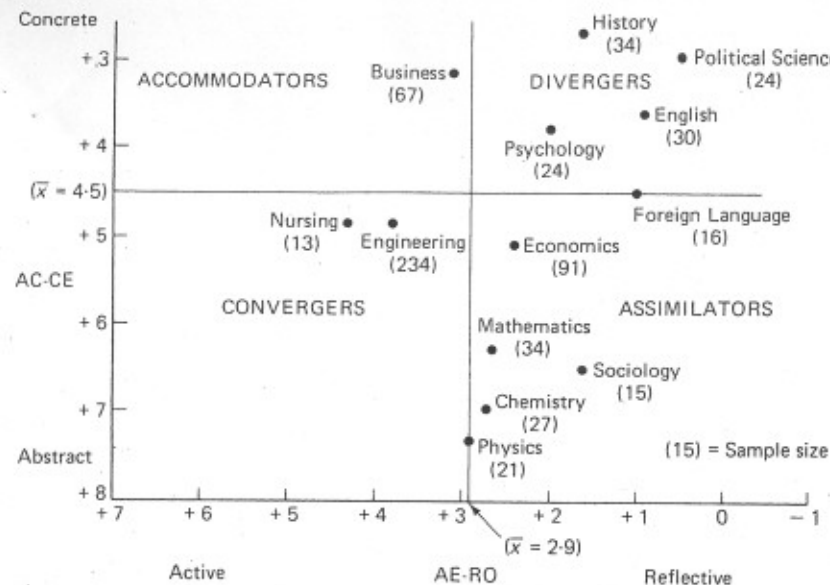


Figure 2. Average LSI scores on Active/Reflective (AE-RO) and Abstract/Concrete (AC-CE) by undergraduate college major

there is a mismatch between the field's learning norms and the individual's learning style, people will either change or leave the field.

Growth and development in the experiential learning model

In addition to providing a framework for conceptualizing individual differences in styles of adaptation to the world, the experiential learning model suggests more normative directions for human growth and development. As we have seen in the previous section individual learning styles affect how people learn not only in the limited educational sense but also in the broader aspects of adaptation to life such as decision-making, problem-solving and life style in general. Experiential learning is not a molecular educational concept but rather is a molar concept describing the central process of human adaptation to the social and physical environment. It is an holistic concept much akin to the Jungian theory of psychological types (Jung, 1923) in that it seeks to describe the emergence of basic life orientations as a function of dialectic tensions between basic modes of relating to the world. As such it encompasses other more limited adaptative concepts such as creativity, problem-solving, decision-making and attitude change that focus heavily on one or another of the basic aspects of adaptation. Thus creativity research has tended to focus on the divergent (concrete and reflective) factors in adaptation such as tolerance for ambiguity, metaphorical thinking and flexibility, while research on decision-making has emphasized more convergent (abstract and active) adaptive factors such as the rational evaluation of solution alternatives.

From this broader perspective learning becomes a central life task and how one learns becomes a major determinant of the course of his personal development. The experiential learning model provides a means of mapping these different developmental paths and a normative adaptative ideal—a learning process wherein the individual has highly developed abilities to experience, observe, conceptualize and experiment. In what follows we will describe our current thinking about these developmental paths and the process of growth toward this adaptive ideal.

The human growth process is divided into three broad developmental stages. The first stage, *Acquisition*, extends from birth to adolescence and marks the acquisition of basic learning abilities and cognitive structures. The second stage, *Specialization*, extends through formal education and/or career training and the early experiences of adulthood in work and personal life. In this stage development primarily follows paths that accentuate a particular learning style. Individuals shaped by social, educational and organizational socialization forces develop increased competence in a specialized mode of adaptation that enables them to master the particular life tasks they encounter in their chosen career (in the broadest sense of that word) path. This stage, in our thinking, terminates at mid-career although the specific chronology of the transition to stage three will vary widely from person to person and from one career path to another. The third stage, *Integration*, is marked by the reassertion and expression of the non-dominant adaptive modes or learning styles. Means of adapting to the world that have been suppressed and lay fallow in favour of the development of the more highly rewarded dominant learning style now find expression in the form of new career interests, changes in life style and/or new innovation and creativity in one's chosen career.

Through these three stages growth proceeds from a state of embeddedness, defensiveness, dependency and reaction to a state of self-actualization, independence, pro-action and self-direction. This process is marked by increasing complexity and relativism in dealing with the world and one's experiences and by higher-level integrations of the dialectic conflicts between the four primary adaptive modes—Concrete Experience, Reflective Observation, Abstract Conceptualization and Active Experimentation. With each of these four modes a major dimension of personal growth is associated. Development in the Concrete Experience adaptive mode is characterized by increases in *Affective Complexity*. Development in the Reflective Observation mode is characterized by increases in *Perceptual Complexity*. Development in the Abstract Conceptualization and Active Experimentation modes are characterized respectively by increases in *Symbolic Complexity* and *Behavioural Complexity*.

In the early stages of development, progress along one of these four dimensions can occur with relative independence from the others. The child and young adult, for example, can develop highly sophisticated symbolic proficiencies and remain naive emotionally. At the highest stages of development however the adaptive commitment to learning and creativity produces a strong need for integration of the four adaptive modes. Development in one mode

precipitates development in the others. Increases in symbolic complexity for example refine and sharpen both perceptual and behavioural possibilities. Thus complexity and the integration of dialectic conflicts among the adaptive modes are the hallmarks of true creativity and growth. Albert Einstein in his personal account of his own development illustrates well the dialectic nature of the states of adaptive functioning in scientific inquiry.

'For me it is not dubious that our thinking goes on for the most part without use of signs (words) and beyond that to a considerable degree unconsciously. For how, otherwise should it happen that sometimes we "wonder" quite spontaneously about some experience? This "wondering" seems to occur when an experience comes into conflict with a world of concepts which is already sufficiently fixed in us. Whenever such a conflict is experienced hard and intensively it reacts back upon our thought world in a decisive way. The development of this thought world is in a certain sense a continuous flight from "wonder" ...'

'I see on the one side the totality of sense experiences and, on the other, the totality of the concepts and propositions which are laid down in books. The relations between the concepts and propositions among themselves and each other are of a logical nature, and the business of logical thinking is strictly limited to the achievement of the connection between concepts and propositions among each other according to firmly laid down rules, which are the concern of logic. The concepts and propositions get "meaning", viz. "content", only through their connection with sense-experiences. The connection of the latter with the former is purely intuitive, not itself of a logical nature. The degree of certainty with which this relation, viz., intuitive connection, can be undertaken, and nothing else, differentiates empty phantasy from scientific "truth".' (Schilpp, 1949.) (From *Albert Einstein—Philosopher Scientist*, by permission of Open Court Publishing Co.)

Figure 3 graphically illustrates the experiential learning model of growth and development as it has been outlined thus far. The four dimensions of growth are depicted in the shape of a cone the base of which represents the lower stages of development and the apex of which represents the peak of development—representing the fact that the four dimensions become more highly integrated at higher stages of development. Any individual learning style would be represented on this cone by four data points on the four vertical dimensions of development. Thus a converger in developmental stage two (specialization) would be characterized by high complexity in the symbolic and behavioural modes and lower complexity in the affective and perceptual modes. As he moved into stage three of development his complexity scores in the affective and perceptual modes would increase. With this broad overview of the model let us now examine in more detail the processes of development in each of the three developmental stages.

While we have depicted the stages of the growth process in the form of a simple three layer cone, the actual process of growth in any single individual life history probably proceeds through successive oscillations from one stage to another. Thus a person may move from stage two to three in several separate sub-phases of integrative advances followed by consolidation or regression into specialization.

Stage one—Acquisition

We have found significant parallels between the experiential learning model

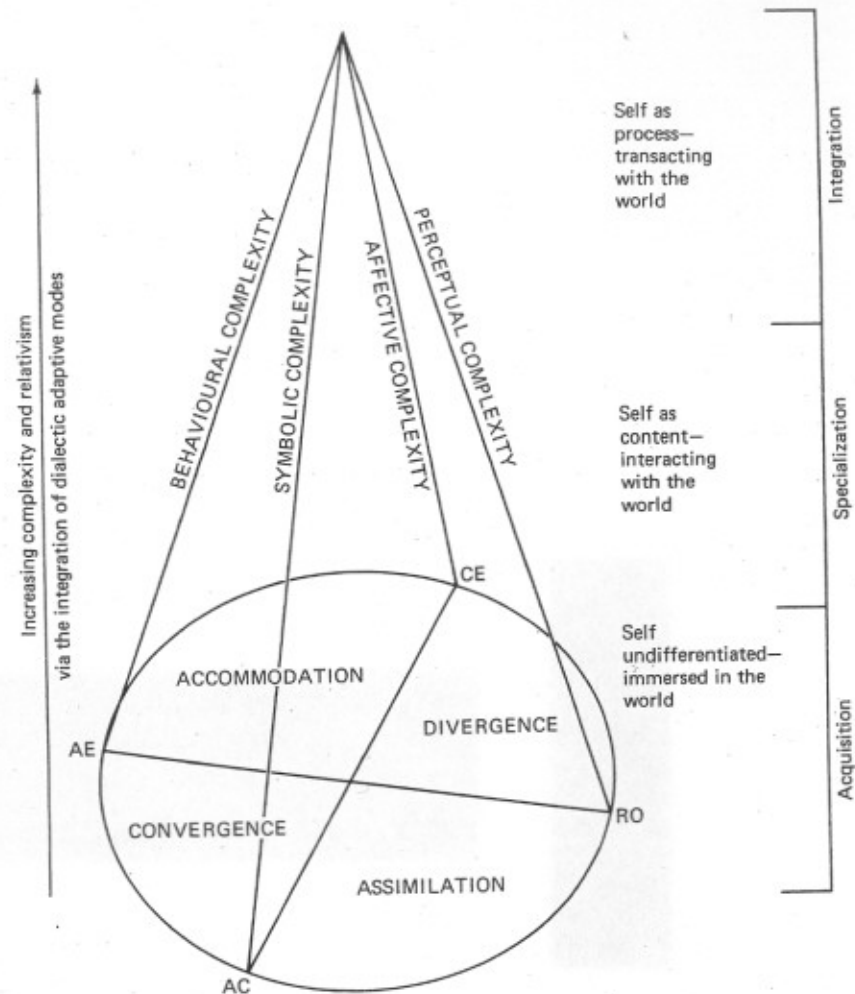


Figure 3. The experiential learning theory of growth and development

and the theory of learning implicit in Piaget's theory of cognitive development. By examining the characteristics of the stages of early cognitive development we can obtain a more complete picture of the acquisition stage of the experiential learning process. Piaget's work has identified four major stages of cognitive growth that occur from birth to about the age of 14–16. In the first stage (0–2 years) the child is predominantly concrete and active in his learning style. This stage is called the sensory-motor stage. Learning is predominantly *enactive* through feeling, touching and handling. Representation is based on action, e.g., 'a hole is to dig'. Perhaps the greatest accomplishment of this period is the development of goal-oriented behaviour. 'The sensory-motor period shows a remarkable evolution from non-intentional habits to experimental and ex-

ploratory activity which is obviously intentional or goal-oriented' (Flavell, 1963, p. 107). Yet the child has a few schemes or theories into which he can assimilate events and as a result his primary stance toward the world is accommodative. Environment plays a major role in shaping his ideas and intentions. Learning occurs primarily through the association between stimulus and response.

In the second stage (2–6 years) the child retains his concrete orientation but begins to develop a reflective orientation as he begins to internalize actions, converting them to images. This stage is called 'the representational stage'. Learning is now predominantly *ikonik* in nature, through the manipulation of observations and images. The child is now freed somewhat from his immersion in immediate experience, and as a result is free to play with and manipulate his images of the world. At this stage the child's primary stance toward the world is *divergent*. He is captivated with his ability to collect images and to view the world from different perspectives. Consider Bruner's description of the child at this stage:

'What appears next in the development is a great achievement. Images develop an autonomous status, they become great summarizers of action. By age three the child has become a paragon of sensory distractibility. He is victim of the laws of vividness, and his action pattern is a series of encounters with this bright thing which is then replaced by that chromatically splendid one, which in turn gives way to the next noisy one. And so it goes. Visual memory at this stage seems to be highly concrete and specific. What is intriguing about this period is that the child is a creature of the moment; the image of the moment is sufficient and it is controlled by a single feature of the situation. The child can reproduce things that were there before—in the form that was there before. He can reproduce a pattern of nine glasses laid out in rows and columns with diameter and height varying systematically. Indeed, he does it as well as a seven year-old. But he can only reproduce the order the way it was—with height increasing from left to right and diameter from top to bottom. The likeness of equivalent patterns (for instance, with diameter varying from left to right) is lost on the younger child. He can copy but not transpose.' (Bruner, 1966, p. 13.)

In the third stage (7–11 years) the intensive development of abstract symbolic powers begins. This first symbolic developmental stage Piaget calls the stage of concrete operations. Learning in this stage is governed by the logic of *classes and relations*. The child in this stage further increases his independence from his immediate experiential world through the development of inductive powers. 'The structure of concrete operations are' as Flavell (1963, p. 203) suggests, 'rather like parking lots whose individual parking spaces are now occupied and now empty; the spaces themselves endure, however, and leave their owner to look beyond the cars actually present towards potential, future occupants of the vacant and to-be-vacant spaces.' Thus, in contrast to the child in the sensory-motor stage whose learning style was basically accommodative the child at the stage of concrete operations is basically *assimilative* in his learning style. He begins to develop concepts and theories which select and give shape to his experiences.

Piaget's final stage of cognitive development comes with the onset of adolescence (12–15 years). In this stage the adolescent moves from symbolic

processes based on concrete operations to the symbolic processes of *representational logic*. He now returns to a more active orientation but it is an active orientation that is now modified by the development of the reflective and abstractive powers that preceded it. The symbolic powers he now possesses enable him to engage in hypothetical-deductive reasoning. He develops the possible implications of his theories and proceeds to experimentally test which of these are true. As such his basic learning style is *convergent* in contrast to the divergent orientation of the child in the representational stage.

'... formal thought is for Piaget not so much this or that specific behavior as it is a generalized *orientation*, sometimes explicit and sometimes implicit, towards problem-solving; an orientation towards organizing data (combinatorial analysis), towards isolation and control of variables, towards the hypothetical and towards logical justification and proof.' (Flavell, 1963, p. 211.)

From this brief summary of cognitive development theory we can see the outlines of those basic developmental processes which shape the basic learning process of adults. The essential accomplishments in this stage of development are the acquisition of basic cognitive structures and the emergence from immersion in one's experience where self and world are undifferentiated to a sense of self and self-control.

Stage two—specialization

Although the child in his early experiences in family and school may have already begun to develop specialized preferences and abilities in his learning style (cf. Hudson, 1966), in the later years of secondary school and beyond the individual begins to make choices which will significantly shape the course of his development. The choice of college vs trade apprenticeship, the choice of academic specialization, and even such cultural factors as the choice of where to live begin to selectively determine the socialization experiences the individual will have and thereby influence and shape his mode of adaptation to the world. The choices an individual makes in this process tend to have an accentuating, self-fulfilling quality that promotes specialization.

In the experiential learning theory of adult development stability and change in life paths are seen as resulting from the interaction between internal personality dynamics and external social forces in a manner much like that described by Super (Super *et al.*, 1963). The most powerful developmental dynamic that emerges from this interaction is the tendency for there to be a closer and closer match between self-characteristics and environmental demands. This match comes about in two ways—(1) environments tend to change personal characteristics to fit them, i.e. socialization, and (2) individuals tend to select themselves into environments that are consistent with their personal characteristics. Thus development in general tends to follow a path toward accentuation of personal characteristics and skills (Feldman and Newcomb, 1969; Kolb, 1973) in that development is a product of the interaction between choices and socialization experiences that match these choice dispositions such that resulting experiences

further reinforce the same choice disposition for later experience. Most adult life paths follow a cycle of job, educational and life style choices that build upon the experiences resulting from previous similar choices. Indeed the common stereotype of the successful career is a graded ladder of similar experiences on which one climbs to success and fulfillment.

Some examples from our research will serve to illustrate this process of specialization in learning style as a result of accentuation. In a first attempt to examine the details of this process, Plovnick (1971) studied a major university department using the concepts of convergence and divergence defined by Hudson (1966). He concluded that the major emphasis in physics education was on convergent learning. He predicted that physics students who had convergent learning styles would be content with their majors whereas physics majors who were divergent in their learning styles would be more uncertain of physics as a career and would take more courses outside of the physics department than their convergent colleagues. His predictions were confirmed. Those students who were not fitted for the convergent learning style required in physics tended to turn away from physics as a profession.

In another study currently in progress Plovnick (1974) is attempting to identify a correspondence between the learning style of medical students and their choices for career specialization. In addition he is attempting to identify relationships between learning styles and the process these students go through in making these choices. Initial data indicate that the different medical career paths (e.g. academic medicine, private practice, public health, etc.) attract people with different characteristic learning styles. Those that have styles that do not 'match' their chosen career path indicate great uncertainty about whether they will continue to pursue that path. Further, students with different styles seem to be utilizing different sources of information and influence in the career development process. For example, concrete students seem to do more 'identification' with attractive role models while abstract-reflective students are influenced more by course work. These 'choices' about sources of influence then act to accentuate the learning style that led to the choice, since courses are inclined to be more abstract/reflective while close personal relationships are inclined to reinforce a more concrete style.

In another unpublished study we examined the accentuation process as it operated at the molecular level of course choice. This research examined the choice of sensitivity training by MIT graduate students in management. When we tested the learning styles of students who chose an elective sensitivity training laboratory, we found that they tended to be more concrete (CE) and reflective (RO) than those who chose not to attend the lab. When these individuals with divergent learning styles completed the training sessions their scores became even more concrete and reflective, accentuating their disposition toward divergent learning experiences.

As part of a large survey of MIT seniors (Kolb and Goldman, 1973) we selected for intensive case study four university departments whose learning style demands matched the four dominant learning styles. The four departments

chosen and their learning style demand as measured by several criteria were Mechanical Engineering = Accommodator, Humanities = Diverger, Mathematics = Assimilator and Economics = Converger.

To study the career choices of the students in the four departments each student's LSI scores were used to position him on the LSI grid with a notation of the career field he has chosen to pursue after graduation. If the student was planning to attend graduate school his career field was circled. If the accentuation process were operating in the career choices of the students we should find that those students who fall in the same quadrant as the norms of their academic major should be more likely to pursue careers and graduate training directly related to that major while students with learning styles that differ from their discipline norms should be more inclined to pursue other careers and not attend graduate school in their discipline. We can illustrate this pattern by examining students in the mathematics department (Figure 4). Ten of the thirteen mathematics students (80%) whose learning styles were congruent with departmental norms chose careers and graduate training in mathematics. Only two of the thirteen students (15%) whose learning styles are not congruent plan both careers and graduate training in math (these differences are significant using the Fisher Exact Test $p < .01$). Similar patterns occurred in the other three departments.

To further test the accentuation process in the four departments we examined whether the student's choice/experience career development cycle indeed operated as an accentuating positive feedback loop. If this were so then those students whose learning style dispositions matched and were reinforced by their discipline demands should show a greater commitment to their choice of future career field than those whose learning styles were not reinforced by their experiences in their discipline. As part of a questionnaire students were asked to rate how important it was for them to pursue their chosen career field. In all four departments the average importance rating was higher for the students with a match between learning style and discipline norms (the differences being statistically significant in the mechanical engineering and economics departments). Thus it seems that learning experiences that reinforce learning style dispositions tend to produce greater commitment in career choices than those learning experiences that do not reinforce learning style dispositions.

From the above research we draw two main conclusions. First the experiential learning typology seems to provide a useful grid for mapping individual differences in learning style and for mapping corresponding differences in the environmental demands of different career paths. As such it is a potentially powerful tool for describing the differentiated paths of adult development. Secondly, the above data present enticing if not definitive evidence that early career choices tend to follow a path toward accentuation of one's learning style. Learning experiences congruent with learning styles tend to positively influence the choice of future learning and work experiences that reinforce that particular learning style. On the other hand, those students who find a

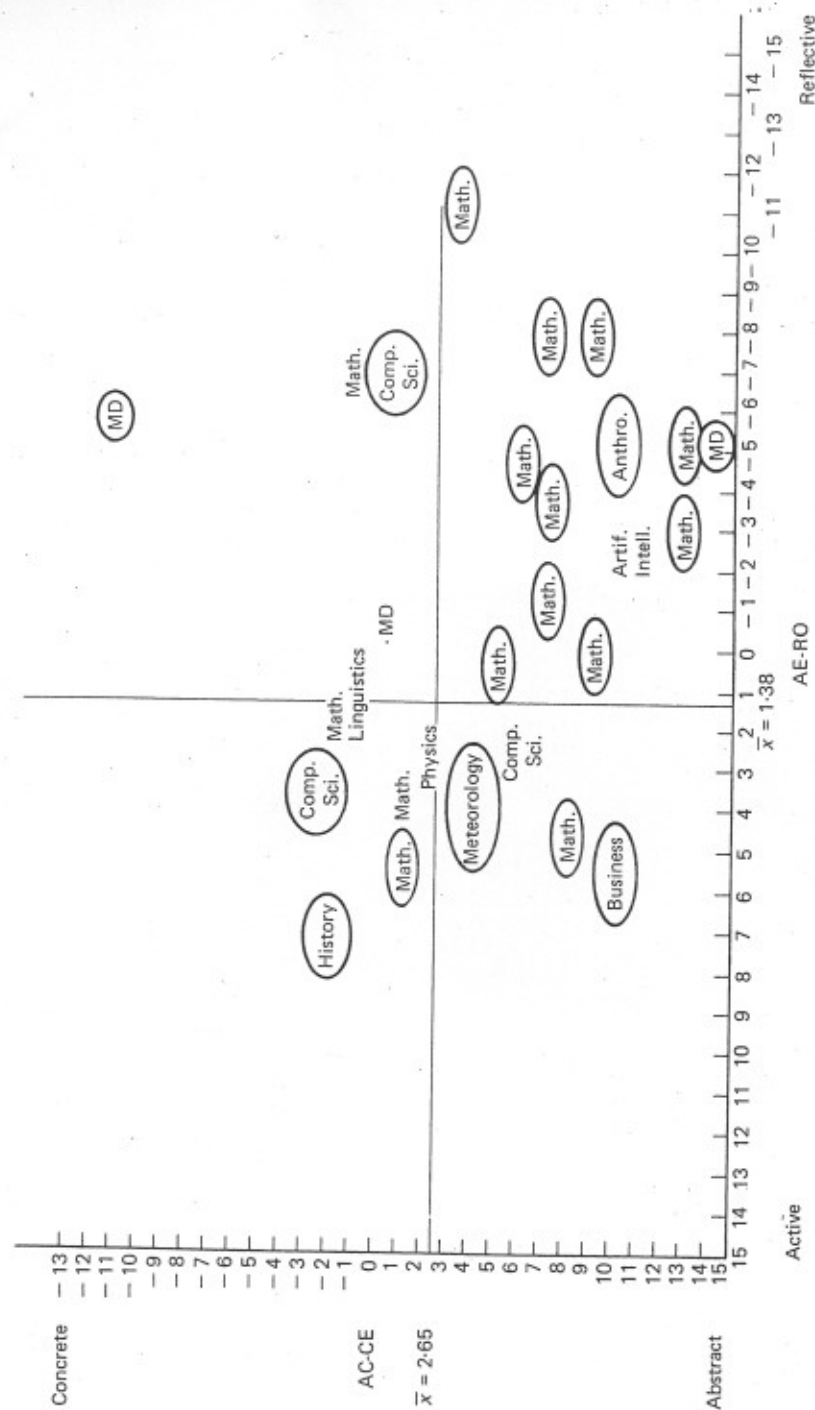


Figure 4. Career field and graduate school plans for Mathematics majors as a function of their learning style

learning environment incongruent with their learning style tend to move away from that kind of environment in future learning and work choices. The research to date suggests that accentuation is the most powerful force in early adult development. The primary reason for the strength of the accentuation forces in early career seems to stem from identity pressures to choose a job and a career. Fulfilment needs seem to be second priority at this time.

Thus in the second stage of development the individual achieves a sense of identity through the acquisition of a specialized adaptive competence in dealing with the demands of his chosen 'career'. His sense of self-worth is based on the rewards and recognition he receives for doing his 'work' well. The self in this stage is defined primarily in terms of *content*; things I can do, experiences I have had, goods and qualities I possess. The primary mode of relating to the world is *interaction*—I act on the world (build the bridge, raise the family) and the world acts on me (pays me money, fills me with bits of knowledge) but neither is fundamentally changed by the other. The radical educator Paulo Freire describes this stage-two sense of self and the 'banking' concept of education which he feels serves to prevent development beyond stage two:

'Implicit in the banking concept is the assumption of a dichotomy between man and the world: man is merely *in* the world, not *with* the world or with others; man is spectator, not re-creator. In this view, man is not a conscious being; he is rather the possessor of a consciousness; an empty "mind" passively open to the reception of deposits of reality from the world outside

It follows logically from the banking notion of consciousness that the educators role is to regulate the way the world "enters into" the students. His task is to organize a process which already occurs spontaneously, to "fill" the students by making deposits of information which he considers to constitute true knowledge. And since men "receive" the world as passive entities, education should make them more passive still, and adapt them to the world. The educated man is the adapted man, because he is better "fit" for the world.' (Freire, 1974.)

Stage three—integration

Paulo Freire's sense of frustration and pessimism about the destructive effects that societies, socializing institutions have on personal fulfilment has been a continuing theme of Western thought, particularly since the Enlightenment. The transition from stage two to stage three of development is marked by the individual's personal, existential confrontation of this conflict.

In 1826 the German poet and historian, Friedrich Schiller wrote:

'When the commonwealth makes the office or function the measure of the man, when of its citizens it does homage only to the memory in one, to a tabulating intelligence in another, and to a mechanical capacity in a third; when here, regardless of character, it urges only towards knowledge while there it encourages a spirit of order and law-abiding behavior with the profoundest intellectual obscurantism—when, at the same time, it wishes these single accomplishments of the subject to be carried to just as great an intensity as it absolves him of extensivity—is it to be wondered at that the remaining faculties of the mind are neglected, in order to bestow every care upon the special one which it honours and rewards?' (Schiller, 1826.)

Later, Freud and his followers in psychoanalysis developed the socio-emo-

tional dimensions of this conflict between individual and society—libidinous instincts clashing with repressive social demands. In modern organization theory this conflict has been most clearly articulated by Argyris (1962).

Yet it is Carl Jung in his theory of psychological types, whose formulation of this conflict and the dimensions of its resolution have the most meaning for the experiential learning theory of development. The Jungian theory of types, like the experiential learning model, is based on a dialectic model of adaptation to the world. Fulfilment, or individuation as Jung calls it, is accomplished by higher-level integration and expression of non-dominant modes of dealing with the world. This drive for fulfilment, however, is thwarted by the needs of civilization. Commenting on the passage by Schiller cited earlier Jung says:

'The favouritism of the superior function is just as serviceable to society as it is prejudicial to the individuality. This prejudicial effect has reached such a pitch that the great organizations of our present day civilization actually strive for the complete disintegration of the individual, since their very existence depends upon a mechanical application of the preferred individual functions of men. It is not man that counts but his one differentiated function. Man no longer appears as man in collective civilization: he is merely represented by a function—nay, further, he is even exclusively identified with this function and denied any responsible membership to the other inferior functions. Thus, the modern individual sinks to the level of a mere function, because this it is that represents a collective value and alone affords a possibility of livelihood. But as Schiller clearly discerns, differentiation of function could have come about in no other way: "There was no other means to develop man's manifold capacities than to set them one against the other. This antagonism of human qualities is the great instrument of culture; it is only the instrument, however, for so long as it endures man is only upon the way to culture".' (Jung, 1923.)

It is the personal experience of this conflict between social demands and personal fulfilment and the corresponding recognition of self-as-object that precipitates the individual's transition into the integrative stage of development. The experience can develop as a gradual process of awakening that parallels specialized development in stage two or it can occur dramatically as a result of a life crisis such as divorce or losing one's job. Some may never have this experience, so immersed are they in the societal reward system for performing their differentiated specialized function.

With this new awareness the individual experiences a shift in the frame of reference he uses to experience life, evaluate activities and make choices. The nature of this shift depends upon the specifics of the individual's dominant and non-expressed adaptive modes. For the reflective person the awakening of the active mode brings a new sense of risk to his life. Rather than being influenced he now sees opportunities to influence. He can shape his own experience rather than observing and accepting experiences as they happen to him. For the person who has specialized in the active mode the emergence of his reflective side broadens his range of choice and deepens his ability to sense implications of his actions. For the specialist in the concrete mode the abstract perspective gives new continuity and direction to his experience. The abstract specialist with his new sense of immediate experience finds new life and meaning in his constructions of reality.

The net effect of these shifts in perspective is an increasing experience of self as process. A learning process that has previously been blocked by the repression of the non-specialized adaptive modes is now experienced deeply to be the essence of self. Carl Rogers in his description of the peak of human functioning describes this state as well as anyone:

'There is a growing and continuing sense of acceptant ownership of these changing feelings, a basic trust in his own process. Experiencing has lost almost completely its structure bound aspects and becomes process experiencing—that is, the situation is experienced and interpreted in its newness, not as the past. The self becomes increasingly simply the subjective and reflexive awareness of experiencing. The self is much less frequently a preceived object, and much more frequently something confidently felt in process. Personal constructs are tentatively reformulated, to be validated against further experience, but even then to be held loosely. Internal communication is clear, with feelings and symbols well matched, and fresh terms for new feelings. There is the experiencing of effective choice of new ways of being.' (Rogers, 1961.)

The key to this new sense of self-as-process lies in the re-establishment of the reciprocity between the dialectic modes of adaptation. Jung in his analysis of Schiller's work expresses it this way.

'...the idea of a "reciprocity" between the two instincts, a community of interest or symbiosis, as we should perhaps prefer to call it, in which the waste products of the one would be the supply of the other. Schiller himself says that "the reciprocity of the two instincts consists in this, that the effectiveness of the one both restricts and establishes the other, and that each in its own separate sphere can reach its highest manifestation only through the activity of the other."' (Jung, 1923.)

With this overview of the three stages of development we now turn to an analysis of the learning environments that shape the growth process.

Towards a new view of learning environments

In this section we want to share some of our notions about learning environments, particularly as they relate to experiential learning theory. These ideas come from our work in trying to relate learning to the environment and represent an initial statement of where we are now. Our efforts to understand and further develop learning theory will be fruitful if the results eventually affect the deliberate use of models (based on theory) to design and implement more effective learning situations. We must therefore consider the basic paradigm posed by Lewin: $B=f(P,E)$. Any theory of learning must deal with person-environment interactions in order to be useful. More exactly, environmental differences must be expressed in a form commensurate with individual differences so that meaningful statements about the consequences of person-environment interactions can be made. Our current objective is to understand how people with different learning styles react to and interact with which environmental factors and with what results.

As Dubin and Taveggia (1968) found in their summary of research on lecture methods vs discussion methods, nothing can be concluded regarding this level of environmental analysis (comparing educational approaches) except that

a given method was helpful to some students some of the time for some specific test. Unless we have a model of an environment that can be related to both inputs (different learning styles) and outputs (different learning goals) we can do little to understand or help shape effective learning situations. To have such an 'applied' model of environments, the three theoretical implications of experiential learning discussed so far in this chapter suggest the following:

- (1) 'Environment' must be more broadly defined than its current meaning—formal educational approaches—in the educational research literature.
- (2) Observable and controllable factors in the environment can be related to individual differences as expressed in behavioural learning styles.
- (3) To be 'commensurate', person–environment interaction must be related in the context of growth and development goals for the learner.

We turn first to the concept of environment. The broader view of learning as an adaptative process has great implications for what is viewed as an educational setting. Learning, in the adaptative sense, is central to all life settings. The experiential model described in Figure 1 is much akin to problem solving which occurs everyday and everywhere. Because of their unique task and environmental demands, for instance, most work groups develop characteristic ways of thinking and working together, different styles of decision making and different approaches to solving problems. In one study (Kolb, 1973), we found that the members of functional groups of an organization had different characteristic learning styles that seemed to match the environmental demands of that particular group. Marketing managers tended to have accommodative learning styles, engineers had convergent learning styles, personnel managers had divergent learning styles and those in research departments had assimilative learning styles. Thus there seem to be styles that are best suited to particular task demands. And the interaction between learning styles and environmental demands occurs *outside* the typical educational setting. Even within traditional educational systems, the notion of environment has typically been bounded by the classroom or a subject/course where the key factors are either methods (e.g. lecture vs discussion) or climate variables (e.g. teacher/leadership style, seating structure, grading/reward system). Yet most classroom or course experiences are but a fraction of a total experience involving many classes, many courses, many activities outside of classrooms and so on. A teacher who sees a group of students four hours per week for twenty weeks, along with four other teachers, has a different effect on his students than if he taught them alone, twenty hours per week for four straight weeks, even if his methods and classroom climate factors remained the same. In an accelerated management curriculum for Master's students where thirty students took six courses over ten weeks, Fry and Rubin (1972) found that factors external to the classroom/courses played a key role in changing student expectations and behaviour. Factors including peer group norms, informal study groups, orientation to the programme, and general feedback sessions to the entire programme staff had major impacts on students' ability to benefit from individual courses.

Having expanded our view of what constitutes a setting wherein learning takes place, the challenge is deciding *what* it is in the environment that we should look at. One needs to understand the environment in terms that relate to learning styles—the way learners behave in situations. The four styles described earlier have been useful in distinguishing some features of the environment. A survey of over one hundred students who had completed an introductory, experientially oriented course in human factors in management at the M.I.T. Sloan School of Management indicated some trends such as the following: Accommodators found the classroom sessions most helpful (contributed most to their learning from the course) because of its lack of structure, high amount of peer-interaction, and lack of any authority figure; Assimilators least preferred the course in general because of the classroom emphasis but did find those activities requiring some conformity to directions or rules helpful as well as assigned readings and theory inputs; Divergers reported the open-ended, unstructured homework papers and self-diagnostic activities to be helpful and least preferred peer interactions in class and course requirements (e.g. number of required papers, deadlines); Convergers found instructor/expert inputs and reading linking classroom activities to the 'real world' helpful and least preferred open-ended peer discussions and group autonomy. Although far from conclusive or generalizable about person–environment interactions, this data points to the need for a more specific, micro-level analysis of environmental factors. It would not have sufficed in this case to have asked students to evaluate the 'seminar format' or the 'experiential mode' of teaching. At this level of environmental analysis, most everyone liked it, but for different reasons. Divergers liked the opportunity to watch and learn from it; Convergers liked the discussions relating it to the business world; Accommodators preferred the interactive, autonomous nature of the sessions; and Assimilators liked the role plays. Similarly in other surveys, we have found that although both Divergers and Assimilators prefer lectures, it is probably for different reasons. Both are comfortable in more passive, reflective situations but Divergers seem to be reacting most to the lecturer as a person (they also prefer faculty conferences, talks by experts and faculty feedback on papers) while the Assimilators seem to be reacting to the presence of an authority figure *per se* (they also prefer assigned readings, exams and being given a task). The fact that such data is highly interpretive only convinces us that superficial definition of environmental factors is meaningless. There needs to be a systematic exploration of how learners see situations. It is not enough to know that a lecture or lecturer was helpful or not. We need to know why. Only then can we begin to understand the person–environment interface.

Our interpretation of data like the above has led to a tentative typology of environments in terms of the personal growth dimensions discussed earlier: affective complexity, perceptual complexity, symbolic complexity and behavioural complexity. The kinds of environmental factors we now believe to be key in differentiating learning styles and stimulating growth within these styles are indicated by the following:

- (1) *Affectively complex* environments are characterized by:
 - (a) focus on here-and-now experiences,
 - (b) legitimization of expression of feelings and emotions,
 - (c) situations structured to allow ambiguity,
 - (d) high degree of personalization.
- (2) *Perceptually complex* environments are characterized by:
 - (a) opportunities to view subject matter from different perspectives,
 - (b) time to reflect and roles (e.g. listener, observer) which allow reflection,
 - (c) complexity and multiplicity of observational frameworks.
- (3) *Symbolically complex* environments are characterized by:
 - (a) emphases on recall of concepts,
 - (b) thinking or acting governed by rules of logic and inference,
 - (c) situations structured to maximize certainty,
 - (d) authorities respected as caretakers of knowledge.
- (4) *Behaviourally complex* environments are characterized by:
 - (a) responsibility for setting own learning goals,
 - (b) opportunities for real risk taking,
 - (c) environmental responses contingent upon self-initiated action.

We are currently in the process of clarifying and elaborating upon this typology. We are using this model in one study, for example, to understand if and how the ability to design is learned in graduate schools of architecture. In order to design, it appears that one needs both convergent skills (e.g. deductive problems solving within constraints, solutions expressed in practical terms) and divergent skills (e.g. creative or inductive thinking, ability to envision larger entity or total 'gestalt' from a subpart). Given this, how do learners with either style acquire the other? What factors in these schools contribute to either type of skill development and for which type of learner? Are there events or structures that help convergers become more divergent (enable them to integrate) and vice versa? If our typology above is useful in answering these kinds of questions then we will have taken a major step towards understanding learner-environment interactions. To test its applicability we hope to find that learners with similar styles report similar environmental factors as preferable and that these trends correlate positively with preferred events in their educational settings, events that have been independently rated or typed using the above dimensions.

Knowing 'what' to be concerned with in the environment is still, however, insufficient to be able to deliberately design learning situations. For environmental factors to be 'commensurate' with learning styles one must also consider the 'for what' question. As Hunt (1974) points out, matching environments to learners can be done on the basis of a compensatory model or a preferential model. The growth and development implications of experiential learning discussed earlier add insight to the choice between these two models. If, for example, the goal were one that involved acquisition or further specialization of knowledge, skills or attitudes that required a particular learning style, then

one would try to design environments to match the preferences of that kind of learner. Most of the current research in educational environments seems to assume these goals (acquisition or specialization) because students are asked what they liked or preferred about a situation. We would speculate, for example, that a graduate school of mathematics would be designed to include those factors Assimilators 'like' because they have acquired that style as undergraduates and now want to specialize. If, on the other hand, the goal is to integrate styles by acquisition of less-preferred or least-dominant styles, then one must determine what factors are compensatory or needed to de-emphasize the preferred style of the learner and help him acquire new ways of learning. For example, Divergers who prefer open-ended, self-directed activities have reported needing time limits and constraints in order to learn more in a given situation where the goal was to apply and test ideas and theories they had already internalized. The point to be made here is that in addition to typical educator or employer goals in terms of desired knowledge, skill or attitude outcomes, the learner's growth and development needs must also be taken as goals. The distinction between what a learner likes, wants, needs or prefers now becomes very crucial in any effort to determine and measure environmental factors.

To summarize our model of learner-environment interaction, it is helpful to return to the previously mentioned study of an introductory, experientially based, master's-level course in human factors in management. The learning styles of the participants were predominately convergent and assimilative since most had come from engineering (e.g. chemical, aeronautical) or basic science backgrounds (physics, chemistry, mathematics). In relation to both their styles and the other courses they were taking (economics, statistics, marketing, finance) this course emphasized their non-dominant, less preferred learning skills. The course was centred around here-and-now experiences and reflective discussions in the classroom with minimal instructor leadership or conceptual input. It was thus an Affectively complex environment and varied at times from being Behaviourally complex in the class session to Perceptually complex in open-ended and introspective writing assignments. For the Convergers and Assimilators, this course had a compensatory goal to help them acquire new learning skills in order to learn and experience knowledge, skills and attitudes related to the course topic. For those who were Divergers or Accommodators, the course became more of a preferred learning situation wherein they could specialize and further develop learning styles they already had. The existence of these two goal models is born out by the fact that the Assimilators disliked the course in general and that those who took subsequent courses in organization behaviour tended to be Accommodators or Divergers.

Although the Assimilators (and some Convergers) least preferred the course, they did report that some degree of learning had taken place. Looking at the specific environmental factors they reported as contributing to their ability to learn gives us some insight into the integrative stage of learning growth and development. Some of the helpful factors included those events where there was a definite point of closure or summary, those situations where there were clear

rules to be adhered to (such as how they perceived role plays), written introductions and summaries to experiential sessions, and opportunities to conform to authority figures. These factors did not typify the general environment in the course but they did seem to make the Assimilators comfortable enough to get something from the course. This suggests that a certain degree of 'psychological safety' must be attained before a learner can acquire non-dominant skills and constructs (e.g. move to the integrative stage of growth). The factors that lead to such safety may not be universal, however, for all learners. What seems to have made Assimilators comfortable was similar to what Accommodators least preferred and would not be likely to learn from without some of their preferred environmental factors present.

Summary

We have sought in this chapter to more systematically elaborate the scientific and practical implications of the experiential learning model first formulated by Lewin and his colleagues. We have seen that the model, in addition to being a very practical tool for use in training design, has much wider applications. Chief among these is that it provides a framework for the integration of the cognitive and socio-emotional perspectives of the learning process. In the integration of these perspectives lies the possibility of a holistic approach to the learning process that recognizes both the emotional and intellectual components of the learning act. Experiential learning theory also allows for the recognition and description of individual differences in learning styles. These styles shape behaviour not only in traditional educational settings but shape an individual's basic mode of adaptation to the world about him.

Thirdly, the experiential learning theory of growth and development describes the life cycle of human development through the stage of acquisition of basic cognitive structures, the stage of specialization in dominant learning style and matching career path, and the stage of integration of non-dominant modes of dealing with the world. Finally, we have addressed some of the issues involved in the deliberate design of learning environments. In the end, the basic conflicts between man and his social institutions will only be resolved through scientific understanding of these socializing environments that shape human development and through the enlightened design and management of these environments.

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