DEVELOPING AND USING AN ELEMENTAL LEARNING CYCLE IN A CORPORATE TRAINING SETTING

THESIS

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ABSTRACT

The author of this thesis extracts from the literature an elemental learning cycle that is foundational to the process of adult learning, and then interlocks these learning cycles in a course design in order to achieve synthesis learning. The elemental learning cycle is based on the commonalties identified among the adult learning models of 11 early and recent theorists. The proposed elemental cycle has four phases, namely experience, reflection, conclusion or generalization, and application.

The concept of the elemental learning cycle was tested in a supervisor's training program within a large organization, using an action research methodology. The training program design used facilitated discussions and structured activities to integrate the learning cycles within and among the modular subject areas of a training course to achieve synthesis. The results indicate that participants did indeed achieve synthesis learning, with some possibly experiencing a degree of perspective transformation.

Where synthesis learning is the goal, this thesis recommends a course design that interlocks learning cycles to integrate learning into a comprehensive framework of understanding, rather than presenting compartmentalized modules of material. Training of instructors and trainee readiness are also important factors for success in achieving synthesis levels of learning.

ACKNOWLEDGEMENT

I wish to acknowledge and thank the following persons for their support and contributions to my learning journey:

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CHAPTER 1

INTRODUCTION

Organizational training is an arm of adult education that draws upon a wide array of theories and practical ideas. Underlying so many of the theories and so much of the training in this setting are learning models. Learning models provide visualizations intended to help theorists and practitioners understand better how adult learning occurs and, consequently, how learning events can better assist the adults to learn.

Most learning models offered by adult educators generally describe a cyclical process in which the learner's experience is given meaning through reflection and integration into what is already known, then a new meaning is formalized and applied. In these models, learning occurs through the sequential acquisition of discreet units of cognitive, psychomotor, or affective dimensions. Similarly, training design typically consists of a sequence of learning cycles that comprise the components of the full training picture. The learner achieves a complex understanding by synthesizing these discreet units into a larger conceptual framework. Modifying the training design to interlock the learning cycles can facilitate the linkages among the various units and thereby assist the learner in building a broader conceptual framework. In this study, I designed interlocking learning cycles into an organizational training program and investigated the usefulness of this interlocking design on learners' synthesis level learning.

Background to the Research

In organizational settings, adult education practitioners are often constrained by tight budgets and rigid time parameters. Additionally, organizational training programs are typically expected to produce useful knowledge and skills that are transferable to the

workplace. Organizational trainers are challenged to design courses that maximize the return on investment from both a learning and a performance perspective. Consequently, efficiency and effectiveness of design are significant factors in determining the success of organizational training.

I am a training officer in a large electricity generating utility. In 1997, the company introduced a restructuring and recovery plan to correct its declining performance. The quality of supervision had been identified as a contributing factor to poor performance; thus, the role of the supervisor was redefined to include increased accountabilities. My group, the Management Training Department, was responsible for designing and delivering a new training program for supervisors. Our challenge was to prepare a training program which could be used both to enhance the knowledge, skills, and attitudes of existing supervisors and to develop new supervisors.

The key elements of the training course were to provide an overall conceptual understanding of the supervisors' role, and to develop and strengthen the supervisors' skill level. Earlier training programs were designed to improve the trainees' ability to do specific supervisory tasks by teaching these skills in independent and unrelated modules. I recognized that, in this program, the learners were expected to have a broader picture of their role, and to understand the supervisors' importance to the organization, not simply to know how to execute disparate duties better; thus I saw the importance of helping them synthesize their learning into a larger conceptual framework. Through a collaborative process with my colleague, we refined the course so that the supervisors could easily transfer their learning to the workplace, and integrate new skills and practices into their

overall understanding of their supervisory role. These refined course objectives were aimed at the application and synthesis levels of Bloom's (1971) taxonomy.

As part of an organizational training program, the course was intended to sustain learning at these application and synthesis levels. In order to accomplish this, I, along with my colleague, built in deliberate linkages among the various learning cycles within and among the course modules to synthesize their learning into a larger whole. I realize that this process might be of interest to other organizational development educators. Thus, I decided to explicitly study the design parameters and outcomes.

The Focus of Inquiry

The main issue for this study was how to design training so as to achieve learning synthesis efficiently, and then to determine whether the training transferred to the workplace effectively. Synthesis level learning requires the learner to integrate various ideas, skills, and attitudes into an integrated comprehensive understanding of the subject area. This study focused on whether the methods used encouraged synthesis learning during a training program for supervisors. The primary design strategy employed was to interlock the learning cycles within and among individual modules in ways that integrated learning. The results and conclusions of the study are intended to contribute to the knowledge of adult educators, and to help them identify guidelines for good practice.

The Purpose

The basic question posed in the study was whether interlocking learning cycles contributes to synthesis learning, and whether this design strategy promotes transfer of learning to the workplace. In order to demonstrate how synthesis level learning can be implemented and evaluated, the course lesson plan identified how modular subject areas

could be linked during the presentation of the course so as to help facilitate a holistic understanding of the supervisor's position. The course was evaluated by monitoring trainees' input to discussions and assessing their individual and group work. Post-course questionnaires and interviews evaluated the transfer of learning to the workplace. An action research methodology was used to conduct this study. As my colleague and I analyzed successive deliveries of the course, we noted any problems or deficiencies and implemented strategies to correct them.

Scope and Limitations of the Study

The study is in the area of applying learning theory to organizational development; its aspect is on program design. The context for the study was a supervisory skills development course for first level management supervisors at a province-wide electricity generating utility with 17,000 employees. The study involved the design of a complex two-week training program that was delivered approximately 40 times over 2½ years. The course consisted of 19 modules, ranging from 2 to 10 hours in length. The entire study included about 1200 trainees, (of whom approximately 1125 were already functioning as supervisors and approximately 75 were newly designated supervisors), 100 senior managers as mentors, and 12 instructors (including me). In particular, the study examined the usefulness of the training design for achieving synthesis level learning. To that end, only reflective or experiential learning was examined. Learning defined as rote, memorization, or behaviour modification is outside the scope of the study.

Two or three, but not always the same, senior level managers from the three major production sites and head office were present for every course delivery. They attended for

the full 2 weeks of the course. As mentors, they provided a senior management perspective to the class and one-on-one advice and encouragement to individual trainees.

The study employed an action research methodology to assess the usefulness of interlocking learning cycles. Initially, my colleague and I reviewed the data gathered from the pilot delivery to identify problems or deficiencies. Based on this analysis, we initiated changes to improve the design and better achieve synthesis learning. Following the implementation of a change, subsequent course deliveries were monitored to assess the effectiveness of the improvement. Through this iterative process we shaped and improved the design.

Merriam and Simpson (1995) point out that because action research "lacks external and internal controls, generalizability of results are limited to the specific circumstances and conditions in which the research was done" (p. 125). In this study, the conclusions are further limited because the design strategy was tested in only one course. However, during the study period, the single course was delivered 40 times using different pairs of training instructors from a total pool of 12 in our training team. This has permitted observations of different instructor pairs and an opportunity to observe patterns within the delivery results. Consequently, it is possible to draw some general conclusions from this project and to identify particular factors that influenced the effectiveness of the design. These are offered as illustrations of what was achieved in this setting to those who may be conducting similar work.

The course design incorporated the concept of interlocking learning cycles. Of the 40 course deliveries, I led 12, taught portions of 15 others, had extensive dialogue with the instructors of the other courses, and carefully examined all of the evaluation

feedback. This increases the confidence level in the theories and conclusions that I draw from the data.

During each of the forty course deliveries, 3 instructional modules were presented by internal subject matter experts, and 2 instructional modules were presented by external subject matter experts. In-house instructors presented the remaining modules. Generally, the same subject matter experts presented at all 40 course deliveries, whereas the in-house instructors varied. Although, as designers, we provided the learning objectives and approved the lesson plans for the modules delivered by the experts, it was somewhat difficult to manage their presentations because they sometimes worked from their personal experience and frame of reference. For example, as most of the experts were not familiar with the total course, they often failed to make linkages to other subject modules. Thus, although the study looks at the course as a whole, it primarily focuses on the 14 modules designed and delivered by the in-house instructor team.

The results of the training were evaluated at the reaction, learning, and behaviour levels (Kirkpatrick, 1998). However, the evaluation did not explore the impact of delays in transfer of learning to the workplace as a result of delays in the restructuring and recovery program.

Assumptions

In this study, I assumed that synthesis learning can be measured by observing the extent to which concepts from one subject module are applied within another subject module. I also assumed that synthesis learning can be promoted through interlocking learning cycles. To that end, as course designers, my colleague and I accepted a cyclical model as the best expression of how adults learn at the synthesis level. Critical reflection

on my reading in the St. Francis Xavier University masters program and discussions with my advisor led me to conclude that interlocking the learning cycles within and among subject modules would integrate the individual units of learning into the more holistic picture required for synthesis learning. While acknowledging that individuals can memorize facts and data, I also assumed that higher level learning requires reflection on, and assimilation of, concepts and data.

The use of action research was accepted as a valid method of approaching the question, since the study focused on qualitative rather than quantitative results. Imbedded in this choice was also the assumption that the instructor team would be sufficiently consistent in their deliveries and skills that the successive deliveries of the course could be compared. While recognizing the research limitations of the action research, I assumed that the repeated course deliveries and the sample size enhanced the validity of the findings. Such assumptions are consistent with the qualitative research recommendations of Guba and Lincoln (1988).

Definitions of Terms

A number of terms and abbreviations have specific meaning in the context of this paper. Their definitions are as follows:

Learning is part of an ongoing debate in the field of adult education. Jarvis (1990) provides five definitions of learning. His first two define learning as behaviour changes resulting from experience or practice. The third defines learning as "the process whereby *knowledge* is created through the transformation of *experience*" (p. 196), and the fourth describes learning as the "processes of transforming *experience* into *knowledge*, *skills*, and *attitudes*" (p.196). His fifth definition is memorization. This study explores the

process of learning described in Jarvis' third and fourth definitions, focusing particularly on "synthesis learning." It considers some of the subsequent behaviour changes, as described in Jarvis' first and second definitions. It does not consider memorization.

Performance Assessment is a comprehensive evaluation of the organization's operating and business performance relative to prescribed standards.

Supervisors comprise the lowest level of management for the organization; the other two levels are middle managers and senior managers. In this thesis, supervisor is also used to refer to those middle managers who took the course on which this study is based.

Perspective transformation is the process of becoming critically aware of the constraints of one's understandings, developing new perspectives, and acting upon these new perspective or understandings. In this course, trainees showed evidence of perspective transformation by adopting new management practices and paradigms into their thinking and action plans.

Requisite Organization refers to Jaques' (1996) model for organizational structure and management. In this model, the management hierarchy is rigidly divided into levels or strata based on the time horizon of the longest task for each position. Managers at all stratum levels are assigned the same set of managerial accountabilities. Only the scope of their accountabilities varies. Similarly, requisite management refers to a management system based on the managerial structure and practices defined in Requisite Organization.

Synthesis learning is learning that involves integrating component ideas into a complex whole. It is learning at the synthesis level of Bloom's (1971) cognitive

taxonomy. In this course, trainees demonstrated synthesis learning by integrating the concepts and vocabulary of one subject module into other subject areas and by making decisions and defining actions based on these integrated concepts.

Training self-assessment is an audit of a training course to determine if internal standards are being met.

Plan of Presentation

Following this introductory chapter, in Chapter 2 I review learning models in the literature, extract a cyclical process that is common to them all, and describe their similarities and differences. Implications of this cyclical learning process for training design, the practice of adult education, and organizational training are reviewed. In Chapter 3 I describe the study, including the course design and evaluation results. In Chapter 4 I discuss the major findings of the study and their implications for practitioners of adult education in the context of the adult education literature. I then draw conclusions and offer recommendations for practice and for further research.

CHAPTER 2

REVIEW OF THE LITERATURE

Learning is a common, lifelong, experience for adults, yet it possesses a complexity that has defied attempts to arrive at a unified, comprehensive theory of the adult learning process. Merriam and Caffarella (1991) explain that "there is no single theory of adult learning" (p. 248). They discuss attempts by authors such as Knowles, Cross, McClusky, Knox, Jarvis, Mezirow, and Friere, concluding that "no single theory fares well . . . [but] each has strengths and weaknesses" (p. 264). Consequently, adult education as a field of study lacks a single underlying theory. Nonetheless, many authors have attempted to describe the learning process and offered cyclical models to illustrate its mechanism. Taken together, these models show considerable similarity and seem to suggest an underlying, elemental cycle of learning, despite the various authors' different philosophical positions. These differing positions have contested most of the efforts to define a simple unifying theory. In this chapter I will review 11 of these models and explore their similarities and differences. I extract a common learning cycle that I observe among them all. Finally, I review literature that will illustrate the implications of this cyclical learning process to training design.

What Is Learning?

Before examining the descriptive models, it is helpful to consider what learning is. The Canadian Oxford Dictionary's (Barker, 1998) definition of the verb *learn* is "gain knowledge of or skill in by study, experience, or being taught; acquire or develop a particular ability" (p. 813). Reflecting a behaviourist orientation, Biehler and

Snowman's (1990) glossary definition of learning is a "more or less permanent change in behaviour as a result of experiences," (p. G4). Similarly, Gagné and Medsker (1996) state "learning is a relatively permanent change in human disposition or capability that is not attributable simply to processes of growth" (p. 6). These behaviourist definitions focus primarily on the result or end state of a unit of learning.

Understanding the *product* of the process, such as the increase in knowledge, the newly-acquired skill, ability, or value, -- what Mezirow (1991) might call a new meaning schema -- is necessary to fully understand learning. Some authors, (such as Gagné, Briggs, & Wager, 1992; Jarvis, 1987), accept a hierarchy of learning levels. At the lower end of this hierarchy some products of learning may be acquired by rote or at a pre-conscious level, whereby the process is simply a stimulus-response reaction. At the upper end of the learning hierarchy, the products are acquired only through complex processing and reflection.

Thomas (1991) describes learning as both a possession and as a process. He points out that the traditional view sees learning as achieving objectives or outcomes, then adds that the *process* of learning is "valuable in itself" (p. 3). This additional viewpoint illustrates the humanist philosophy at work. Vella (1995) notes that the process of learning can be deductive or inductive. She explains the difference in approach: "a deductive approach begins with theory and invites practice to prove the hypothesis that is the theory. An inductive approach begins with practice and evokes the theory as a hypothesis to explain the rationale in the practice" (p. 176). She describes both processes as effective and says she uses both approaches "interchangeably, constantly, and intentionally" (p. 176) in her own learning model.

Taking process further, other authors in the humanist tradition focus on the transformative nature of learning. MacKeracher (1996) points out "learning results in relatively permanent changes not only in meanings and behaviours but in the ways one goes about making meaning, thinking, making choices, acting, and ultimately making sense" (p. 6). A. Rogers (1996) adds volition by describing learning as "those more or less permanent changes brought about voluntarily in one's patterns of acting, thinking and/or feeling" (p. 77). Mezirow (1991) emphasizes interpretation and change in learning: "learning may be understood as the process of using a prior interpretation to construe a new or a revised interpretation of the meaning of one's experience in order to guide future action" (p.12), but "transformative learning results in new or transformed meaning schemes or, when reflection focuses on premises, transformed meaning perspectives" (p. 6).

It is important to distinguish between education and learning. Merriam and Brockett (1997) point out that "adult learning is a cognitive process internal to the learner . . . [that includes the] unplanned, incidental learning that is part of everyday life" (p. 6), whereas education is planned activities designed to produce learning, often at the upper end of the learning hierarchy. Thus, educational activities can lead to learning and the processes of education can lead to knowledge products or outcomes. It is the process of acquiring these knowledge products or outcomes that the experiential learning models seek to describe.

Descriptive Models of the Learning Cycle

Models of the learning cycle repeatedly describe the cyclical process that gives meaning to experience. It is the process of reflecting on new experiences and interpreting

these experiences in light of what is already known that gives them meaning. When experiences are given meaning, conclusions can be drawn, decisions can be taken, and actions can be pursued. Although theorists describe this process of learning differently, common elements are typically contained in the models they offer.

Dewey's Model

A number of early theorists in the fields of education and psychology laid the foundations upon which many of the later models were based. Dewey was one of these theorists, and his work has become an intellectual watershed in the study of learning and education. Dewey (1933) submits that information becomes "knowledge only as its material is comprehended" (p. 78). This he claims is "attained only when acquisition is accompanied by constant reflection upon the meaning of what is studied" (p. 79). He posits that "the function of reflective thought is, therefore, to transform a situation in which there is experienced obscurity, doubt, conflict, disturbance of some sort, into a situation that is clear, coherent, settled, harmonious" (pp.100-101). Dewey presents reflection in five phases: suggestion, intellectualization, hypothesis, reasoning, and testing by action. He argues that impulse must be followed by reflection to determine an action that has purpose and meaning.

Dewey describes learning as a cyclical process involving reflection and meaning formation. In addition, Dewey's (1938) model expands the learning process into a continuum of experiences that increase understanding and depth. He observes,

> Every experience enacted and undergone modifies the one who acts and undergoes, while this modification affects, whether we wish it or not, the quality of subsequent experiences. For it is a somewhat different person who enters into them ... From this point of view, the principle of continuity of experience means that every experience both takes up something from those which have gone before and modifies in some way the quality of those which come after." (p. 35)

Dewey notes that "the process [of learning] is a continuous spiral" (p. 79). This sense of spiraling is important; it emphasizes that the cycles do not simply repeat, each cycle is changed somewhat from the previous one.

Lewin's Model

Lewin (in Cartwright, 1951) draws on research and laboratory methods from the social sciences to describe the process of learning. Using an illustrative example, he shows how learning occurs when "a previously vague and unstructured area becomes cognitively structured and specific" (p. 71). His model of learning begins with a concrete experience. Through observation, the individual gathers more data and gives the experience meaning by establishing "new connections or separations, differentiations or dedifferentiations" (p. 74). The conclusions or assumptions are then tested to complete the learning cycle.

Piaget's Model

Piaget (1971) observes that researchers and theorists "regard knowledge as a process more than as a state" (p. 2). He also claims "all knowledge doubtless supposes an intervention of experience" (p. 28). From his study of cognitive development in children, Piaget identifies four major stages of cognitive growth from infancy to adulthood. Biehler and Snowman (1990) summarize the characteristics of Piaget's four stages: During the sensorimotor stage (birth to 2 years) meaning schemes are developed "primarily through sense and motor activities" (p. 63). In the preoperational stage (2 to 7 years) individuals gradually acquire "the ability to conserve and decenter, but [are] not capable of operations, and [are] unable to mentally reverse actions" (p. 63). The concrete operation stage (7 to 11 years) is characterized by the ability to "solve problems by generalizing

from concrete experiences" (p. 63). Individuals are now capable of concrete operations, but are "not able to manipulate conditions mentally unless they have been experienced" (p. 63). The final stage, formal operations, begins about age 11 when the individual can "deal with abstractions, form hypotheses, solve problems systematically, [and] engage in mental manipulations" (p. 63). The developmental stages, as defined by Piaget, progress from concrete to abstract, and from egocentric to reflective. As the individual ages, mental capability and complexity of operations increase, therefore, the maturation process leads to a capacity for abstraction and reflection through synthesis of activities and events.

Piaget (1971) claims that "the characteristic of intelligence is not to contemplate but to 'transform'" (p. 67). He describes learning as follows:

> A certain equilibrium between assimilation of objects to the subject's activity, and the accommodation of this activity to the objects . . . forms the point of departure of all knowledge and is presented at the very outset in the form of a complex relation between the subject and the objects, which simultaneously excludes any purely empirical or purely apriorist interpretation of the cognitive mechanism. (p. 108)

Piaget's stages of cognitive development describe the evolution of learning skills or learning capability. In his model, adults possess a maturation capability. At this level of maturity, they can sustain the continuum of experience leading to learning described by Dewey.

Kolb's Model

Reflecting Piaget's view that learning is more a process than a state, Kolb (1984) describes learning as "*the* major process of human adaptation" (p. 32). He emphasizes "learning is best conceived as a process, not in terms of outcomes" (p. 26). He argues that traditional education and behavioural theories define learning in terms of outcomes, "an

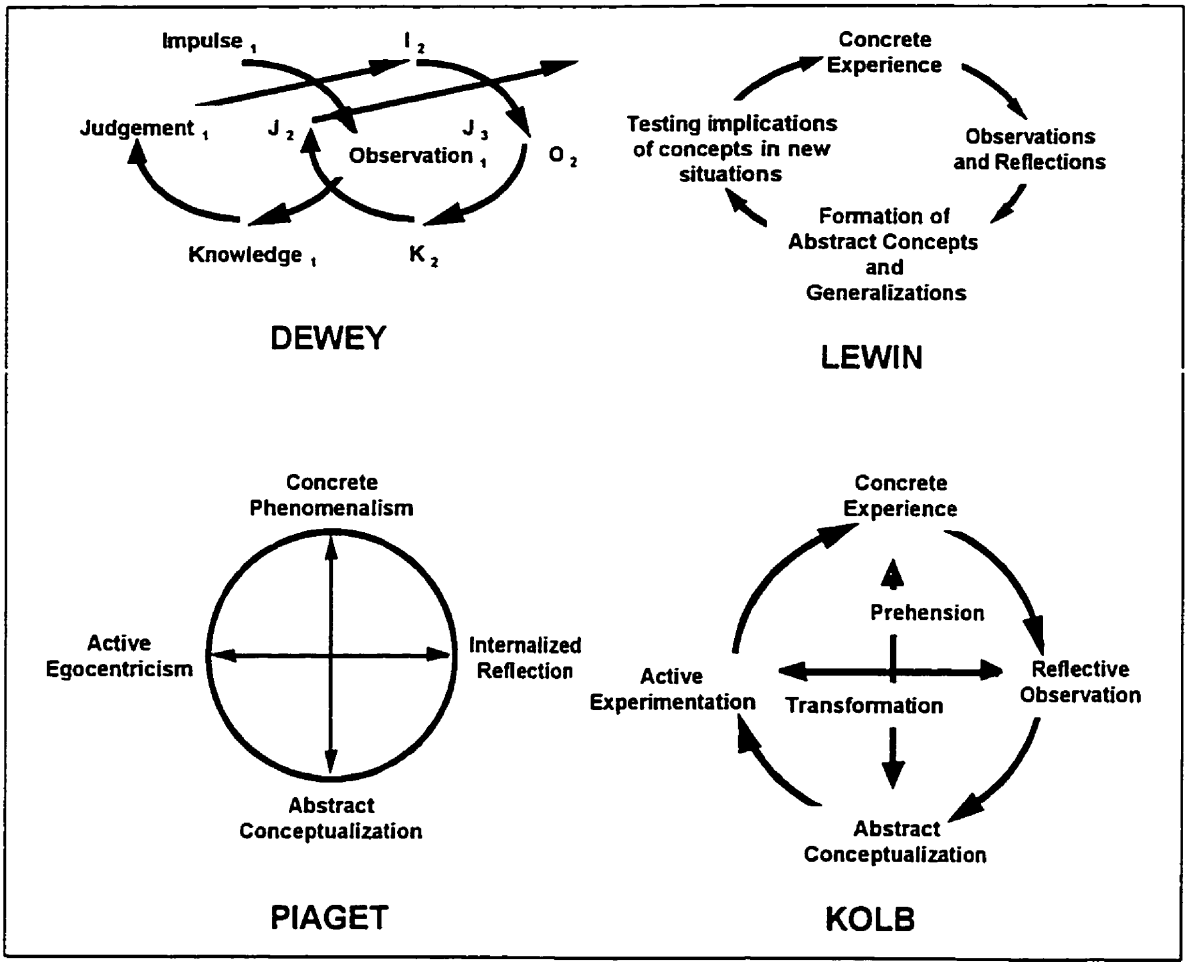

Figure 1: A comparison of the learning models of Dewey, Lewin, Piaget, and Kolb. Adapted from Kolb, D. A. (1984). Experiential learning: Experience as the source of learning and development. Englewood Cliffs, NJ: Prentice-Hall. (pp. 21, 23, 25, 42).

accumulated storehouse of facts or habits," whereas experiential learning theory assumes that "ideas are not fixed and immutable elements of thought but are formed and re-formed through experience" (p. 26). He suggests that "knowledge is continuously derived from and tested out in the experiences of the learner" (p. 27). He goes on to explain that "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" (p. 31).

Drawing on the strong foundations laid by Dewey and Lewin, Kolb (1984) describes learning as "the process whereby knowledge is created through the transformation of experience" (p. 38). This process, he claims, is "a four-stage cycle involving four adaptive learning modes -- concrete experience, reflective observation, abstract conceptualization and active experimentation" (p. 40). In essence, Kolb suggests that knowledge is created as experience and that experience is transformed by cycling it through this four-stage process. Underlying this four-stage cyclical process are two structural dimensions. Kolb summarizes the two structural dimensions of the model as follows:

> The first is a prehension dimension that includes two dialectically opposed modes of grasping experience, one via direct apprehension of immediate concrete experience, the other through indirect comprehension of symbolic representations of experience. The second is a transformation dimension, which includes two dialectically opposed modes of transforming experience, one via intentional reflection, the other via extensional action. (pp. 58-59)

Figure 1 shows Kolb's (1984) experiential learning model, complete with the structural dimensions that underlie the process. Kolb compared his model with the models put forth by Dewey, Lewin, and Piaget. In Figure 1, I combine and adapt Kolb's comparative schematics in order to emphasize the similarities and differences among the four models. The schematics illustrate an evolution from Dewey's three-phase to Lewin's four stage cycle to Piaget's underlying structure to Kolb's "holistic process of adaptation to the world" (p. 31). Kolb acknowledges the contribution of Piaget's underlying structure, whereby "the mutual interaction of the process of *accommodation* of concepts or schemas to experience in the world and the process of *assimilation* of events and experiences from the world into existing concepts and schemas" (p. 23), to his own model.

Hunt's Model

Based on his studies of student-student and student-teacher interactions, and using Kolb's experiential learning model, Hunt (1987) developed two models. The first is a mutual adaptation model for interpersonal communications. The model describes how Kolb's learning cycle can be used to map the interfacing of learning cycles as two individuals dialogue. This interface is displayed graphically in the top of Figure 2, using Kolb's descriptors. (Hunt renamed the phases feedback, perception, implicit theory and intention, and action, in order to express his interpretation of what is happening in each phase.) Essentially, the action of the one individual at the active experimentation phase provides feedback to the other individual, thus creating or modifying an experience for that other individual. In this model Hunt accepts the idea of learning as a continuous cyclical process of concrete experience, reflecting on experience, forming meaning, and applying it; Hunt's contribution is that the learning interaction between individuals follows essentially the same interactive exchange cycle.

In his second variation of Kolb's model, Hunt (1987) defines five steps, namely concern, reflect, analyze, try out, and experience. Hunt calls this model the C-RE-A-T-E cycle; it is also shown in the bottom of Figure 2. It reinforces the suggestion that learning is highly cyclical.

Hunt (1987) also describes the impact on learning when Kolb's model is truncated by omitting one of the four steps. He indicates that learners who truncate the model by omitting abstract conceptualization have difficulty giving meaning to their experiences and organizing their actions in a systematic manner. Those who omit active

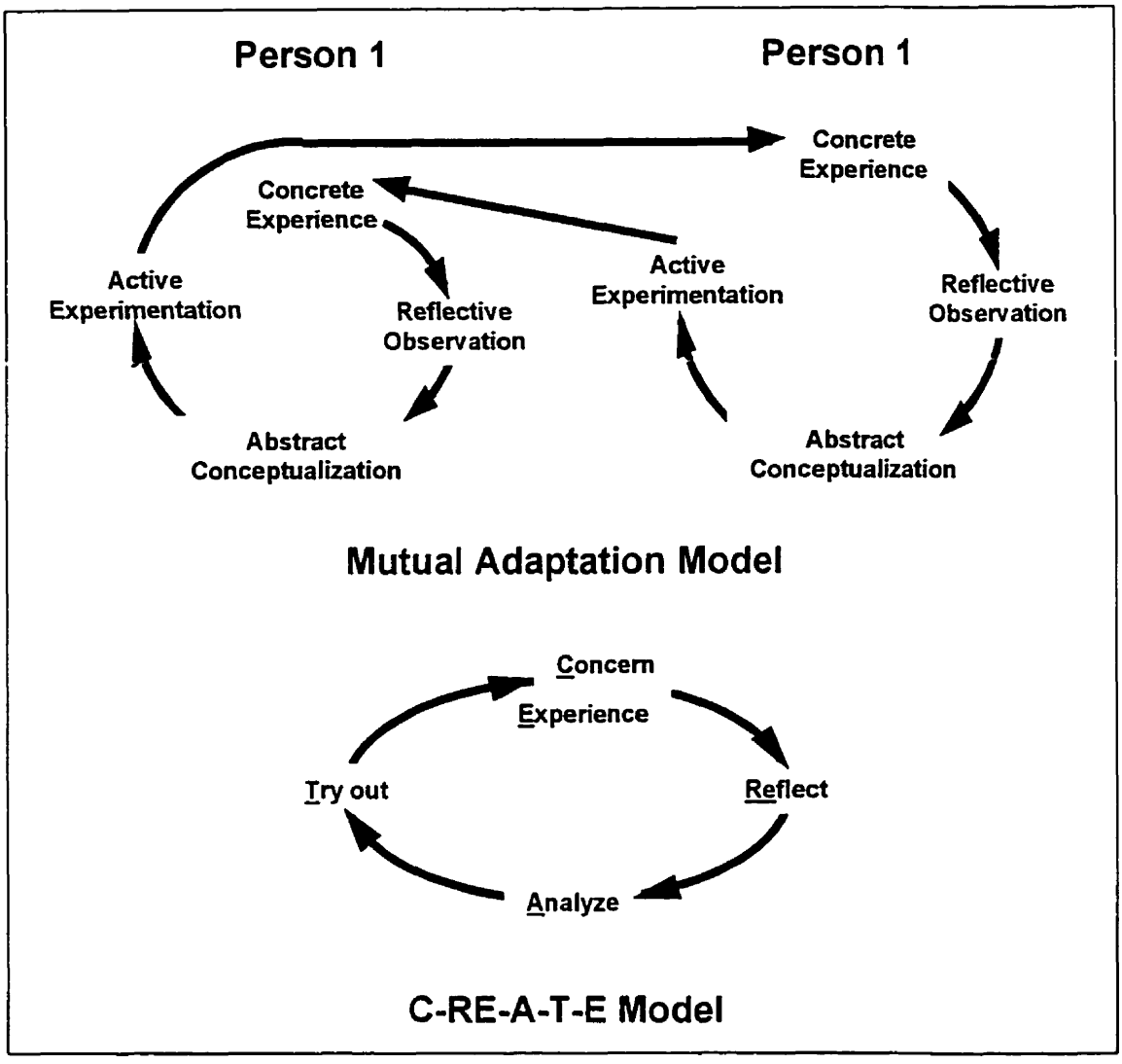

Figure 2: A comparison of Hunt's Mutual Adaptation and C-RE-A-T-E models. Adapted from Hunt, D. E. (1987). Beginning with ourselves: In practice, theory and human affairs. Toronto: OISE Press. (pp. 156-157).

experimentation are deprived of new experiences that trigger continual learning. They are responding to their feelings, not the results of actions. Omitting concrete experience means that the learner's response to actions is "mechanical and sterile" (p. 155). Finally, omitting reflective observation results in an unclear or underdeveloped conceptual framework. Hunt's analysis of these truncated learning patterns demonstrates how

learning can be abridged or incomplete, and emphasizes the importance of having uninterrupted learning cycles for effective learning to occur.

Taylor's Model

Most models of learning have resulted from *educators'* observations of learners. Taylor (1987) studied the learning process from the perspective of the *learner*. She interviewed students as they progressed through a 13-week self-directed graduate course, and identified a cyclical process with four phases and four transitions in her research.

According to Taylor's model, when an individual experiences a major discrepancy between expectations and experience, equilibrium is broken and the individual enters a period of disorientation (See Figure 3 top). During the disorientation phase, people experience a crisis of confidence and withdraw from those associated with the confusion. Naming the problem without attributing any blame permits a transition to the exploration phase to occur. The "intuitively-guided, collaborative, and open-minded exploration" (p. 183) of this phase initiates a reflective review that provides a transition into the reorientation phase. From the reorientation phase, individuals move through a "sharing the discovery" transition as they test their new understanding with others, and finally return to equilibrium. In the equilibrium phase, their "new perspective and approach is elaborated, refined and applied" (p. 183). Individuals remain in the equilibrium phase until a new discrepancy triggers a disconfirmation, and the cycle repeats.

Taylor's model differs from earlier models in that her model infers something about the impact of the learning process on the individual. Her use of terms like disorientation, reorientation, equilibrium, and disconfirmation to describe phases of the

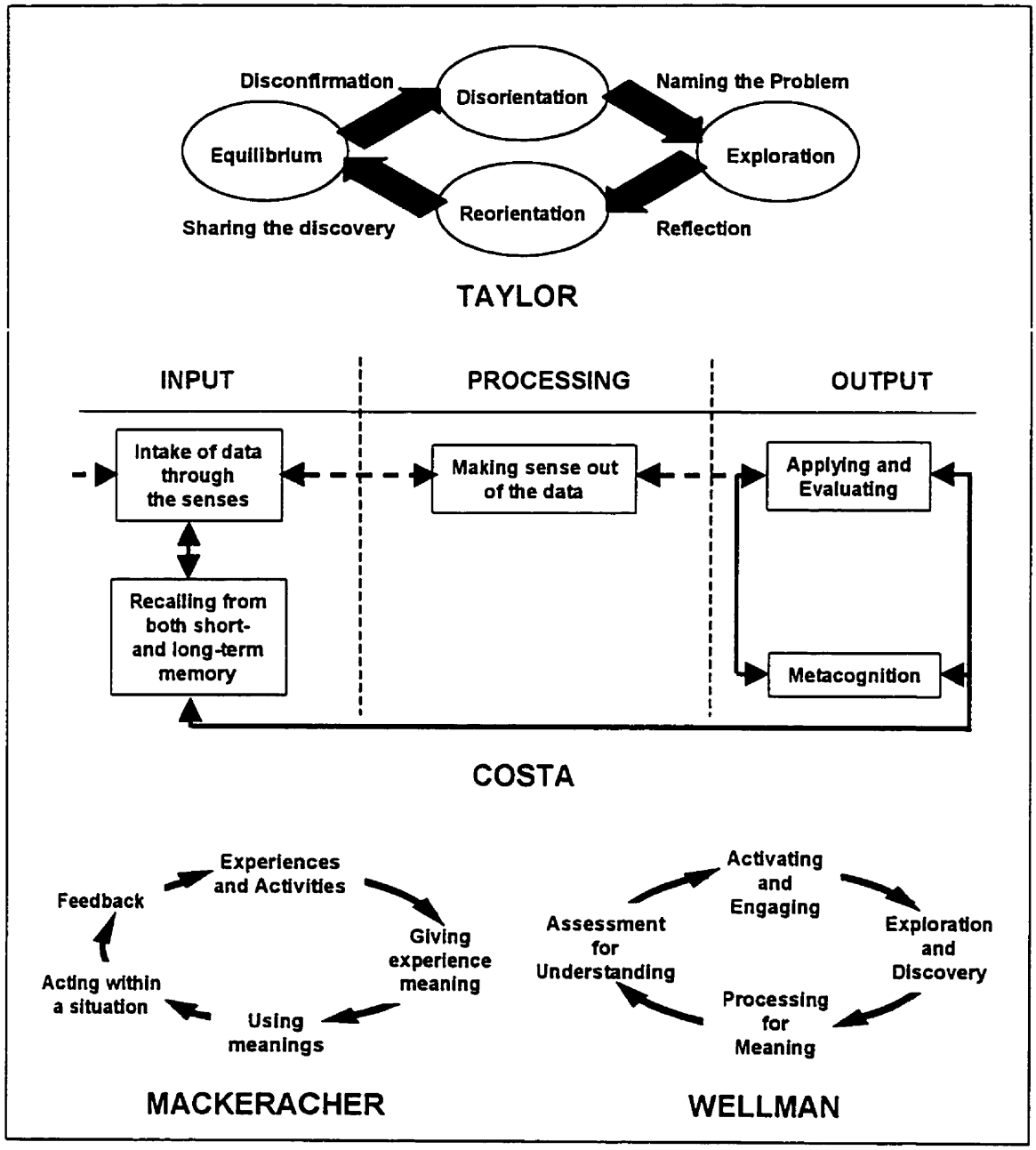

Figure 3: A comparison of the learning models of Taylor, Costa, MacKeracher, and Wellman. Adapted from Taylor, M. (1987). Self-directed learning: More than meets the observer's eye. In D. Boud, & V. Griffin (Eds.), Appreciating adults learning: From the learner's perspective (pp.179-196). London: Kogan Page. (p. 184); Costa, A. L. (Ed.). (1991). Developing minds: A resource book for teaching thinking (Rev. ed., Vol. 1). Alexandria, VA: Association for Supervision and Curriculum Development. (1991, p. 139); MacKeracher, D. (1996). Making sense of adult education. Toronto: Culture Concepts. (p. 11); and Wellman, B. (1991). Making science learning more science-like. In A. L.Costa (Ed.), Developing minds: A resource book for teaching thinking (Rev. ed. Vol. 1, pp. 159-163). Alexandria, VA: Association for Supervision and Curriculum Development. (p. 162).

cycle imply an emotional as well as an intellectual response. Accepting Kolb's (1984) view that learning is "*the* major process of human adaptation" (p. 32), and Dewey's (1938) view that learning is "a continuous spiral" (p. 79), Taylor's model points towards seeing the whole person -- physical, intellectual, and emotional -- as being involved in the learning process. The early contention that learning is merely an intellectual (cognitive) exercise may be to see less than the complete picture.

MacKeracher's Model

MacKeracher (1996) blends the ideas of other writers into her five-step description of the learning process. For her, the cycle begins with the intake of coded or uncoded information from internal or external sources as the learner participates in experiences and activities (See the bottom of Figure 3). In the second step, meaning or value is given to the experience through the use of pattern-recognition and meaning-making cognitive and affective processes. Next, these meanings are used to solve problems, make decisions, and plan strategies. In the fourth step, the decisions or choices are implemented and tested by the learner, or the learner observes others' actions or tests. In the final step, she describes how the results of such testing yields new information -- new information that both completes the current cycle and provides inputs to trigger a subsequent cycle.

Most models describe learning from a single perspective or within a single context. In blending the ideas of several models, MacKeracher has shown the complexities within the larger learning cycle by describing the activities and processes contained in each discrete step. For example, she describes in detail how different mental

processes can be integrated into the learning steps to uncover meaning and determine actions as the learner progresses through the cycle.

Costa's Model

Costa (1991) compares several earlier models and remarks that his examination of the "models of thinking yields more similarities than differences" (p. 137). He consolidates the thinking models into a three-phase model for intellectual functioning. The first phase, called input, involves the intake of data through the senses and recall of information or data from both short-term and long-term memory. Phase two, processing, makes sense of the data. Phase three, output, includes applying and evaluating, as well as metacognition. The relationships among the phases and between the components of each phase are shown in the middle part of Figure 3.

This model is derived from research into the brain's cognitive processes and memory, rather than the humanistic and psychological focuses of learning. Costa (1991) points out how the brain never stops, but simply switches to other inputs if it is not engaged by the intended inputs. He also explains how data are linked to what is already known as it is being stored in long-term memory -- a reflection step. Although derived from a different line of research, the resulting model is cyclical.

Like MacKeracher, Costa shows some of the complexities within the learning process, however, his model is, again, an essentially cyclical process with output serving as input for the next cycle. In fact, Maples (1996) summarizes Costa's learning sequence as a five-step cycle. The steps are labeled: doing, think, talk out loud, talk internal, and theorize. These steps reflect the inputs from experience and recall, the reflective process that ascribes meaning, and the conclusion that theorizes and applies.

Wellman's Model

Wellman (1991) presents a four-stage learning cycle intended for the design of science education. Interestingly, this research is based in children's learning but it carries the same cyclical pattern seen in other models reviewed in this chapter (See the bottom of Figure 3). The first stage, activating and engaging, focuses on finding out what the student already knows about the subject. The next phase, exploration and discovery, provides opportunity for firsthand experiences and other data gathering. The third phase, processing for meaning, is the integration of the new experiences and discoveries into the student's existing schema. The final phase, assessment for understanding, seeks to confirm correct understanding and readiness for application.

In his explanation, Wellman (1991) includes what is accepted in the school literature as basic science processes; namely, observing, communicating, comparing and organizing. He also cites Lunetta and Tamir's (1979) four stages of problem solving in science, (i.e., planning and designing, performing, analyzing and interpreting, and applying). Both the basic science processes and the specific stages of problem solving reflect elements of the cyclical learning process.

St. Francis Xavier University's Training Model

St. Francis Xavier University's Training for the Trainer (1996) diploma program (pp.4-17 to 4-20) adopts the generic four-phase model of experiential learning for application in workplace learning. In the experiencing phase individuals engage in an activity to generate data. The data are processed through reflection. There is additional data generation in the second or reflection phase. In the third phase, conclusions are drawn and generalizations are made that give meaning and utility to the experience. The

new concept or understanding is then tested in a working context during the application phase.

The Training for the Trainer program focuses on the design of training and integrates the learning cycle into a training design model. Through time, hundreds of graduates of this program have tested and applied this model in training situations across Canada and abroad.

Jarvis's Model

Jarvis (1987) criticizes Kolb's experiential learning model, arguing that its concrete experience is too narrow and exclusive, and that it oversimplifies the learning process. Jarvis presents a model for adult learning that incorporates nine different paths or lines of responses to a potential learning experience (See Figure 4). Of the nine possible responses, he categorizes three as pre-conscious learning, three as non-reflective learning, and three as reflective learning, thus establishing a hierarchy. The multiple paths and levels reflect Jarvis's attempt to map the process of adult learning in different situations and under different circumstances. Yet, he acknowledges that although his model "is much more complex than that produced by Kolb, . . . there is a very similar baseline" (p. 24). The paths in Jarvis model reveal that "situations" can lead to a changed, more experienced person through various pathway sequences that include a reflection process, but Jarvis is not insisting that this will always occur. Yet, he does argue that learning can involve the elemental learning cycle discussed here and, indeed, he argues that change does come out of a process very like those reviewed earlier. This is evident in that the more complex, reflective learning pathways in his model are indeed cyclical, (and involve reflection, experimentation, and evaluation).

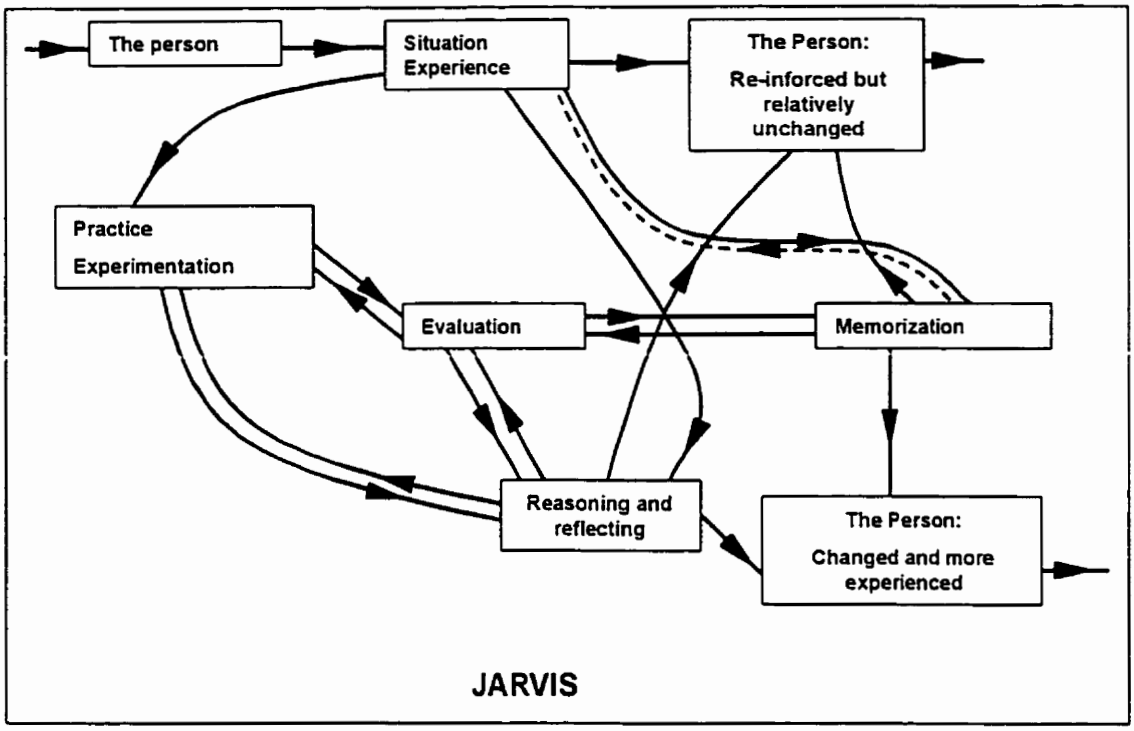

Figure 4: Jarvis model of learning showing the response network. Adapted from Jarvis, P. (1987). Adult learning in the social context. New York: Croom Helm. (p. 25).

Reconciling the Models

Although differing in terminology, number of phases, and complexity, the eleven descriptive models of the learning process show inherent similarities. In general, there is a basic cyclical process at the root of all the models. This underscores the importance and enduring quality of the models described by early theorists, such as Dewey. The differences typically reflect the philosophical or contextual perspective from which each model was derived.

Model Similarities

Although different terminology and different divisions are used, each learning model has a cyclical process at its root in which an experience is given meaning, and that

meaning is applied within one's life. A. Rogers (1996) reports a "growing consensus too that experience forms the basis of all learning" (p.107) and notes that many writers suggest "that at the heart of all learning is the search for meaning in experience" (p. 107). The models seen here depict a continuous cycle -- or, perhaps, more accurately a spiral, in which each cycle is initiated or triggered by an experience of some kind. Whether the experience is entirely new or the outcome of a previous cycle, it exposes the learner to information that needs to be integrated into what is already known. This does not mean, however, that all new experience produces learning; as Dewey (1938) notes, "the belief that all genuine education comes about through experience does not mean that all experiences are genuinely or equally educative" (p. 25). Some experiences simply trigger a behavioural response, but experiences that inspire reflection and a search for meaning are the beginnings of learning.

Following on experience, in the next phase of the learning models, information that has not yet been "assimilated" or "accommodated" tends to an uncertainty or confusion that is resolved through reflection and additional observation. This is the search for meaning. The search is complete when the experience is given meaning by integrating it into what is already known, or by adapting what is already known to incorporate the new information. Mezirow (1991) claims that "reflection is the central dynamic in intentional learning... involving either the explication of the meaning of an experience, reinterpretation of that meaning, or application of it in thoughtful action" (p. 99).

Having assigned meaning to the experience, the learner then moves into the third phase wherein conclusions or generalizations are made about this new meaning or

concept. The learner is now addressing the question, "So what?" Conclusions or generalizations made during the third phase provide the bridge between simply comprehending an experience and recognizing the applicability of that knowledge. From this basis, the learner moves to the fourth and final phase in which the learning is applied in a real-world context. A. Rogers (1996) reports that many contemporary writers argue that "action is an essential part of the learning process, not a result of learning, not an add-on at the end. Without action, learning has not effectively taken place" (p.107). Applying the knowledge derived from the processing of an experience validates and consolidates the learning; the process is complete, and the learner is ready to progress into another learning cycle.

Kolb (1984) observes the "remarkable similarity in concept" (p. 33) between his experiential learning model and other models for scientific inquiry, problem solving, decision making, and the creative process. He suggests "there may be great payoff in the integration of findings from these specialized areas into a single general adaptive model such as that proposed by experiential learning theory" (p. 33).

Model Differences

The most obvious difference among the models is the differing number of steps (phases) and the labeling used. These different divisions of the learning cycle result in differing emphases on specific aspects or details of the learning process. For example, much of Piaget's work focused on the development process, Hunt considered the interaction between individuals, Wellman focused on learning science among children, and Jarvis emphasized the social context.

Unlike Kolb, MacKeracher suggests that problem-solving, decision making, and other cognitive processes are part of the third phase of the cycle. However, there is a significant discrepancy in their perception of the learning cycle in relation to other cognitive processes. The two are far apart because Kolb is focused on the overall outcome of a learning experience, whereas MacKeracher is probing the intricacies of a step within the process. Despite these differences, each of them has based his or her model on a cyclical process.

Approaching the differences in terms of time-span for different models, MacKeracher (1996) writes:

> It is useful to view Hunt's model as occurring almost instantly as facilitator and learner flex to each other, and to view Kolb's model as occurring over a slightly longer period of time, but still of short duration. Taylor's model probably occurs over several days or weeks or even months if the problem is complex and the inquiry difficult. (p. 193)

The different study subjects and scenarios may explain the differences in duration of the various cycles; however, the differences in time duration do not mean that the learning process itself is different. In different situations, or for different knowledge or skill areas, it takes a longer period of time to progress through a learning cycle.

A further difference, MacKeracher (1996) observes, is that Kolb and Hunt do not include the highly emotional phase described by Taylor. MacKeracher notes that

> Taylor... includes a phase in the cycle which describes the integration of what has been learned into one's personal model of reality and self-esteem and the transfer of this learning into different contexts. Both Kolb and Hunt seem to be describing learning which takes place in one context only; transfer would be seen as an entirely new cycle of learning. (p. 194)

In the difference among models, there are differences of sequencing, of time-span, and even of phases, but the essential cyclical process remains at the center of each model.

Model Controversies

Although the similarities suggest that the various models are descriptive of the same learning cycle, several of the researchers argue that the other "competing" models are inadequate. Given the diverse philosophical perspectives involved, this is not surprising. The essential debate about behavioural learning objectives illustrates two opposing perspectives. Behaviourists define learning as a "change in behaviour" (Elias & Merriam, 1995, p. 89), and they expect behavioural objectives to "specify the behaviour to be exhibited by learners after completing a unit of instruction" (p. 89). Critics of the behavioural approach

> argue that learning is a complex phenomenon, that many kinds of behaviours might reveal that learning has occurred, that outcomes can be creative and unpredictable, and that learning can be structured or latent and approached from the whole rather than bits and pieces. (p. 89)

Without a clear definition of the product or expression of learning, it is not surprising that the models differ or that the researchers are in disagreement with one another. For instance, commenting on Kolb's cycle, A. Rogers (1996) suggests it needs three modifications. A search for new knowledge and experience should be added to reflection, provision should be made for further critical reflection after active experimentation, and the specific decision points should be included. Still referring to Kolb, A. Rogers goes on to point out:

> There is a widespread acceptance that critical reflection on experience leading to action forms a large part of the process of learning. But it is probably unacceptable to suggest... that this is *the* way in which we learn... There are many different strategies of learning...Critical reflection on experience would seem to be the key strategy in the process of creating meaning out of experience; it is certainly the main way in which critical learning is developed. But there is more to learning than the search for meanings. (p. 109)

A. Rogers acknowledges the validity of Kolb's model, but considers it simply incomplete. A. Rogers believes that it does not describe *all* the ways one can learn. He argues that it fails to present the complexities of the learning process; thereby, revealing the inadequacy of the Kolb model.

Perhaps a critical observation here is the complexity of learning. At its elemental level, learning seemingly occurs within the fundamental learning cycle that these models describe. But, the learning process may be described best as a succession of learning cycles that interlock with each other in a linear, parallel, or staggered sequence. Individual cycles may be related to, triggered by, or independent from other cycles in the sequence, and all will differ in length. In discussing learning to learn, Smith (1996) notes that learning is "understood to be a complex, lifelong process -- or a constellation of processes -- through which people acquire and modify their skills and capacities for knowledge acquisition, problem-solving, and the extraction of meaning from experience" (p. 418). Thus, although the learning models may adequately describe the elemental cycle that drives learning, they do not reflect the complexity and intricacy of the learning process itself -- thus researchers are far from agreed on a single model.

An Elemental Learning Cycle

The differences and controversies over the models highlight the difficulty in clearly describing the learning process in a simple model. Nevertheless, the similarities among these models suggest that, at its elemental level, learning is best described as a cyclical process. When the models are considered collectively, the pattern established by their commonalties defines a fundamental cyclical learning process, which I term the "*elemental learning cycle*".

As the literature reviewed suggests, the elemental learning cycle consists of four distinct phases. The cycle begins with a new experience. A new experience provides input of new information or data, which triggers the learning process. This depicts the initiating step that Lewin, Kolb, and Hunt call concrete experience; Dewey calls impulse; Piaget calls concrete phenomenalism; and Taylor calls disorientation. This new experience is reflected on and otherwise accommodated within the framework of what the learner already knows and is willing to accept through additional observation or intake. Lewin, Dewey, Piaget, Kolb, and Hunt describe their phase as reflection or observation in their models, whereas Taylor and Wellman use the term exploration. When the reflective process gives a meaning to the experience, the learner then forms a conclusion or makes a generalization. This phase parallels abstract conceptualization in the models of Lewin, Piaget, and Kolb; implicit theory in Hunt's model; reorientation in Taylor's model; and the process of giving meaning as described in the models of MacKeracher and Wellman. Dewey simply calls this phase knowledge. Finally, the conclusion or generalization is confirmed by testing its validity through application. Acting, experimentation, testing, assessment, and judgement are typical descriptors of the final steps of the models used by the authors discussed here. Essentially, when the differences in terminology, time lapses, and sequences are removed, one arrives at an elemental learning cycle. The elemental learning cycle is not intended to precisely describe the intricacies of the learning process, but rather to describe the generic, cyclical process that underlies learning.

Implications for Design and Practice

My interpretation from literature that learning occurs through an elemental cycle of experience, reflection, conclusion or generalization, and application, has several implications for the design of instruction, the practice of adult education, and organizational training. Ideas already expressed in the literature illustrate some of these applications.

Implications for Design

Understanding the elemental learning cycle can equip the adult educator with a basic understanding of the process that is typically required to design an effective and efficient training program. St. Francis Xavier University's Training for the Trainer design template is a good example of linking the experiential learning cycle to training design, in that the cycle phases are built into the design template. In so doing, the design addresses the process of learning as much as the product of learning.

Looking at other examples of exemplary learning cycle designs, Rothwell and Kazanas (1998) describe a 10-step instructional design process model that details the design steps from initial needs assessment through to objective writing, strategy selection, and final evaluation. In their design step, they offer a design strategy adapted from Gagné, Briggs, and Wager (1992), that employs a cyclical learning process and is applicable to learning intellectual skills, cognitive strategies, information, attitudes and motor skills.

Houle (1996) describes several factors that influence the selection of a design format. He notes that progression occurs even within a single learning act and emphasizes that "the arrangement of [learning] events so they will be maximally

educative grows in importance as activities increase in complexity and length" (p. 65). Summarizing, he notes that "any educational activity...has a distinctive shape or pattern... but a successful program requires a fusion of all such elements" (p. 63). The intricacies of design that Houle describes, underscore the sequencing and interlocking of relevant learning cycles.

These design models indicate the process of instruction is as important as the material content. Simply presenting all of the facts or providing all of the experiences does not mean that the receiver learned. To achieve synthesis learning, the designer must provide these inputs in such a way that they guide the learner through a sufficient number and sequence of learning cycles to give meaning to the information or experiences.

Similarly, among the 12 principles for effective learning suggested by Vella (1994) are sequence and reinforcement, action with reflection, immediacy, teamwork, and engagement. The underlying theme of Vella's principles is praxis, which she defines as "action with reflection" (p. 11). She notes that "praxis can be used in teaching knowledge, skills, and attitudes as learners do something with the new knowledge, practice the new skills and attitudes, and then reflect on what they have just done" (p. 11). Allman and Wallis (1990) question whether praxis unfolds as "act-reflect-act" or "reflect-act-reflect." That the starting point is debatable suggests that praxis is more likely a helix or succession of cycles rather than one single learning cycle. This suggests that good design might be a linear succession of independent learning cycles.

Drawing on concepts like Gardner's (1993) multiple intelligences and blending the work of various researchers and scientists, Maples (1996) proposes that three interactive principles can accelerate learning: (a) a low-threat, high-challenge

environment that places the learner in a state of relaxed alertness, (b) orchestrated immersion into a rich complex of life-like interactive experiences, and (c) active processing that encourages the learner to extract and consolidate meaning from the experiences. He endorses Barzakov's suggestion that "when the thematic design is fully integrated with a delivery process alive with emotional stimulus, a liberating learning vortex is created" (p. 87). In essence, he recommends a design strategy that includes a multitude of stimuli to engage the learner. The effectiveness of this strategy is rooted in the fact that multiple stimuli can trigger multiple learning cycles.

The common theme in these design models and recommendations is an approach that provides abundant stimuli for the learner. The design is concerned with the learners' *processing* of the content material, not the content material itself. This is a fundamental design question. Receiving information is different from learning. The designer has to ensure that, as the learner receives the content material, it is processed and given meaning by the learner. The more comprehensive design models, such as Rothwell and Kazanas (1998) 10-step process, cover a broad scope, such as confirming that the right content is selected to meet learner needs, and that an effective evaluation methodology is defined. Others (such as Gardner, 1993; Maples, 1996) focus more narrowly on the actual learning event itself. In effect, I interpret from all these models that it is not the methodology that is important; rather, the methodology should focus on generating effective learning.

Moreover, the statistics on learner retention suggests that a stimulus-rich environment is the best design choice. Pike (1994) reports that learners retain 10% of what is read, 20% of what is heard, 30% of what is seen, 50 % of what is heard and seen, 70% of what they say, and 90% of what they say and do. Clearly, as more of the senses

are employed in the learning experience, the learning is more effective. Increased sensory input obviously provides more experiences, more data for reflection, and more evaluation results. Consequently, in a high sensory learning environment, learning cycles will be rich in detail, and more numerous. Good design wisely attends to engaging the whole person.

Implications for the Practice of Adult Education

Accepting the elemental learning cycle as the fundamental process of learning can provide a basis for good practice in adult education. If educators are to facilitate meaningful learning, then they must understand the process by which learning occurs in order to design their learning activities to effectively stimulate and enhance the learning process. Expanding the scope of learning, Kolb (1984) argues that "when learning is conceived as a holistic adaptive process, it provides conceptual bridges across life..., portraying learning as a continuous, lifelong process" (p. 33). He goes on to explain how such a holistic view captures the similarities among what educators call learning, creativity, problem-solving, decision-making, and scientific research. If as educators we conceive of learning holistically, we are forced to accept its varied extension through "time and space" (p. 34). In effect, adopting the holistic view that learning is continuous and lifelong suggests that it is essentially a continuum of learning cycles. Education, then, becomes the deliberate attempt to manipulate the learning of others at specific points in their continuum of learning. These manipulations are effective if they modify the individuals' continuum by introducing new learning cycles, modifying existing cycles, or establishing relationships among unrelated cycles. Several researchers have discussed the design implications of this observation.

Gagné & Briggs (1974), for instance, have categorized intellectual skills in the following categories based on level of complexity: stimulus-response connections, chains, associations, discriminations, concepts, rules, and problem solving. They suggest that learning at more complex levels "does not appear to be done on a single occasion" (p. 27). Gagné (1985) states that "learning is best conceived as set of processes" (p. 245). Thus, as the complexity level increases, the number and complexity of learning cycles can also be expected to increase. Like Jarvis, Gagné advocates a hierarchy of learning. In Gagné's nine step design model, the first steps include stimulus, followed by "learning guidance" (Gagné & Briggs, 1974, p. 123), performance, and assessment steps. The basic process that drives this design approach clearly reflects the elemental learning cycle.

Similarly, Knox (1986) suggests that understanding is increased by stages. At lower levels, information is processed in a fragmentary way, with no organization of concepts or themes. Next, central concepts are developed, but not related to all supporting facts or details. Still higher learning identifies the relationships among concepts. At the highest level, the integration of themes extends beyond the context of the information to explain similarities and differences and to explore alternative views. The increased understanding Knox describes could be achieved by increasing the number of elemental learning cycles and increasing number of connections between learning cycles. Thus, education designed to increase the depth of understanding requires the educator to stimulate an increasingly complex series of learning cycles that interconnect with each other.

Challenging such traditional thinking from a strong humanist viewpoint, C. R. Rogers (1961) declares that "the only learning which significantly influences behaviour is

self-discovered, self-appropriated learning" (p. 276). He summarizes that "if we focused on the facilitation of *learning* -- how, why, and when the student learns, and how learning seems and feels from the inside -- we might be on a much more profitable track" (1969, p. 125). Reflecting his humanistic philosophy, C. R. Rogers insists on a student-centered approach to learning instead of the more traditional subject-centered approach. Building on this foundation in adult education, Knowles (1990) developed his theory of andragogy which attempts to explain the unique needs of adults and the requirements for effective adult education. His underlying assumptions of the andragogical model are that adults need to know the reason for learning something; bring a self-concept and sense of responsibility; have a greater pool of experience; have a desire for real-life applications; prefer life-centered, over subject-centered, learning; and are more intrinsically than extrinsically motivated. Knowles acknowledges the adult's capability for manipulating complex meanings and concepts, giving them situational relevance. This highlights the increasing complexity of the learning cycle continuum as the individual's experience increases.

Similarly, MacKeracher (1996) emphasizes that learning occurs within a specific context, information intake is controlled by the learner, new meanings and values are linked to the learner's existing meaning and values, cognitive processes may be conscious or sub-conscious, group learning is more effective when cognitive processes are verbalized, and feedback is an important step in confirming or disconfirming the learning. According to MacKeracher, these factors influence the basic learning process or learning cycle. Fundamentally, when adult education works toward a synthesis level, it becomes an attempt to inspire and sustain a sequence of meaningful learning cycles.

Implications for Organizational Training

Training to develop applied skills within organizational training programs narrows the focus from the broader scope of education to a more restrictive, applied context. Lowyck (1996) observes that there is very little integrative literature available in traditional training, even though adult education can reasonably be expected to contribute to the foundation of training and development in industrial settings. He insists that "understanding learning theories... is essential for any training design and development if at least a systematic and controllable approach is aimed at" (p. 415). This apparent lack of integration suggests that organizational training is not meeting its potential in that it is not capitalizing on adult education research.

However, there is some evidence that this gap may be closing. Lewis and Williams (1994) report that "experiential models are being applied more widely than ever before in business and industry" (p. 10). They claim

> In its simplest form, experiential learning means learning from experience or learning by doing. Experiential education first immerses adult learners in an experience and then encourages reflection about the experience to develop new skills, new attitudes, or new ways of thinking. . . . Experiential approaches appear to be more effective in developing skills that employers seek. (pp. 5-6)

This trend is clearly towards the type of learning cycle reviewed here.

Sims (1990) discusses the importance of acknowledging individual differences in designing and implementing training; he notes that individuals learn at different rates and are capable of different end states. This, he suggests, requires enough flexibility in training strategies and methodologies to accommodate individual differences. On the one level, it may be assumed that learners with more prior knowledge and experience will require more time to reflect on different aspects of a new experience. On the other hand,

they may require less time because they have already formulated basic concepts. The level of achievement during the training may also be influenced by the amount of reflection and application included in that education. Sims further notes that training is of little benefit to the individual or organization unless it can be transferred to the home or workplace. If learning cycles are truncated by omitting the application phase, it may be assumed that transfer will be more difficult.

Woolfe (1992) claims four main components required for experiential learning are (a) the learner being aware of the processes, (b) the learner being involved in a reflective process, (c) a personally significant experience, and (d) an involvement of the whole self. Hobbs (1992) gives an example of an experiential workshop for communication and counseling skills. The five sessions described are: attentive listening, use of open and closed questions, paraphrasing and summarizing, reflection of feelings, and skills integration. The sessions include reading, demonstration of skills, role-playing, and discussion. In the workshop example they give, it is evident that each session follows a complete learning cycle. Additionally, the sequencing of the subject material illustrates the sequential connection of learning cycles as skills are developed in the workshop. Hobbs acknowledges the importance of understanding the learning process in designing and delivering effective workshops.

From their recent study of three experiential programs, Druian, Owens, and Owen (1995) identify several common elements. In addition to similarities in purpose, roles, activities, and settings, they also discovered a common learning strategy. This common strategy followed an ordered sequence of steps. They observed that this common strategy begins with engaging the learner in an experience upon which he or she reflects. They

explain, "This step often merges with the next, which involves transforming the raw material of the experience through reproducing it in a form that can be shared by others" (p. 21). Their sequence of steps clearly mirrors the experience, reflection, conclusion, and application steps of the elemental learning cycle. Moreover, they also observe that such transformations can be both immediate and delayed, acknowledging that a single experience, if significant enough, may stimulate multiple learnings. This supports MerKeracher's (1996) contention that differences among the learning models of Hunt, Kolb, and Taylor relate to time-span. It may therefore be argued that the same fundamental process is at work, with the difference simply being the time required to complete the learning. The possibility of delayed transformations suggests that designers ought to carefully consider both the short-term and long-term results of their training.

Smith (1996) observes that "people learn to learn effectively through educational experiences and training that result in flexibility and awareness as well as the development of a repertoire of appropriate strategies for various learning contexts" (p. 422). Moreover, de Moura Castro and de Oliveira (1996) note "that the differences between education and training have always been exaggerated and that most reputable training programs are education as much as training" (p. 19). Thus, the challenge to the training designer is to provide programs flexible enough to accommodate individual differences, but effective enough to produce the necessary skill sets within the constraints of time and budget. This presents the training designer with the challenge of selecting methods that facilitate the completion of learning cycles by participants with often widely varied experiences and capabilities. Learning styles, facilitator capabilities, and the learning environment are further influencing factors.

The recent vision of a learning organization has increased the emphasis on learning within the organizational context. A learning organization is "an organization that is continually expanding its capacity to create its future" (Senge, 1990, p.14). Senge claims that adaptive learning (learning that focuses on survival) alone will not achieve this, but that the organization must also engage in generative learning (learning that enhances the capacity to create). Generative learning is best demonstrated by systems thinking, rather than linear thinking. "Systems thinking is a discipline for seeing wholes. It is a framework for seeing interrelationships rather than things, for seeing patterns of change rather than static 'snapshots'" (p. 68). Watkins and Marsick (1993) note that "learning results in changed organizational capacity for doing something new, and it is embedded and shared through systems" (pp. 147-148).

Through illustrative examples, such as feedback loops and circles of causality, Senge (1990) demonstrates the complexity of systems and the inadequacy of linear thinking. Many illustrations involve double and even multiple loop learning. Argyris (1982) argues that single-loop learning is the way individuls learn through "socialization in the systems in which people live and work" (p.100), and advocates developing a double-loop learning model. These more complex learning loops are seen as key drivers in creating a learning organization. In his description of team learning, Senge illustrates the complexity of thinking required to understand systems completely, and mirrors the interaction described in Hunt's mutual adaptation model. Within systems thinking, one can see how the interaction between learning cycles contributes to the reflective process and deepens understanding. As such, it produces learning at higher taxonomic levels.

To close this section, I look briefly at three recent models that are now influencing the area of training. Ross, Smith, and Roberts (1994) describe a four-stage wheel of learning, which consists of reflecting, connecting, deciding and doing. The wheel is displayed on a grid with two axis. One axis extends from more abstract to more concrete, and the other extends from more action to more reflection. The cycle depicted in the wheel of learning is another clear expression of the elemental learning cycle. Because learning in organizational settings often involves team learning, Ross et al. describe a team learning wheel with four stages: public reflection, shared meaning, joint planning, and coordinated action. At the individual level, this wheel is concentric with the elemental learning cycle. Ross et al. believe "the wheel of learning can ease people out of a constant pattern of low-level frenzy, by setting aside time for reflection and creativity" (p. 61). They offer this approach to help individuals find meaning, see patterns, and make sense of their experiences. In essence, Ross et al. contend that a learning organization is one that provides individuals or teams the opportunity to engage in complete learning cycles.

More recently, Dixon and Ross (1999) describe a four-stage model for the organizational learning cycle, that consists of the widespread generation of information, the integration and dissemination of the information, its collective interpretation, and the authority to take responsibility to act. They explain that the widespread generation of information refers to the active data gathering and sharing by everyone in the organization, from the shop and office floor to the senior executive level. Because information cannot be fully understood in isolation, in the next phase, individuals and teams integrate and disseminate the information so that it can be interpreted in the right

context during the third phase. Individuals with the responsibility for enabling change then act based upon the insight gained from the collective interpretation of the data. Observation and recording of the results from the actions, and sometimes experiments, of the fourth stage produce new information and the cycle repeats. When the phases are compared, the organizational learning cycle clearly mirrors the elemental learning cycle I extracted in an earlier section. In essence, the organizational learning cycle represents the process of bringing the individuals' learning cycles in alignment, and thereby effecting a collective action. Thus, I conclude that it is the elemental learning cycle that drives the learning organization.

Watkins and Marsick (1993) also present a model for continuous work and learning that

> features alternating cycles of judgement or reflection with action taking, which deepens learning from work experiences. . . . People can learn at any time by converting ordinary challenges in their work into learning opportunities, exploring the experience as they think about action, experimenting with solutions, examining results, and using new insights to plan for future similar experiences. (p. 26)

Their model presents work and learning as concentric processes; they describe learning as "a continuous cycle of acting and reflecting that grows out of work" (p. 27). Their descriptions of a learning organization illustrate that learning is an ongoing life experience -- in this case, set in the context of the workplace. In such an environment, "the result is a continuous, upward spiral of learning" (p. 27).

Watkins and Marsick (1993) identify three barriers to learning that can affect both individual and organizational learning, namely "truncated learning, learned helplessness, and tunnel vision" (p. 239). These barriers can have a particularly large impact on learning at the reflective or synthesis level. Truncated learning suggests interrupted

learning cycles; learned helplessness suggests a conclusion based on experiences that have not been reflected upon; and tunnel vision suggests limited reflection and, perhaps, limited experiences. Watkins and Marsick believe that integrating the elemental learning process into an organization's systems and practices can shape a learning organization. The workplace becomes a learning forum when learning cycles are inculcated into the daily routine. Similarly, all of life may be viewed as a spiral of learning if one allows time for action and reflection.

Framework Derived from the Literature

Theorists have presented several models to describe the learning process. An examination of the similarities and differences among these descriptive models reveals that, although they may differ in labeling and division of steps, a fundamental cyclical process underlies each model presented. For these theorists, at its most elemental level, learning is a cycle in which a new experience is given meaning through reflection, interpretation, and application. This basic learning cycle is particularly critical for learning that is positioned higher up the learning hierarchy, such as synthesis learning.

Recognizing the elemental learning cycle as the essential process of reflective learning is significant in designing education, developing organizational training, and sustaining learning organizations. To that end, the literature reviewed here consistently recommends a design strategy that has an elemental learning cycle as its basis. Various researchers also advocate that the learning cycles be complete, not truncated. By linking a spiral of ever broadening and deepening learning cycles into a continuum of learning, the effectiveness of the learning opportunity can be maximized. In the next chapter, I

describe my efforts to link learning cycles within a modular, organizational training course.

CHAPTER 3

DESCRIPTION OF THE STUDY

This study evolved from my interest in promoting synthesis learning within organizational training. A new 2-week modular course on supervisory training at my organization provided an ideal opportunity to study how learning cycles could be linked as a way to increase synthesis learning on broader aspects of supervisory training. I used the elemental learning cycle that I developed from the literature as the model for the interlocking cycles.

The course was developed over a 10-month period, pilot tested, then delivered to approximately 1200 supervisors and supervisor trainees over a 2½ year period; evaluative questionnaires took place at the end of each delivery, during a post-course workshop, and by follow-up computer survey. In this chapter, I first describe the organizational context for the course, then I describe the design process, the delivery of the course, and the evaluation findings.

Project Context

The organization I work for, which I call Greentech (fictitious name), is a large publicly-owned electricity-generating utility that operates several generating units with energy-producing concentrations at three major sites. In the early through mid-1990s Greentech recognized significant declines in its performance. Production was falling below projections, unit out-of-service time was increasing, accident and incident rates were increasing, and revenues were declining. Successive performance audits showed a

high number of recurrent findings that indicated an inability to turn declining performance trends around. Greentech reacted to its declining performance by hiring a team of consultants to manage the organization through a recovery program. A team, called the Advisory Team, was chartered to conduct a performance assessment of Greentech, and to map out a strategy to lead the utility to top level performance as compared with similar large utilities. Among its findings, the assessment reported that all of the generating plants were being operated in a manner that met defined regulations and accepted standards related to safety. However, it also rated the performance of all of the operating stations as just minimally acceptable. This ranking was the lowest rating at which the government regulator would allow utilities to continue to operate. In fact, the rating drew increased scrutiny of the utility's operations by the regulator, who granted only short-term operating licences for the utility until performance trends improved.

The performance assessment found that a significant number of managers at all levels of the organization lacked the basic management and leadership skills to be successful. It further noted that serious shortages of key management skills, supervisory skills, and some technical skills existed within the organization. For example, the performance assessment reported that many employees at one plant had been placed in front-line supervisory positions with no understanding of their accountabilities or authority. Moreover, after holding these positions for several years, many supervisors had still not received even the most basic training or coaching by their managers on how to manage, set priorities, or handle employee communication. The performance assessment summary of the situation noted that the mix of skill and assignments given were not aligned with the work being done.

In response to these findings, the performance assessment report recommended that Greentech train all its managers in basic managerial and leadership skills. The report insisted that the content and delivery of existing training programs be upgraded to the current industry standards and that new training programs be created to improve individual effectiveness. In response to these findings and recommendations, Greentech's Management Training Department, in which I was a training officer, was requested to develop a basic training program for their first level managers, also known as supervisors. The original program mandate was to prepare and deliver a course in fundamental management skills to an estimated 250 supervisors across all functions and sites within a 15 month period. However, over the course of 6 to 9 months, the organizational restructuring process that was also in progress consolidated the supervisory structure and ultimately created more than 600 supervisors. It was later decided that the next level of management supervision, middle managers, should also attend the course. This added about 550 more trainees, and extended the delivery schedule over 2½ years. When the expanded mandate is entirely fulfilled, over 1200 trainees will have completed the program. This will occurred by the end of year 2000.

The Management Training Department appointed a team to develop and deliver the training. A department colleague and I shared leadership of the project as co-leaders of the team. Our first step was to conduct our own training needs assessment to determine the appropriate course content. The team developed a survey based on the current Greentech task list for supervisors. The survey was distributed to representative samples of about 11 supervisors from each of the three major sites. The surveys were distributed at the beginning of a focus group session at each site; 100% of the surveys were

completed and returned. As the organization was restructuring at the same time as the needs assessment was conducted, the supervisors selected were believed to be incumbent to the new positions. These sample groups included supervisors from the various production, maintenance, and business functions, (i.e., representative of supervisors across Greentech operations). The focus group sessions were held with each of the three sample groups to discuss any further training needs not captured in the survey. The survey was then adapted and given to similar samples of middle managers, again followed by a focus group discussion. The middle manager samples averaged about 6 managers per site. In addition, the development team interviewed the director and 2 or 3 senior managers from each of the generating sites to determine their expectations of the supervisors. Finally, two members of the Advisory Team were interviewed to gain a more complete understanding of their earlier findings. In total, 51 incumbent supervisors, and 17 middle managers completed the survey and participated in the focus group discussions. All 3 site directors, 7 senior managers, and 2 Advisory Team members were interviewed.

The eventual course content choices were based on the compilation of these data, and compared with programs at two similar American electricity-producing companies and two other non-utility, Canadian industries. The content choices that followed focused on two basic areas: fundamental conceptual material, and managerial practices. The conceptual material was derived primarily from literature and other training programs used throughout the industry. The managerial practices were based on the requisite practices outlined in Jaques' (1996) managerial accountability hierarchy, the model being followed by the organization for its restructuring.

Greentech's recovery plan included several concurrent initiatives aimed at different performance problems. The multifaceted approach was intended to facilitate a rapid improvement. Because supervisory training was identified as an improvement area, the project mandate required the supervisors to be trained in a short time frame. The large trainee population that resulted from the restructuring and inclusion of middle managers added a second challenge. Consequently, it was decided to structure the training into three phases. The first phase, which is now concluding, was known as the Supervisor's Academy, Phase 1, and is the subject of this study. It was intended to provide the basic knowledge and skills required for the supervisor position at Greentech. The content material reflected the industry's guidelines and managerial material and content accepted by the senior-most levels of Greentech. Phase 2 will add to the knowledge and skills included in the first phase, and focus particularly on individual assessments to determine the specific training requirements of each individual supervisor. Phase 3 will consist of a collection of independent training modules. Individual supervisors will be required to take only those Phase 3 modules that the individual assessment indicates they require during Phase 2. Thus, the training will move from a broad, general focus to a customized individual program. The three-phase approach was selected to meet the objective of providing all supervisors with basic training as quickly as possible, and to conserve resources by providing individuals with only the training they required.

Supervisor's Academy, Phase 1, was a two-week residential course designed to cover the fundamental concepts that define a supervisor's role and set it in the organizational context of Greentech. It introduced basic principles governing individual behaviour in the workplace, and presented a basic supervisor's skill set. The content

material was packaged into 2 context-setting modules, a set of 16 instructional modules, and a final evaluation module. The primary delivery method of the modules was facilitated discussions and informal lectures. The course also included 10 structured activities, and 2 case study analyses. Each course delivery was opened with a keynote address from a vice-president, and included a conference call with the chief executive officer to set context. Each trainee was to prepare a formal action plan, which was presented to a senior management panel on the final day of the course.

During the period of the study, each class was composed of a mix of trainees from each of the three major generating sites, the corporate headquarters, and each of the functional groups involved. This was an intentional choice, to maximize the cross-fertilization of ideas and learning. To increase the interaction and focus of the trainees, the courses were delivered at an off-site conference centre rather than at the organization's training facilities. Evening sessions and activities were included to reduce the total number of days per course that trainees were required to be away from their jobs and homes. This meant that the course was quite intense, particularly for those individuals who had been away from an education or training environment for some time.

Course Design

The design challenge of the Supervisor's Academy, Phase 1, was to go beyond a compartmentalized understanding of the various elements and practices of the supervisor's role, and seek to achieve a holistic understanding of how the various elements and practices are linked and integrated into a larger conceptual framework. Within each module, the design for the lesson plan needed to encouraged instructors to focus on building a big-picture understanding rather than pursuing an exhaustive

presentation of individual components. However, an assumption for the design of the lesson plan was that it is not necessary to have an exhaustive discussion of a given component in order to effectively demonstrate how it fits into the broader conceptual framework. Having these considerations as part of a clearly stated course goal provided guidance to the designers of the course. The result was a deliberate attempt to link the content pieces through facilitated discussions that interlocked the learning cycles of the various modules. The following subsections describe how the design attempted to achieve this.

Interlocking Learning Cycles

As discussed in Chapter 2, a number of experience-based models have an elemental learning cycle at their base. For training purposes, when a course addresses a single subject or skill, the material is typically chunked into manageable pieces and presented in an appropriate sequence, such as general to specific, specific to general, or by following successive or chronological steps (Caffarella, 1994, Houle, 1996, Rothwell & Kazanas, 1998). Unless these units of learning are cumulative or somehow connected, the learner is simply left with a collection of disjointed facts, feelings, or skills. Creatively linking the learning cycles can weave the learning into a comprehensive whole, and encourage synthesis learning.

Linkages among learning cycles can be established in different ways. In the course, I proposed four patterns, which we incorporated into the design. These options are depicted graphically in Figure 5. In the first, a single experience can be processed in more than one successive cycle by exploring different aspects of the same experience. Another approach is to run learning cycles concurrently by processing two similar

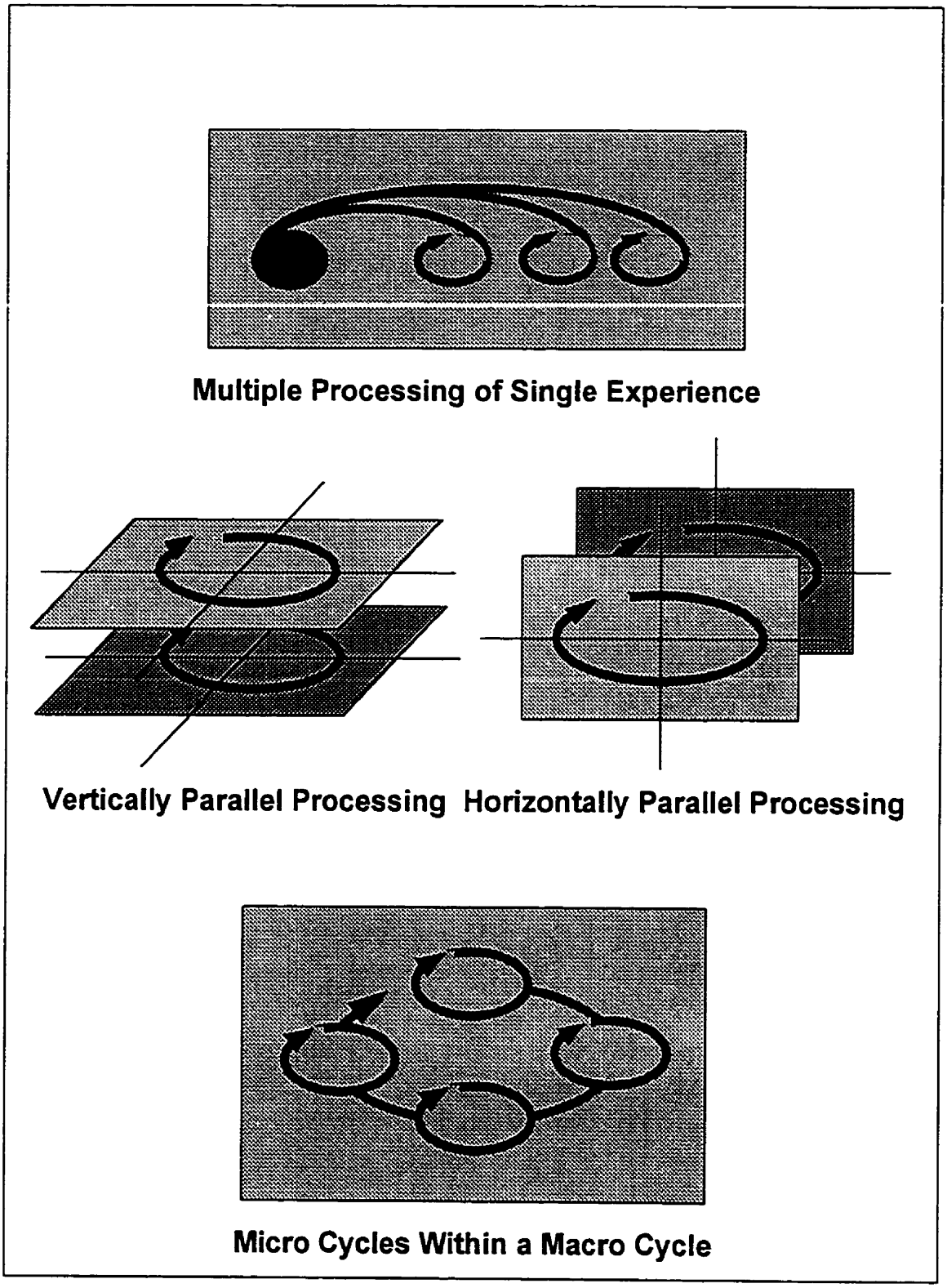

Figure 5: Four ways of interlocking learning cycles.

experiences at the same time. These cycles may be horizontally parallel, where the simpler or less complex cycle provides an algorithm or pattern for the other. Or, the learning cycles may be vertically parallel, where two cycles of equal complexity are run simultaneously to examine the differences and similarities between them. More complicated cycles may be established by running one or more micro-learning cycles inside a larger macro-learning cycle. These micro-learning cycles may be used to guide the learner through the phases of the larger more complex macro learning cycle. Using these or similar strategies, a creative designer or instructor can interlock learning cycles in the manner necessary to guide the learner through the learning process. In the next subsection I explore how these four linkages were applied in the design strategy.

Design Strategy

The design team, of which I was co-leader, used two primary mechanisms to achieve an integration of learning. Much of the material was presented through the use of facilitated discussions. This provided the opportunity to draw information from previous modules into the presentation of subsequent modules, particularly during the reflection phase of the learning cycles. The second mechanism was the use of structured exercises to blend the learning of more than one module together. As the examples below illustrate, these mechanisms were used in various places through the two weeks to interlock the learning cycles.

Week 1 was devoted to the fundamental conceptual material. This set the stage for Monday of week 2, which began with a simulation exercise designed to demonstrate the advantages of teamwork. One trainee was assigned the role of supervisor, and another was assigned the role of assistant supervisor. The remaining trainees (typically 23 to 28)

played one of 7 factory worker roles that might be found at a manufacturing factory. The classroom setup consisted of a series of worktables that formed the factory assembly line. The exercise consisted of a paper folding activity that simulated the manufacture of a paper toy. The first production scenario had a rigid assembly line structure with a sweatshop atmosphere and stern supervision. The second scenario allowed the team to redesign the manufacturing process using a team-based, self-management, approach. The exercise was then debriefed by the whole group from several perspectives, including the use of teamwork, organizational structure, economics, productivity, and morale. The immediate focus of the exercise was to understand, recognize, and define the advantages of teamwork. The importance of a well-defined and well-functioning organizational structure was also explored.

In this, the trainees all reprocessed the same experience, but from different perspectives. Reflecting backward, the exercise debriefing was linked to the requisite organizational model presented on the previous Monday. Linking forward, the discussion examined the effectiveness of communication strategies in each of the production scenarios. Two days later, on Wednesday, the instructors also linked backward to this experience during a communication and context setting module. When properly conducted, the paper toy exercise was debriefed from several perspectives, linked to previous modules, and the stage was set for future linkages in subsequent modules. Reprocessing the paper toy exercise demonstrated multiple processing of the same experience.

On Tuesday of week 2, a supervision video was shown prior to a discussion on effective communication. A debriefing discussion following the video focused on five

different messages presented in the video. In this example, there were often vertically parallel learning cycles occurring simultaneously as the different aspects of the video were summarized and assimilated into general principles. Horizontally parallel learning cycles were used frequently, as facilitators and speakers used examples to illustrate more complex principles or models.

Horizontally and vertically parallel learning cycles also occurred in the performance monitoring module on Wednesday of week 2. A video scenario set the stage for a performance feedback role-play. In this exercise, the trainees assessed the video content, interpreted it in the context of their workplace, and applied their workplace standards to the video scenario. They then role-played a supervisor giving feedback to the video characters based on their workplace standards.

Safe, event-free operation was the emphasis of the event-prevention and safety modules covered on Wednesday and Friday of week 1, respectively. Several descriptive models were presented to describe individuals' behaviour in the workplace and event causes. An event-prevention model was also taught and practiced. The event-prevention model was on how individual behaviours contribute to workplace events and accidents, and how supervisory strategies can help prevent such undesirable events. This model was presented using a series of discussions and exercises that revealed the model's individual elements and integrated them together. Essentially each piece of the model was presented as its own learning cycle inside the major cycle of the model itself, (the micro inside macro model). Then, on Monday and Tuesday of week 2, a case study applied the model to a subway train crash, drew parallels, and the trainees described lessons learned

applicable to their own workplaces. Several learning cycles were now being interlocked to present and apply this model.

On Thursday of week 1, a performance management module on methods of reinforcing behaviours through use of positive reinforcement was used to explore the strength of positive reinforcement as a performance management technique. An exercise was developed based on the children's game, Jenga, to integrate this learning with event prevention strategies. The game requires the players to build a tower of wooden blocks by removing blocks from lower stories and placing them on the top of the stack. Trainees were told that the objective of the exercise was to apply the event-prevention framework and positive reinforcement to plan and execute the task. Interestingly, each team developed a work plan using the event-prevention framework, and ignored the people-aspect of positive reinforcement. Only 1 of more than 225 trainees I have observed doing this exercise, included behaviour reinforcement into the team's plan. This clearly demonstrates the supervisory group's task-orientation, rather than people-orientation, bias. A lively discussion followed. By this point in the course, the trainees could synthesize learning from the different modules and describe how they could apply it to this very stimulating exercise and to their workplace. The intent of synthesis learning was accomplished through a series of learning cycles that interlocked in various ways.

Course Delivery

The course was initially delivered to a pilot class representing a cross-section of supervisors within the organization. Following some minor rework, it was delivered to 39 more classes. This section describes the pilot delivery and the formative changes that occurred through subsequent deliveries.

Course Pilot

The pilot delivery was co-facilitated by the course designers, with support from subject matter experts for specific modules. The 25 trainees included a mix of management supervisor candidates from the major functional groups and from each of the 3 major generating sites and head office. It included 22 males and 3 females. The inclusion of representatives from the various functional groups and locations made the sample a good cross-section of the organization. As the position of management supervisor was a newly-created position in the restructured organization, these trainees were candidates that management expected to fill the new positions when the restructuring was finalized. As such, they were also a good sample of the target population. All of the trainees were considered to be excellent supervisors by their managers and wanted to be a part of the pilot training. Moreover, this select class brought great enthusiasm and a desire to learn.

The content essentially followed the lesson plan, with several minor deviations. The only major deviation was that we had to cancel the first Wednesday evening session and weave the material into the following days, because the trainees were becoming fatigued by the very busy schedule. The changes and adjustments during the delivery were based on the instructors' judgements and on feedback gathered from the trainees after each module. A minor amount of reworking and fine tuning occurred as the two weeks progressed, but all of this was seamless and invisible to the trainees. The discussions and exercises unfolded as predicted and the learning objectives were met. The course impacted how the trainees' viewed their role and encouraged them to frame their thinking around new paradigms. This was most evident as they presented their

action plans at the end of the session. Many were quite emotional in describing how the experience had changed their perspective. In fact, the response of the trainees at the end of the program left us wondering if we were witnessing evidence of perspective transformation -- perhaps the most dramatic example of the elemental learning cycle found in the adult education literature.

For example, about one-third of the trainees expressed a deep impact from the training; They reported at the end of the workshop that they had been challenged and had moved to adopt a new perspective on what managing at Greentech should mean. The strongest evidence of this was their struggle to control their emotions while they presented their action plans to the management panel. As they described their planned actions, they emphasized how much they had been personally impacted by the course. At this point, a few of them were visibly struggling to hold back tears. Although somewhat unexpected, the powerful impact of the course on the trainees was evidence that learning had occurred to the extent that individuals were challenging their fundamental assumptions about their role and accountabilities. There were many similarities with Mezirow's description of perspective transformation.

Mezirow (1991) has described a 10-phase process by which individuals progress through a perspective transformation. The scope and timeline of change implicit in Mezirow's description are clearly larger than the experience of a single training course. However, there were clear parallels between the observed experience of several of the trainees and the phases of perspective transformation. Mezirow begins his cycle with a disorienting dilemma. For the trainees, the performance assessment had identified supervision as an area in need of major improvement. At the same time, Greentech was

reorganizing and redefining their roles and accountabilities. Most of our trainees had been supervisors for 10 or more years, and were somewhat startled by the rapid demand for change. They now found themselves questioning their competence level and personalizing the need for performance improvement and change, even though they questioned whether the supervisory team was indeed as poor as the performance assessment was suggesting. This behaviour aligns well with Mezirow's second phase -- self-examination with feelings of guilt or shame. His third phase is a critical assessment of epistemic, sociocultural or psychic assumptions. The class discussions revealed a somewhat critical review of the organizational culture in which they supervised, and which they indeed perpetuated by their supervisory practices. All of the trainees engaged in serious introspection, as evidenced by the thoughts and feelings they shared during the course. This mirrors the fourth phase in Mezirow's perspective transformation process -- recognizing one's discontent and that the process of transformation is shared.

The fifth phase is an exploration of options for new roles, relationships, and actions. All the trainees offered suggestions for performance improvements and changes as they progressed through the course. The more individually relevant of these were incorporated into the personal action plans they prepared at the end of the two weeks. These action plans were based on the knowledge and skills gained during the course. In Mezirow's model, phase 6 is planning a course of action, and phase 7 is the acquisition of the knowledge and skills necessary for implementing the plan. The Supervisor's Academy had helped the trainees learn new skills and devise a path forward. Provisional trying of the new role, phase 8, began as the trainees worked through the activities and

exercises built into the course, and carried over into the workplace as they executed their action plans.

Mezirow describes the ninth phase as building competence and self-confidence in the new roles and relationships. The Supervisor's Academy provided a non-threatening environment in which to experiment with and learn new skills. Following the course, the restructured organization helped push the trainees into a new role as they assumed new accountabilities and implemented new practices.

The final phase of perspective transformation, as described by Mezirow, is the reintegration of the new perspective into one's life. In follow up interviews with the pilot participants, we received anecdotal evidence of changed behaviours and practices by the trainees when they returned to their workplaces. Post-training actions have included accepting new role accountabilities, use of the tools and models presented during the course, being an active spokesperson for change, and encouraging colleagues and managers to attend the Supervisor's Academy. This strong evidence that the synthesis learning was occurring, encouraged us to deliver the course with only a few formative changes along the way.

Formative Changes and Instructor Training During Subsequent Deliveries

The success of the pilot delivery meant that little rework was necessary, nevertheless, as we learned from each workshop, we made formative changes as we went. Several of the smaller pieces were combined into larger modules, and some minor changes were made to the content. For instance, as the full course delivery schedule was implemented, it quickly became apparent that the instructor teams added an interesting variable to the study. The course was designed to be co-facilitated by two instructors who

managed the course delivery, presented their modules, and integrated the material presented by the subject matter experts. Consequently, the quality of the delivery was the responsibility of these instructors. Because of the upcoming, very demanding delivery schedule, which required back-to-back and concurrent deliveries during the first year, we decided to train most of the departmental staff to deliver the course. As a result, there was generally a lead instructor and a support instructor who was being trained. To meet the increasing demands of the delivery schedule, the qualifying of instructors had to be accelerated. The original requirement for trainer qualification consisted of a course preview, observation of the delivery of the course, course content training, and co-delivering with a qualified instructor for at least 2 courses or until the new instructor had demonstrated the ability to deliver the course to meet all of the learning objectives. To speed the qualification process up, the number of co-deliveries was reduced, and some instructors were paired with teaching partners who themselves were not fully qualified. Moreover, some instructors were designated as back-up facilitators and qualified to present only portions of the course. Because of individual schedules, it was not possible to keep the same pairs of instructors together. Thus, the subsequent deliveries were facilitated by differing pairs of instructors, who were at various levels of qualification.

The resultant pairing of instructors introduced an interesting variable into the deliveries. Abbreviating the train-the-trainer process meant that instructors were delivering courses at differing levels of preparedness. Further, some of these new instructors were also receiving feedback and coaching from lead instructors, who themselves may not have been fully conversant with the whole course. In effect, all instructors were not trained to a common standard. Instructors did not always link the

material well among the different modules or focus discussion toward developing a synthesis level understanding of the material. Instructors who were less prepared or less comfortable with the material tended to teach individual modules as discreet units rather than as part of a whole. Thus, the quality of instruction became a factor in the results achieved during a given delivery. The implications of this variation are discussed in Chapter 4.

The trainee mix always included individuals from the different work locations and functional groups. A major change occurred about mid-way through the deliveries, when the middle managers were included in the target population. These middle managers supervise the management supervisors, so there was some initial concern about the middle manager presence dampening the participation and openness of the supervisors. Care was taken in the scheduling not to have a supervisor and his/her immediate manager on the same course. However, the concern about having the two management levels in the same class proved to be unfounded. The management supervisors profited from the deeper level of discussion and broader perspective of the middle managers, and the middle managers learned about the needs and issues of the supervisors first hand. The broader mix of trainees actually enriched the experience for the supervisors. Course deliveries are continuing, so this study considers the results of the first 40 classes only.

Course Evaluation

A comprehensive evaluation of training programs has been described as having four levels, namely reaction, learning, behaviour, and impact results (Kirkpatrick, 1998). The Supervisor's Academy has been evaluated extensively at the first three levels. This section summarizes the evaluation results from the information as available for the first

21 course deliveries of the Academy. This constitutes over 50% of the courses delivered. Reaction data is available for most of the modules of deliveries 1 through 19, and also for delivery 21. Learning level results are based on instructor feedback and the trainees' action plans. A post-course workshop and a computer-based survey were used to collect data at the behaviour level. In addition, the training department has conducted a training self-assessment of the program. Thus, the reaction, learning, and behaviour levels of Kirkpatrick's model have been assessed.

Reaction Level

The course-end reaction sheets asked for trainees' comments. Essentially, we asked what they liked most, liked least, and suggestions for improvement. As well, the survey asked the trainees to rate the presenters and specific aspects of the delivery on a 1-to-7 Likert scale. As a standard baseline to determine program success, the design team had earlier decided that no course delivery should average less than 5.5 on the scale of 7, and no single course module should average less than 5.0 on the scale of 7 on the reaction feedback. The averages were well above these criteria.

The reaction comments were generally favourable. Some common themes, with illustrative comments, were:

1. Trainees expressed appreciation for the vice-president's keynote address and the occasional drop-ins by other of the senior managers. Three comments given were: "I liked the option of being able to openly ask questions of the VP." "It was good to hear from the VP level that they understand the importance of the supervisor's role. It set good grounds for why we are here." "Representation of senior management gives credibility to the importance of the course content and desired results."

2. Concerning favourable reviews of the guest presenters, one even commented, "Excellent use of specialist facilitators for delivering the material." Another said the "majority of presenters and facilitators were excellent." And a third wrote: "I liked the enthusiasm and helpfulness of the instructors."

3. The trainees endorsed the choice of a remote location so that they could immerse themselves in the training without the distractions of the workplace. Comments included: "The facilities were excellent. It got you away from work and distractions. This helped people work together -- great team building." "Perfect location -- away from the jobsite."

4. Another aspect that received positive feedback was how well understanding of the theoretical concepts was balanced with practical applications. The feedback included comments such as: "I learned why the techniques worked"; "Lot's of meat in the subject material"; and, "Practical solutions to problems were identified."

5. The mix of trainees from all the different locations and functional groups provided an opportunity to network and discover others' perspectives. One person wrote, "The opportunity to meet supervisors from the different locations and job functions, and, to discuss common concerns was great." A second stated, "I enjoyed receiving the input of people I didn't previously know, and listening to their personal experiences."

6. Concerning our decision to divide the class into small study groups so that trainees could quickly find a comfort zone, one commented, "Learning in teams was helpful." Another said, "Interactions within the group helped me capture the lessons learned."

7. The trainees described the material as useful and relevant. Comments included: "The topics provided some new information and reinforced basic managerial techniques"; "The modules are all relevant to my work"; and, "A large number of the issues that applied to me were addressed throughout the course."

8. The trainees particularly appreciated the mentors' perspectives, and felt that the mentors added value to the learning experience. One wrote: "I appreciated the mentor's willingness to share his experiences and his encouragement." Another said, "They are supportive and objective."

Concerns and suggestions expressed in the reaction feedback, with supporting comments, included:

1. Regarding the busy schedule, including evening sessions, one person complained, "It's a very busy schedule. I suggest you plan some physical activities for mid-day so we can clear our minds and refresh." Another griped, "A tremendous amount of material for two weeks, sometimes resulting in a restrictive time format." And another wrote: "Reduce the number of evening sessions."

2. One major area of concern was the disconnects between the course content and the trainees' real world. Some typical comments were: "Make the practical examples more relevant to our workplace by using Greentech examples instead of external case studies"; and, "Some of the tools and concepts do not align well with current practices here at Greentech."

3. Trainees also feared a lack of line management support because their immediate managers had not received the same or similar training. One wrote: "I'm not sure of the reception waiting back at site. I hope our middle and senior managers are as

excited about this as we are, so they can properly support us." A second commented, "Do whatever you can to get the middle managers on this course. I will do my part by letting my managers know how important this course is."

Many of the concerns expressed related to the logistics of the delivery, such as facilities, accommodations, and travel. When possible, such concerns were addressed as they arose. Other concerns related to the design choices, such as the concern expressed about Sunday and evening sessions. However, these sessions were necessary in order to meet the constraints of time and budget. Aware of this formative feedback, we compensated for the busy schedule by ensuring that we focused on applications and practice during the evenings, not on the presentation of new material. Consequently, the original design was maintained, as it was not possible within the budget and financial constraints to opt for a different arrangement. Where suggestions were practical and did not impact on the design intent of the program, we tried our best to implement them. Some examples included reducing the number of questions posed in the major case study and condensing it from three to two sessions, streamlining the course information and interview package to encourage more of the trainees' managers to meet with the trainees before and after attending the course, and building additional flexibility into the schedule where possible.

In reviewing the reaction feedback, the focus was placed on general themes or trends rather than specific comments. For example, the Supervisor's Academy was designed to go beyond a compartmentalized understanding of the various elements and practices of the supervisor's role, and was intended to produce a holistic understanding of how the various elements and practices are linked and integrated into a larger conceptual

framework. When a suggestion reflected a compartmentalized interpretation of the material rather than the intended holistic understanding of the content, no action was taken unless there was a specific need for clarification. Where trends or deficiencies were apparent, remedial action was taken. For example, when modules, such as Requisite Organization and Event-Prevention, showed a pattern of low ratings, revisions were made and the overall ratings improved in the subsequent course offerings.

Additionally, the reaction sheets requested a rating on some specific aspects of the program and the presenters. The overall pattern of results regarding content depth, integration of subject material, and overall quality is illustrated in the graphs in Appendix A. These graphs show the range of ratings for each module, as well as the average overall rating, (calculated as the average of averages). The average rating of overall quality, (calculated as the average of module averages), for each delivery of the Supervisor's Academy is also shown. In summary, the data shows that the average ratings were well above the baseline criteria. Interestingly, when trainees completed a reaction sheet rating the overall program, the result was consistently higher than the average of their ratings of each module. The extent to which this reflects a synthesis of the modules into a more comprehensive whole is unknown. Nevertheless, it does allow for the possibility that the higher overall rating is an indication that there was additional value added through the integration of the various modules into a more complete understanding.

When the middle manager ratings were compared to the supervisor ratings, it was observed that middle manager trainees typically rated the course 0.25 to 0.33 lower (on the 1 to 7 scale) than the supervisors. An explanation for this lower rating may be explained by the fact that the course was designed specifically for the supervisors.

However, the middle managers still rated the course higher than the baseline criteria. In fact, the middle managers rated delivery 29 slightly higher than the supervisors did. The feedback clearly indicates that the program was well received by both groups.

Trends in the reaction results were monitored and remedial actions taken when results did not achieve the expected standard. For example, the Requisite Organization and Event Prevention modules were revised to improve reaction level feedback. An application exercise was added to the Requisite Organization module and a more interactive delivery style was adopted. One case study was dropped from the Event Prevention module because it did not integrate well with the balance of the module. Additionally, the application exercises were changed to progressive stages of the same scenario, resulting in better linkage of the concepts in the event-prevention model. These kinds of remedial changes moved the design toward a more interlocked, rather than a less interlocked, structure.

As the instructors gained experience through successive course deliveries, the need to synthesize the material into a more comprehensive whole was reinforced. The kind of remedial actions discussed above were a reflection of the instructors' own learning. The course designers were very aware of the intricate relationships among the course modules. As a result, they easily recognized when the learning cycles were appropriately linked within and among modules. Other instructors who were less familiar with design or less experienced in course delivery may not have understood the intricacies of design, but certainly recognized when the delivery reached its intended goal. Repeated deliveries, observations of other instructors, and review of the feedback

revealed the need to understand the intricacies of the design and to integrate the learning by interlocking learning cycles.

Learning Level

Learning results means more than learner satisfaction; this Kirkpatrick level involves knowledge and skills gained. This gain was based on instructors' observations and their critique of the trainees' work. It also included instructors' observation of participation patterns of individuals and their informal assessment of listener comments concerning the program content and how well it met the course goals. As well, instructors monitored and critiqued the output of individual and team assignments during the course. This was essentially a norm-referenced evaluation, as no specific criteria were defined for the trainees' responses. The validity of such evaluations depended on the consistency among instructors and their assessments. The participation patterns revealed an increased willingness on the part of the trainees to accept and actively support the concepts presented as the course progressed. The instructor assessments were a collaborative effort on the part of the two instructors. The mixing of instructor pairs helped maintain a balance and consistency in the instructor assessments.

Each trainee prepared an action plan to transfer the learning back to the workplace. Although the action plans were not submitted for review, the instructors coached the trainees through the action plan preparation. On the last day of the course, the trainees presented their action plans to a panel of senior managers. These were stand-up presentations within the class setting. The panel provided comments and feedback to the individual presenters, and offered encouragement and support. The instructors monitored these presentations to ensure the actions were aligned with the intent and

content of the program, and reflected a clear understanding of the concepts involved. For any given class, all of the module subjects were reflected in at least one of the trainee's action plans, indicating that the subject areas were relevant to the audience. In addition, instructors looked for examples of content from several modules being blended together into an action strategy. Invariably, classes showed evidence of such synthesis of the content material. The action plan essentially served as a practical test for the course. To date, all trainees who attended the course have received credit and this level of learning was seen as successful.

Behaviour Level

At the behaviour level, we searched for evidence that the learning occurring in the classroom was transferred back to the workplace. The pilot class was reassembled for a post-course discussion 10 months after the delivery. Data were also gathered from an electronic survey of graduates from course deliveries 2 to 25, and a similar survey of these trainees' immediate supervisors. The survey inquired into the extent the trainees had transferred the learning back to the workplace and explored their general satisfaction level with the training.

A total of 195 (32%) trainees, and 85 (28%) trainee supervisors responded to the respective surveys. Some key findings of the survey are:

1. Seventy-four percent of the trainees and 86% of their immediate supervisors believed that clear role accountabilities have been defined. Sixty-seven percent of trainees and 78% of the trainees' supervisors indicated that clear role authorities have been defined. However, only 55% of the trainees indicated that these accountabilities and authorities are aligned with the content of the Supervisor's Academy module. This

perhaps reflects the fact that the course presented a more theoretical requisite management perspective than was the reality in the workplace. Interestingly, 57% of the trainees indicated they were fulfilling their accountabilities and authorities according to requisite management, but 93% of their immediate managers were unsure as to whether they were fulfilling those accountabilities and authorities. The course was built on requisite management principles because the organization was restructuring according to the requisite organization model. In reality, Greentach did not adopt the model completely, and implementation was much slower than projected. The resulting disconnects between theory and reality because of this situation clearly provided some impediments to the full transfer of this learning. The high level of uncertainty among the trainees' supervisors (93% unsure) versus the higher level of certainty among trainees (57% said they were fulfilling their accountabilities and authorities) *suggests* that the trainees have acquired an understanding of their role and are striving to fulfill it in spite of ambiguity in their workplace. Thus, it may be argued that the course achieved its objective, but transfer was inhibited by workplace conditions. This point is taken up again in Chapter 4.

2. Seventy-one percent of the trainees indicated they valued the supervisor's role more at the end of the course than at the beginning. Fifty percent indicated they value the supervisor's role less once back in the workplace than they did at the end of the course. This finding is consistent with the pilot class feedback that the course was effective in presenting a role that the trainees value, but that they were disillusioned or frustrated on returning to the workplace.

3. Eighty-six percent of the trainees indicated that they felt the course met its goals at the end of the program. In retrospect, 6 to 12 months after the course, they rated the Supervisor's Academy at 5.37 on a scale of 7 for overall quality. This is only slightly less than the reaction-level average rating for the overall quality of the first 20 course deliveries. Historical data are not available at Greentech to provide a pattern as to how the typical trainee rates a training course a few months after the program as compared to the reaction rating at the end of a course. It may be argued that the trainees are simply recalling their reaction rating rather than reassessing the value of the training at the later date. Nevertheless, it is believed that this is a very positive finding, because it indicates that the trainees' perceived value of the course endured over time.

4. A series of 21 questions were asked to determine if the trainees were doing what was discussed at the course, and how helpful the training was with respect to these practices. These results are shown graphically in Appendix B. Typically, about three-quarters were performing these practices. The average difficulty rating for the practices was between 3 and 4, on a scale of 7. Typically, the helpfulness of the training for the practices was rated between 4 and 4.5. Supervisors typically rated the amount of improvement in their trainees between 4.5 and 5. The training department does not have benchmark data to indicate what the rating has been historically for courses that were considered successful. Certainly, the restructuring process, the additional workload of the recovery plan, frequently changing priorities, and the inconsistent training of different management levels presented barriers to transfer. Consequently, this result is judged to be at least an acceptable result and possibly a very good result depending on the interpretation criterion used.

5. On average, trainees indicated that 62% of their action plans were complete at the time of the survey. Some typical responses as to why action items have been put on hold or were incomplete included lack of time, a high rate of change, workload, resource constraints, changed position, unclear organizational structure, and lack of line management support. Examples of benefits to the organization resulting from action items included better communication, improved time management, clearer role expectations, more use of positive reinforcement, more monitoring and coaching, and improved safety culture. Only 39% of respondents indicated that their action plans were incorporated into their personal performance contracts. Forty-two percent of the trainees' supervisors indicated that the action plans were not incorporated, whereas 58% were unsure. This surprising finding may reflect the low number of post-training meetings and follow-up by trainee's managers, a clear barrier to transfer (which is described in Chapter 4).

These results, taken together, suggest a favourable evaluation of the course. However, it is also important to recognize the questions often had no point of comparison or were somewhat imprecise. For example, respondents generally indicated they were *performing* these practices. What we do not know is to what standard and frequency they are performing them, because it is their self-report data. Similar questions are valid regarding the rating of difficulty, and helpfulness of the training. Even their managers' rating of improvement is open to criticism in this respect, because managers' interpretation and bias is involved. Perhaps the most that can be claimed from the data is that the training was perceived as significant in changing behaviour. More objective methods of measuring behaviour level results might have been helpful, but the subject

areas were generally "soft skills" and are difficult to compare with any specific benchmarks.

As a general benchmark, however, it has been estimated by Broad and Newstrom (1992) that perhaps only 50% of training is being consistently applied a year later. Broad and Newstrom also quote studies that indicate possibly as little as 10% of expenditures on training result in observable changes in behaviour in the workplace. They identify the absence of reinforcement on the job as the most significant barrier to transfer. Although this does not justify or excuse a low level of transfer to the workplace, the behaviour level result suggests that this course compares favourably to the typical transfer of learning levels for organizational training. Although it is not a definitive measure of the course's success, the results do look strong when compared to these general benchmarks.

Impact Results Level

The training was only one of many major changes that occurred simultaneously during a major recovery program to improve performance. Thus, it is extremely difficult, if not impossible, to isolate supervisor's learning as the cause of performance improvement or decline when so many variables were changed. Consequently, no specific results level evaluation was undertaken at the fourth level of Kirkpatrick's model of evaluation. Nevertheless, there is one strong indicator that the Supervisor's Academy has had a positive effect on performance. Every year Greentech has an independent body conduct a performance review of a major part of its operations. The reviews benchmark performance against world standards, identifying areas of strength and areas requiring improvement. Although these reports are unpublished and confidential, management has indicated to my department that the Supervisor's Academy was a contributing strength

during the most recent review at two of Greentech's three major sites. Based on these assessments, it is reasonable to assume that the Supervisor's Academy has had a positive impact at the results level.

Training Self-Assessment

The training department has a practice of conducting internal audits of its training products, called training self-assessments. A team, consisting of two internal auditors and two external experts, conducted a self-assessment of the Supervisor's Academy. We chose delivery 33 at random for the assessment. The assessment report indicates that the course content was excellent, and that the curriculum represented the skills required to develop effective supervision at the management supervisor level. The report highlights specific strengths, including:

1. By the end of the first week, a very strong dynamic had developed, resulting in trainees being motivated and eager to learn.

2. Instructors were fully engaged, effectively leading the class, and transitioning smoothly.

3. The senior management mentors added value by clarifying points and sharing their personal experience. Several trainees sought their advice in one-on-one sessions outside of class time.

4. The comfortable classroom environment encouraged good communications and participation.

5. The instructors and mentors daily debriefing sessions provided effective self-critique and resulted in on-the-spot corrections.

6. The instructors provided clear assignments and directions, reducing the probability of misunderstanding or misinterpretation.

The training assessment recommended only minor changes to the course. The major recommendation for improvement related to pre-course and post-course support for the trainees from their line management. The self-assessment confirmed the department's own conclusions about the program.

The success of the Supervisor's Academy satisfied Greentech's expectations at every level. More importantly, the course designers are satisfied that the course has achieved its intended result. In particular, the methodology of interlocking learning cycles to synthesize learning into a broader conceptual framework was achieved. In the next chapter I discuss the results in light of the literature, and offer conclusions.

CHAPTER 4

DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS

The evaluation results provided a clear picture of the success of the training from the perspective of the organization. In this chapter, I discuss the contributions to this success of the design factors, such as interlocking the elemental learning cycles, the delivery interactions, and the organizational support. This section explores these topics in the light of the results and the literature.

Usefulness of the Design Factors

The design strategy of interlocking learning cycles contributed to the success of the program. In this section I discuss the importance of the elemental learning cycle and the success experienced in interlocking the learning cycles during this study.

Importance of the Elemental Learning Cycle

I used an elemental, cyclical process that I extracted from the literature to design a training course in which the learning cycles were interlocked to foster synthesis learning. The course objective was to achieve a holistic understanding of the role and practices of supervisors at Greentech, rather than a collection of compartmentalized skills. Except for Hunt's (1987) depiction of how the action of one individual can provide an experience for a second, the literature does not discuss interrelationships between learning cycles. Thus, this course design's exploration of ways for interlocking learning cycles within and among course modules to integrate the learning into a more comprehensive and complex understanding fills a gap in the literature.

Educators have the dual role of managing the learning process and presenting the subject material. Because the elemental learning cycle describes the fundamental process of adult learning, it explains the process trainees go through as they learn the concepts, skills, and attitudes presented during a course. Thus, the elemental learning cycle can be used to deliver a discreet unit of instruction. The number and sequence of learning cycles determine what is learned and how it is learned as each cycle delivers its discreet unit of learning -- cognitive, psychomotor, or affective. The sequencing and linking of these learning cycles map out the lesson development. Thus, the elemental learning cycle is particularly significant in designing for synthesis learning, because several units of learning are integrated together to achieve synthesis. In order to define how these units fit together, the course design should make links among the learning cycles that deliver these discreet units.

Bloom (1971) explains that synthesis draws "upon elements from many sources and puts these together into a structure or pattern . . . [to produce a product that is] more than the materials . . . [the learner] began to work with" (p. 162). Because the Supervisor's Academy was a modular course, much of the content was presented in predefined packages, such as those modules delivered by the subject matter experts. The trainees were expected to synthesize these components into a comprehensive picture -- to develop an understanding that was broader than the subject material presented. The interlocking of learning cycles was essential to facilitating that synthesis.

Success of the Interlocking Learning Cycle Design

The design intent was to interlock learning cycles within and among modules to produce a holistic understanding of the subject material. The lesson plan and instructor's

notes did not provide scripts, as this was to be achieved through facilitated discussions and the sequencing and debriefing of activities. The course material provided the subject information. The instructor's lesson plan provided the general structure, agenda, and activity descriptions for delivering the course. The actual facilitating of the course was dependent on the instructors' skill. To that end, a program of instructor qualification was laid out; it also provided them with an opportunity to rehearse their delivery. This level of preparation is consistent with Knox (1986), Brookfield (1990), and Pike (1994).

Observation of several course deliveries revealed that the material from the different subject modules was generally linked, but not as well or as often as the designers intended. The sequence of planned activities naturally integrated some of the material without requiring specific instructor intervention. Additionally, the natural flow of discussions integrated other portions of the subject material. Thus, there was a level of integration that occurred spontaneously through the delivery process. For example, during the safety module linkages were frequently made to the event-prevention strategies presented in the event prevention module and to error reduction programs that have been implemented at the various sites.

Personal experience and observation of other instructors revealed how well the intended integration occurred. Frequently, instructors did intentionally interlock learning cycles, using any or several of the methods described in Chapter 3. For example, the experience of making the paper toy was repeatedly used and debriefed from different perspectives in subsequent modules. Several parallel learning cycles were discussed simultaneously as trainees analyzed an experience or role-play and matched it to a workplace scenario. However, most of the examples observed related to the linkages that

were designed into the course. There were examples of instructors intuitively creating additional linkages, but these were infrequent. Nevertheless, such spontaneity adds to the credibility and authenticity of the instructor -- important factors according to Brookfield (1990).

Whether designed or spontaneous, most of the links between learning cycles resulted from pulling information from a previous learning cycle into the discussions during the reflection phase of a future learning cycle. It was unusual for instructors to spend a sustained period of time manipulating parallel learning cycles. This is not necessarily surprising in that such concentrated manipulation of the learning process can be mentally tiring if the instructor does not enjoy the challenge, if the trainees are not receptive, or if there are external pressures, such as time. Similarly, Brookfield (1986), and A. Rogers (1996) discuss the challenges of teaching adults. Brookfield (1986) notes that many teachers prefer to use the term *facilitator*. In spite of this apparent emphasis on a more student-centered, facilitative approach, he (Brookfield 1990) later points out that teachers often reduce the effectiveness of their instruction by restricting or limiting the amount of time devoted to reflection. A. Rogers (1996) indicates that teachers require good social skills, in addition to subject matter knowledge. It is not surprising, then, that our instructors experienced some difficulty in sustaining highly interactive, in-depth discussions.

Insufficient reflection and discussion sometimes resulted in truncated learning cycles. These generally occurred when instructors were pressed for time. Under time pressure, instructors often did not allow sufficient time for reflection or they aborted the learning cycle before application occurred. Hunt (1987) suggests that omitting the

application phase of the learning cycle means there will be no planned actions. These actions, he suggests, are often rejuvenating. Here, we can expect truncating the learning cycles to ultimately result in less transfer of learning back to the workplace. Failure to bring learning cycles to closure is likely to occur when the design is complex, or the instructor does not readily recognize learning cycles in the dynamic of a course delivery. For example, the failure of instructors to adequately answer a trainee's questions during a discussion sometimes meant that the trainee did not complete his or her reflection and could not draw an accurate or complete conclusion. Failing to complete learning cycles has an impact on learning even when the design is simple and straightforward. When the design is complex, it will clearly have an even greater impact on the intended outcome. The examples of truncated learning cycles that I observed were not detrimental to the learning in the sense that the trainees did not fail to grasp the concepts at a basic level; rather, the learning simply did not reach the intended depth -- it did not appear to be synthesized into the larger conceptual framework. As Jarvis's model indicates, learning can take a number of pathways. If the learning cycle is truncated, the resulting pathway is more likely to be non-reflective and at a lower hierarchical level. This is particularly significant when the desired outcome is synthesis learning. Fortunately, truncating of learning cycles became less frequent as instructors gained inexperienced in facilitation and with the program. This observation reaffirms the importance of completing the learning process whatever the design or methodology. It also highlights the increased alertness and training required of the instructor when the design requires complex manipulation of the learning cycles.

One benefit of using a training design structured around the elemental learning cycle is that the course structure and agenda allow for complete processing of the course material. The implication for practice seen here is that design focused on synthesis learning becomes rather complex and requires additional skill to execute. Bloom (1971) insists that learners are functioning at the synthesis level when they produce new products, rather than simply consume or criticize ideas. Synthesis learning -- producing a new product or whole -- is obviously more complex than simply consuming or criticizing existing ideas and concepts. The greater complexity demands a more intricate design, such as that which results from interlocking the learning cycles.

Usefulness of the Delivery Factors

Delivery factors that influenced the usefulness of the design strategy were the pilot delivery, the instructors' role, the trainees' role, and the interactions among trainees and instructors. In this section, I review the impact of these factors.

Importance of the Pilot Delivery

Of the 40 deliveries, the pilot delivery had the most visible impact on the trainees. As project leaders and course designers, my colleague and I delivered the pilot course. We were keenly interested in testing the elemental learning cycle in our design strategy. As a result, careful attention was focused on integrating the learning among the different modules. Synthesis was evident as trainees used the vocabulary of a module in discussions of concepts in subsequent modules. Their action plans also reflected a blending of concepts from different subject areas. Evidence of some elements of perspective transformation was apparent when many trainees wrestled to control their emotions while they presented their action plans to the management panel. The

perspective consistently expressed in their comments to the panel revealed a more holistic understanding of their role, and a commitment to that responsibility. From an organizational point of view, the training had been quite effective, because the synthesis learning successfully integrated both the cognitive and affective dimensions of the various course content. Thus, the product of the learning was greater than the material components provided. This is consistent with Bloom's (1971) expectation for synthesis level learning.

One clear learning from the pilot was that the complexity of the course and the large volume of material covered in the time frame did not allow for any free space in the delivery. Every minute of the program was filled with activity. Consequently, the instructors had to be continuously alert to ensure that the material was covered completely, and that the discussions were integrating the learning. This can be exhausting for the instructors, even when co-facilitating. Similarly, the pace required the trainees to be active and engaged throughout the program. Many of the trainees at the pilot had been away from formal learning for some time. The pace of the program proved to be quite demanding, intentionally taking them to a saturation level. The instructors recognized the potential of the class disengaging because of overload, so the evening session on the first Wednesday was cancelled and the material woven into later modules. Taking a lesson from this experience, the pace of future deliveries was adjusted and no future evening sessions were ever cancelled. However, the experience did illustrate how it is possible to overload the student and cause disengagement. We quickly realized that although it is possible to engage the student effectively at the synthesis level, there is a danger of overloading causing the learning to collapse entirely. Wlodkowski (1993) cautions that

learners worry when they perceive their skills to be less than required, and experience anxiety when the challenges seem much greater than their capabilities. The experience of canceling the one evening session taught the instructor team to be more sensitive to the trainees' needs.

The pilot delivery also confirmed the need for the instructor to be completely engaged in the process and extremely alert. Not only does the instructor have to facilitate and steer the discussions to ensure that all the required content is covered, he or she also has to be alert for opportunities to make linkages to other content material if the trainees fail to recognize the connection. To engage the trainees and keep them functioning at the synthesis level, the instructors must also continue to function at that level. This requires masterful facilitation that can be difficult to sustain. Even though the pilot instructors were the course authors and were intimately familiar with the content, there was still a tendency to lose focus and return to lecturing when time pressures arose. Brookfield (1990) points to the tendency to give more emphasis to action than to reflection, even though many instructors espouse the principle of praxis. Lecturing limits reflection, thereby truncating the learning cycles. Thus, the second major learning from the pilot delivery was a recognition that the quality of facilitation and level of facilitation was key to the success of the design.

Contribution of the Instructor's Role

The instructor's role in the success of the delivery became apparent early on. Because the preparation process for the course instructors was abbreviated, many individuals were delivering the program before they were fully conversant with all the material and with the design strategy. Consequently, they were not all able to generate

and sustain discussions at the synthesis level. For parts of the course, the synthesis and integration occurred naturally as a result of the discussion and activities, even without the prompting of the instructor. This was more likely to occur in classes that were more eager to learn. Nonetheless, the importance of the instructor cannot be overstated. It is the instructor who manages the discussion, keeps it at the appropriate level, and adds any missing information.

The poorly prepared instructors introduced an interesting variable into several of the course deliveries -- for example when several instructors were outside their comfort zone and felt pressed for time, they had a tendency to default to lecture. Even worse, the lecture occasionally became a parroting back of the presentation slides without added explanation. Fortunately, these extreme incidents were rare, and limited to the period when new instructors were learning the program. However, there were frequent occasions when the instructors failed to sustain a deep enough discussion or to make intended linkages among subject material. Appendix C shows the observed subject linkages during delivery 3, which was the first delivery of the course for both instructors. About half of the intended linkages were missed, as can be seen from a quick comparison to the intended linkages, also shown in Appendix C. This course delivery received the lowest reaction level ratings for module averages of all the course deliveries even though its average rating overall was higher than some other deliveries. In part, the higher average rating can be attributed to the strength of presentations by the subject matter experts and the fact that the course authors replaced the scheduled instructors for part of the delivery. This highlights the importance of the instructor role, and the difficulty in preparing instructors to recognize the complexity of the design and to sustain performance at the

required level. Seaman and Fellenz (1989) emphasize the importance of both the instructor and the trainee working at the same taxonomic level, and the need for "teaching strategies ... [that] enable the adult learner to acquire knowledge at the desired level if the learning is to be meaningful, useful, and satisfactory" (p. 21).

The differing levels of instructor performance provided an opportunity to observe the impact of the instructor's role on the effectiveness of the design. For example, the excitement resulting from the changed perspectives expressed at the close of the pilot delivery faded as less prepared instructors assumed the lead role. The level of enthusiasm and commitment that trainees exhibited at the close of courses varied considerably. A direct correlation was observed between instructor performance and trainee reaction. Although it is impossible to prove definitively that this is a causal relationship, as some trainees may arrive with personal issues or problems that are barriers to learning, it does confirm the importance of the quality of instruction in achieving the desired result. For example, during course delivery 36 the instructors paid particular attention to integrating the learning from different modules. The class responded, taking charge of several assigned activities and modifying them to integrate learning from previous modules.

From these observations, it is reasonable to conclude that good, interactive, engaging discussions that consciously interlock learning cycles and point learners to the larger picture can be effective in producing synthesis-level learning and in transforming the learner's perspective in some cases. This is consistent with Mezirow's (1991) contention that transformative learning requires an encounter with new data that does not fit our existing paradigms. Such data are a natural outflow of interactive discussions. It is also reasonable to conclude that the role of the instructor in leading and sustaining this

level of interaction is critical. Therefore, for purposes of using the elemental learning cycle in training, the instructors should view themselves as both subject matter experts and educators. Obviously, they must be conversant with the subject material in order to teach it. Similarly, they must understand the learning process in order to *manage* the students' learning. C. R. Rogers (1983) reports that students in a "human, facilitative environment" (p. 197) are more creative, learn more, and are more capable of problem solving. Instructors must be able to apply their knowledge of adult learning processes to their teaching role as readily as they can apply the subject material in which they are expert.

Contribution of the Trainee's Role

Just as the instructor's role is significant, the trainees' readiness and willingness to learn is also significant. As this project made clear, if the trainees choose not to engage in the process or decide not to remain active, they will not synthesize the learning. Synthesis of the information and concepts has to occur in the mind of the learner. It does not matter how articulate the instructor is, how long and intricate the explanations are, or how many times the material is repeated, if the trainees choose not to engage in the learning process, then no learning will occur. It is particularly true for reflective level learning. As Freud (cited in Wlodkowski, 1993) said, "One cannot explain things to unfriendly people" (p. 178).

It was obvious to me and the other instructors that most of the trainees attending the 40 course deliveries of the Supervisor's Academy arrived eager to learn. Occasionally, someone would be reluctant, viewing the course as simply a mandatory work assignment; but even in these few cases, their attitude usually changed quickly as

they became part of the experience. Only two trainees dismissed the course and dropped out. Very few, perhaps less than 20 of the approximately 1100 trainees to date, simply tuned out while at the program. In all cases, this was because of work or personal issues, not the training program itself, based on the explanations they provided or the issues they presented during class discussions. It may be assumed from this observation that individuals can be actively engaged in a learning event even when it is demanding, if they have sufficient motivation to learn.

Using Apter's model of arousal, Wlodkowski (1993) points out that adults want low to moderate levels of stimulation for learning tasks they see as imposed, but, they are invigorated and challenged by moderate to high levels of stimulation when it is something they have chosen. He further notes that "optimally challenging learners means allowing them to pursue learning tasks that are *moderately* difficult to achieve" (p. 286). Clearly, the design of the course influenced the trainees' motivation to learn. Additionally, how well their manager's positioned and supported the training, and how well the instructors' presented the course also had an impact on the level of trainee motivation.

The entry level of the trainees varied somewhat because the supervisors were from different functional groups. Their work backgrounds included trades or crafts, technical, business, production, and so forth. Their education level ranged from high school to college or university degrees. This varied background did not appear to affect individual performance at the course. The decision to send the middle managers through the course changed the trainee mix even more. Most of the middle managers had a technical background and at least one university degree. This change in entry level

initially caused some concern because some instructors thought that the supervisors might be inhibited by the presence of the middle managers. They were also concerned that the middle managers might take a more strategic view than the supervisors, thus refocusing much of the discussion away from its supervisory emphasis and toward more general management challenges. These concerns proved to be unfounded. In fact, the broader perspective of the middle managers enriched the discussions. As a result, it was easier to initiate and sustain a more involved discussion. This enabled better reflection and integration of the learning. Wlodkowski (1993) claims that the two major motivating factors during training are the stimulation process and the emotional effect of the learning. Thus, it may be assumed that the more diverse classes offer a more stimulating and emotionally satisfying learning environment.

Reflecting on this experience, it is possible that we tended to underestimate the individuals' capacity for learning. Individuals do rise to the challenge if a sufficiently stimulating learning environment is provided and the learning event is managed to permit adequate exploration of the content material through discussions, interactive participation, and structured activities. It is possible to design training that synthesizes the learning into a holistic picture and engages the audience to respond at that level. The background or experience of the trainee does not necessarily limit the success of the training; rather, based on this study, it seems that training success is more dependent on the integrity of the training design and the management of the training event. In this study, the busy schedule -- even the evening sessions -- did not deter the trainees, although at times it was tiring for them. This is consistent with Maples (1996) contention that a stimulus-rich learning environment is important for maximizing learning, whereas

an over-structured environment will impede learning. With respect to interlocking learning cycles to achieve synthesis learning, it is important that the design is engaging enough to maintain an optimum level of stimulation, but not so complex as to become oppressive. Both course designers and deliverers must be sensitive to the needs of the trainees.

Importance of Interactions Among Trainees and Instructors

Although supported by structured activities and case studies, facilitated discussion was the primary delivery method. Effective discussion required the active participation of the trainees and the guidance of the instructors. The mix of trainees from different sites and functions assisted in the cross-fertilization of ideas, enriching reflection as concepts were explored and integrated into the full picture. Their sense of loyalty to the organization and desire for its success helped these mixed groups quickly coalesce into a team. The diverse interests and perspectives of the trainees kept them focused on the learning and the organization as a whole, rather than being consumed with the narrower issues of specific workgroups -- as we have observed with homogeneous classes. Brookfield (1990) notes that the optimum class size is between 12 and 16. Gagné, Briggs, and Wager (1992) point out that classes are more difficult to manage as group size increases. However, we have found the diversity of interests and backgrounds in the larger, more heterogeneous classes to be a positive factor. Thus, a synergy developed within the classes that encouraged an active dynamic and participation.

In addition to the synergy among trainees, there was also a synergy that developed between the trainees and the instructors. The instructors set the tone for the course by challenging paradigms, stimulating dialogue, integrating ideas, steering discussions, and

exploring underlying values. Summarizing earlier adult educators, Brookfield (1990) advocates, "Anything that helps students learn is good, effective teaching" (p. 193). In this case, effective teaching engaged trainees in an interlocking matrix of learning cycles without becoming excessively complex or exceeding the trainees' attention span. If the instructors had not been sensitive to the trainees' views and feelings, they could have caused offense. Thus, it was necessary for the instructors to build a rapport with the class. When the instructors displayed sensitivity to the interests of the trainees, they developed a synergy that allowed more challenge as the course progressed. This was particularly so when the instructors' response was based on live interaction with the class rather than pre-thought strategies based on lesson plans. As the instructors adapted to the trainees' needs, the trainees gave more liberty to the instructors. Brookfield (1990) emphasizes the importance of earning the trust of their students. When a strong dynamic was established, the instructors were able to maximize learning by strongly challenging the thinking of the class.

We saw that the trainee-instructor dynamic was strongest when the instructor pair was experienced and comfortable with the course. This emphasizes the need for good instructor preparation. Although A. Rogers (1996) insists "a thorough knowledge of one's subject is essential for teaching adults," (p. 173) because learners frequently push teachers by their questions, he also states that the instructor's primary role is managing the learning. We observed the need for instructors to understand and apply adult learning theory. The trainee-trainee dynamic was important for sharing ideas and stimulating reflection, but it was the trainee-instructor dynamic that expanded the depth and application of the learning. It was easier to interlock the learning cycles when there was

active discussion and exploration within the group. For example, although subject matter experts delivered both the safety and the performance management modules, more synthesis was observed during the safety module, which included several interactive discussions, than during the performance management module, which was predominantly lecture. A strong interactive dynamic resulted in a rich exploration of the content and much more holistic learning. If the dynamic was weak and interaction within the class was low, there was less evidence that the trainees had a good holistic understanding of the content. This was particularly true for classes that did not develop a strong dynamic. For example, during delivery 29 one trainee rejected the event prevention module because it presented different analysis tools than he typically used. His strong opposition created an undercurrent of criticism that impeded the integration of this module into the rest of the course content. In terms of the elemental learning cycle, it can be concluded that more learning cycles will be completed and interlocked if the whole group is fully engaged. This will ensure a full exploration and integration of ideas and concepts as the learning is synthesized in a shorter timeframe.

Usefulness of the Organizational Supports

Management involvement and organization readiness are two other factors that contributed to the success of the training. I discuss the impact of these factors in this section.

Management Involvement

Contact with middle and senior management increased the value of the learning experience for the supervisors. Although introducing the middle managers to the classes initially caused with some concern among the instructors, it proved to be beneficial. The

middle managers' brought a broader, more strategic perspective and a less localized view of issues. Further, there was a greater complexity in their thinking about and discussion of issues and subjects. As a result, the supervisors were naturally exposed to a deeper, more challenging perspective as they processed the learning. In effect, they were more challenged to frame their thinking and learning into a broader context, to *synthesize*. The middle managers, on the other hand, were challenged by the probing questions of the supervisors to reflect upon, explain, and defend their positions. The result was a stimulating learning environment for both.

The senior management mentors added value by articulating the organizational values and goals held by the executive leadership. Supervisors, and middle mangers to a lesser extent, typically have limited contact with senior management. For the two weeks of the Supervisor's Academy, the mentors were a source of instant analysis and feedback as to whether the opinions and views of the trainees aligned with those of the organization. Because the opinions and feedback were offered in the context of a learning environment, both mentors and supervisors exhibited a willingness to challenge and explore each others' perspectives. The trainees learned more about senior management's perspective; the mentors learned about the view from the shop or office floor. With this open atmosphere of dialogue, many of the trainees found opportunity to meet individually with the mentors outside of class time to get their advice on issues and career planning. The interaction with representatives of senior level management provided one more source of information to be synthesized into the trainees' picture of their role and responsibilities. Although the senior managers were recruited as mentors only for the duration of the course, most offered to provide continuing support to the trainees

following the course. In that sense, they volunteered to accept a traditional mentoring role (such as described by Haney, 1997), -- a benefit that the supervisors would not have otherwise received. The extent of future mentor contacts was not assessed.

It was apparent in this study that supervisors benefited from exposure to the thinking and views of higher management strata. The information and experience gained from these interactions expanded the scope of learning for the supervisors. As a result of these interactions, there was more synthesis learning and the trainees developed a broader, more informed concept of their role and responsibilities.

From the perspective of interlocking learning cycles, the input from the managers provided additional insight during the reflection phases; sometimes their input provided the necessary linkages between concepts. Moreover, as the trainees synthesized their learning into a larger picture, they were able to immediately test its validity against the senior managers' broader picture view and make any necessary adjustments.

Organizational Readiness

The effectiveness of training in transforming an organization is an interesting question arising from this study. Because the training began in the early stages of a major restructuring and recovery program, the training was ahead of the organizational changes. This was not the intended sequence; the restructuring process took longer than projected. Consequently, training unintentionally became one of the sources of information and a catalyst for change. On the one hand, its effectiveness as a tool for change or transformation is questionable in that the trainees returned to a workplace that had not yet progressed to the structure nor adopted all the practices taught at the Supervisor's Academy. This situation impeded the transfer of learning. On the other hand, the trainees

were prepared for the changes, and, in fact, were eager to facilitate the implementation of changes. This is particularly true because the course focused on synthesis-level learning, ensuring that the trainees understood conceptually what was intended. Therefore, they were able to analyze workplace changes from a more informed perspective. The behaviour level evaluation results indicate that the trainees experienced a level of frustration when their learning could not be transferred nor skills applied immediately. One shortcoming of the follow-up survey is that the questions but did not explore the extent to which those individuals were prepared to embrace the changes as the restructuring was implemented. Further, the evaluation did not gauge the extent to which transfer was blocked by the delay in organizational restructuring, and, consequently, the delay in their opportunities for application of learning. Broad and Newstrom (1992) report an absence of reinforcement as the number one overall impediment. In this case, the lack of organizational readiness may have been a very significant factor influencing the amount of learning transferred to the workplace.

The study did not provide answers as to whether the strategy used for promoting synthesis learning was more effective than other possibilities within training for organizational change. However, it did demonstrate the need for a clear definition of the role of training during periods of organizational change. The demonstrated value of the training was often an item of discussion with line management. From these discussions, I speculate that assigning the right role to training is important to maximize its economic return to the organization. Further, if training is intended to change organizational paradigms, then it must be targeted at the synthesis level in order to ensure the trainees develop a sufficiently sophisticated picture of the new paradigms. This I believe, can be

achieved through the use of a design that interlocks the elemental learning cycles, as was seen in the case of those participants whose perspectives had been significantly transformed.

Conclusions

The results of the study indicate that learning cycles can be interlocked in various ways to generate synthesis learning and improve the usefulness of the training. Classes in which the learning was well integrated produced a better holistic understanding and a more mature perspective than those in which the learning was less well integrated. In fact, my observation of the learning process at the Supervisor's Academy suggests to me that it is difficult to engage learners at the synthesis level if there is no interlocking of the learning cycles. The findings also highlighted the difficulties of establishing and maintaining a sustained period of learning at that level.

The study identified three major factors that facilitate the interlocking of learning cycles and produce a more holistic understanding. First, the design of the training must build in the opportunities for integrating the learning by properly sequencing material, allowing adequate time for dialogue and reflection, and using integration exercises. Second, the learner has to be engaged and willing to process the experiences at the synthesis level. And finally, the facilitator must know the content well enough to function at the synthesis or evaluation level, be capable of facilitating a discussion at that level, remain alert to introduce the linkages at every opportunity, and focus the discussion and activities toward the holistic view. When all three factors are present, the class enjoys a rich learning journey that goes beyond a compartmentalized learning of specific knowledge and skills and results in a holistic understanding.

The study suggests four guidelines for achieving synthesis learning. First, one can not depend on good results occurring naturally, particularly at the synthesis level. The design should focus the learner toward the desired outcome. Second, the learner should be prepared for the experience. If the learner is unprepared or unwilling, neither course design nor facilitation will engage him or her at the learning level required to produce the desired result. Third, if the instructor is unable to function consistently at the synthesis level, he or she will not be able to guide the discussion and integrate concepts. Because the students' performance is evaluated at the synthesis level, the instructor must be capable of operating at the synthesis level. Fourth, the training environment must encourage creative interaction and dialogue among students and instructors in order to synthesize ideas and concepts. Given the right combination of factors, training can consistently achieve synthesis learning. Interlocking designs based on the elemental learning cycle can go beyond basic compartmentalized learning and produce a holistic understanding.

Recommendations for Practice

The study suggests a number of strategies that can enhance the value of organizational training. These include the following:

1. To effectively achieve synthesis learning, the design should incorporate mechanisms that encourage the interlocking of learning cycles within and among course subject areas.

2. Instructor preparation should include more than subject matter expertise. The instructor must understand, and be able to apply, adult learning theory.

3. The trainee has to be motivated to learn, particularly when synthesis learning is desired. The organization should first prepare the individual by explaining the importance and purpose of the training, and demonstrating its support for the trainee. The instructor can then sustain and build on that interest by providing an engaging and positive learning experience.

4. Mixing diverse backgrounds and management levels within the same class provides a more stimulating environment and encourages synthesis.

5. If the training is part of a change process, the organization needs to align the change and the training, so that trained individuals return to a workplace that is supportive of the new paradigms; otherwise, transfer of learning may be minimal.

Recommendations for Future Research

The study results stimulated me to pose a number of questions that could be explored through further study. These include the following:

1. This study used an action research methodology. It would be interesting to conduct a comparative study of two different groups: a test group using the design strategy of interlocking learning cycles and a control group using a different design strategy. This would provide a more quantifiable example of the usefulness of the interlocking design strategy.

2. Much of the subject material in this study related to soft skills, which are difficult to measure by numerical or other definitive criteria. Thus, much of the evaluation relied on my observations and those of the other instructors. As such, it may be subject to individual biases. It would be interesting to explore the effectiveness of the

interlocking design strategy in teaching hard skills, for which there are distinct performance measures that could be assessed objectively.

3. Because special learning characteristics of the study group were not taken into consideration in this project, the "universality" of the elemental learning cycle should be tested further with diverse groups, such as women, minorities, and low-literate adults.

4. Our subject-expert presenters were unfamiliar with the total program. It might be interesting to investigate whether synthesis learning would be increased if these expert presenters were required to attend an entire, preceding course as part of their preparation.

5. Comparing the results achieved by a group of willing learners versus a group of reluctant learners could test the effect of learner willingness on the amount of synthesis achieved. Other motivation factors and their impact of learning outcomes could also be explored.

6. The extent to which an individual's previous learning or learning methods influences their ease of learning at the synthesis level is worth exploring, especially in relation to learner motivation.

7. The interaction and dialogue among trainees contributes to a synthesis of ideas and concepts. It might be interesting to explore how much more difficult it is to achieve the synthesis level without group or facilitator interaction. The usefulness of instructor-led training versus a self-directed study could be explored by comparing the synthesis learning of a facilitated group versus an independent study group, such as distance or Internet learners. Instructor performance would be a variable in such a study.

8. The role of training within the managed system of an organization should be clearly defined. This is important to maximize the economic return on investment when

organizations are attempting to develop new capability or to manage change. A comparative study of the impact of training in developing skill sets or facilitating change in different organizations should provide some baseline data on the economic return of training, and demonstrate whether training is best used to support change or to drive change.

My Own Learning from the Project

As a practitioner within an organizational training setting, it is easy to become myopic. Business constraints often override educative goals and direct the focus toward tangible results. Even though my narrow view of adult education had been vastly expanded in scope and depth through the earlier readings and study associated with the Master's program, I was still unprepared for the full impact of this project. As I watched the trainees transform their meaning schemes in response to our challenging their paradigms, I realized my contribution to that transformation and experienced the magnitude of the impact that an educator can have. Stepping away from the instructor role and viewing the project as a researcher, I, too, was being "transformed." My concept of the educator's role was being reshaped. Effective educators are more than mere distributors of knowledge. They shape the deeper meaning schemes of their learners. Consequently, they are also accountable for the ethical, emotional, economic, philosophical, and sociological implications of their teaching.

As I progressed through the project, I became more aware of my own learning journey. The project increased my skill in research and observation, data analysis, and the precise reporting of results. Most significantly, I learned much about the intricacies of design and the complexities of interlocking learning cycles. Critical reflection on my own

learning revealed I was learning through that same process. As my understanding deepened and my thinking matured, I was also relying on interlocking learning cycles to synthesize my learning. Looking to the future, I hope to continue my exploration of the learning process and further define guidelines for achieving synthesis learning through the manipulation of learning cycles.

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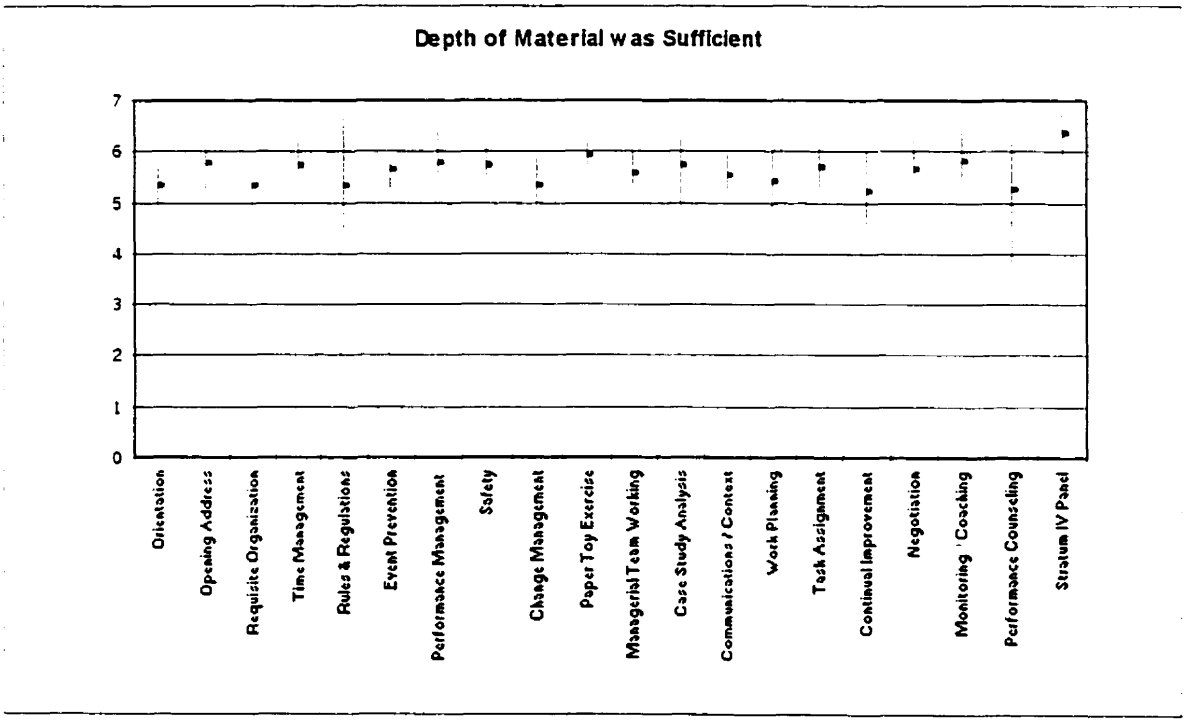
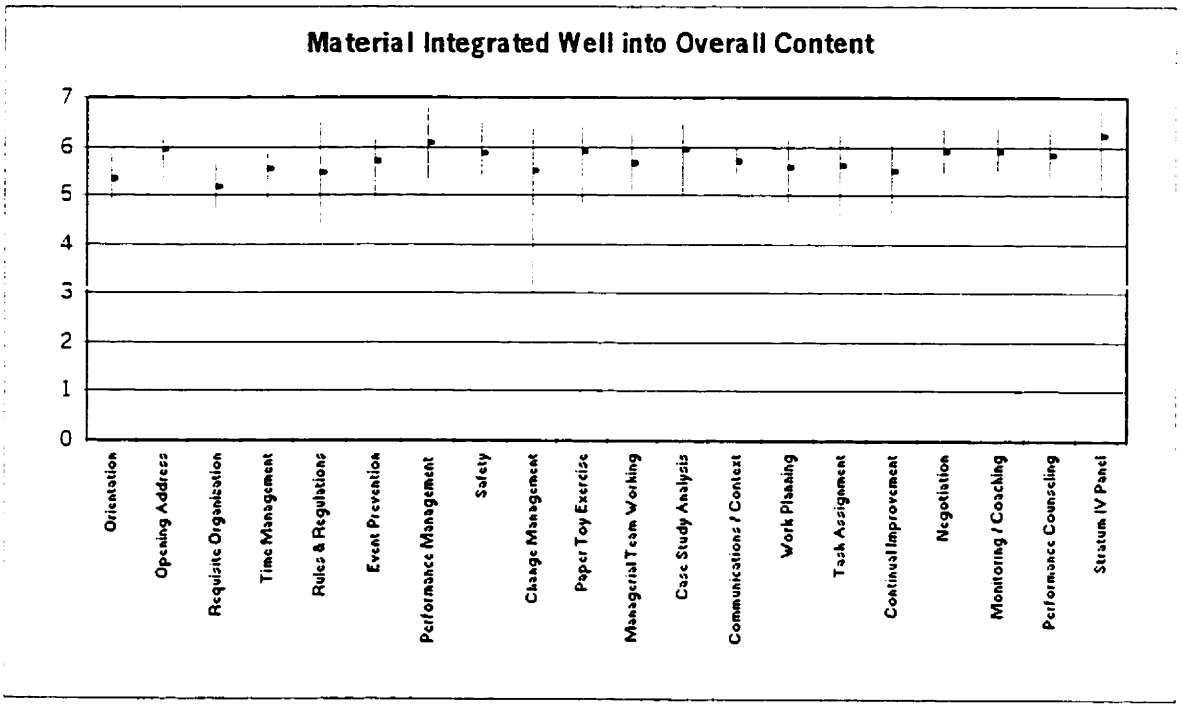
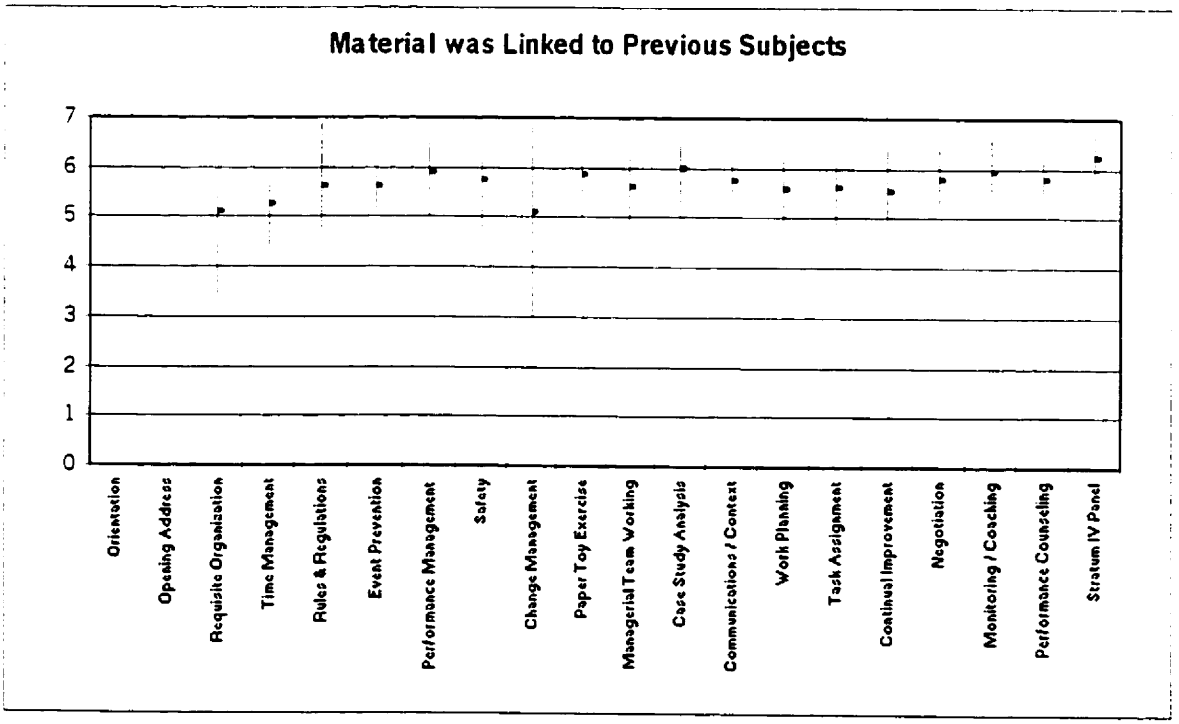
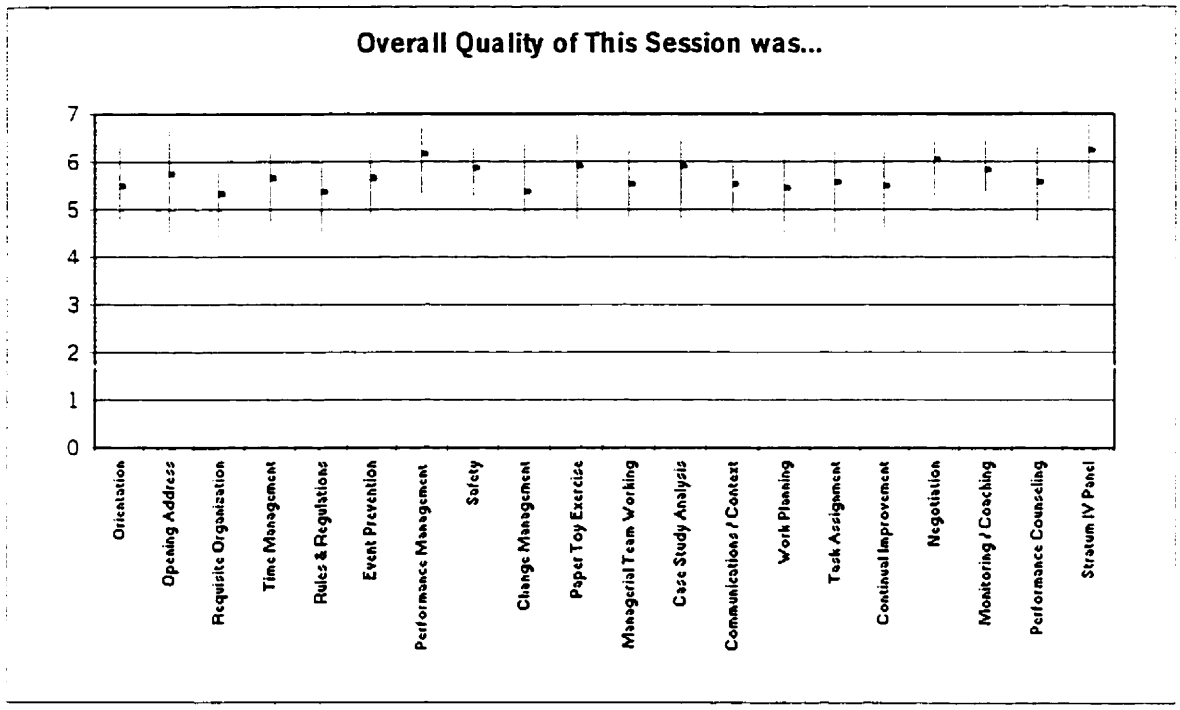
Appendix A: Reaction Data Results

The following graphs show the average rating of each module of the Supervisor's Academy with respect to depth of material, linkage and integration of content material, and overall quality. The target established for the program was to have all modules rate above 5 (out of 7) and an overall program average of at least 5.5 (out of 7).

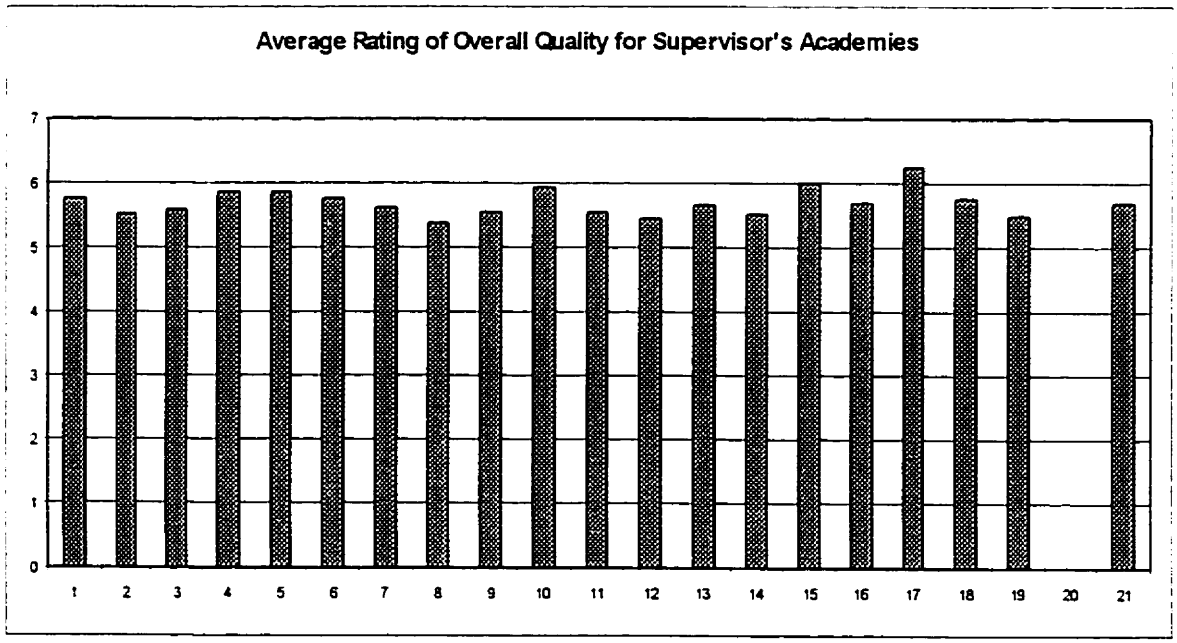



Material Integrated Well into Overall Content
7
6
5
4
3
2
1
0
Orientation
Opening Address
Requisite Organisation
Time Management
Rules & Regulations
Event Prevention
Performance Management
Safety
Change Management
Paper Toy Exercise
Managerial Team Working
Case Study Analysis
Communications / Context
Work Planning
Task Assignment
Continual Improvement
Negotiation
Monitoring / Coaching
Performance Counseling
Stratum IV Panel


Material was Linked to Previous Subjects
7
6
5
4
3
2
1
0
Orientation
Opening Address
Requisite Organisation
Time Management
Rules & Regulations
Event Prevention
Performance Management
Safety
Change Management
Paper Toy Exercise
Managerial Team Working
Case Study Analysis
Communications / Context
Work Planning
Task Assignment
Continual Improvement
Negotiation
Monitoring / Coaching
Performance Counseling
Stratum IV Panel



The following graph shows the average rating of the Supervisor's Academy, by delivery, (calculated as an average of the average ratings per module)..



Appendix B: Behaviour Level Evaluation Survey Results

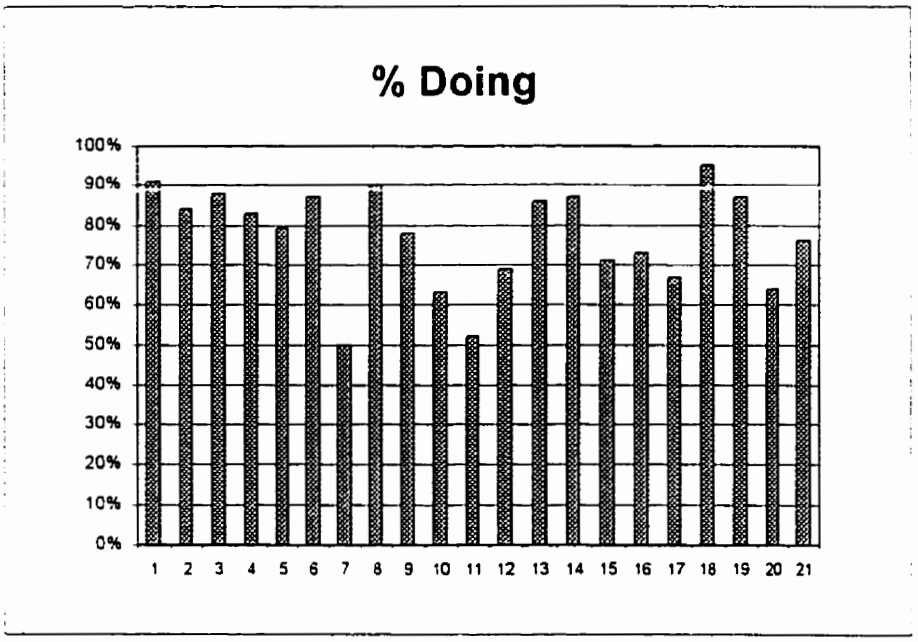
The following graphs display the results of the behaviour level evaluation surveys of trainees and their supervisors. The sample represented about one-third of the total trainees and trainee supervisor populations for the first 25 course deliveries.

The key below identifies the question topic to which the individuals were responding:

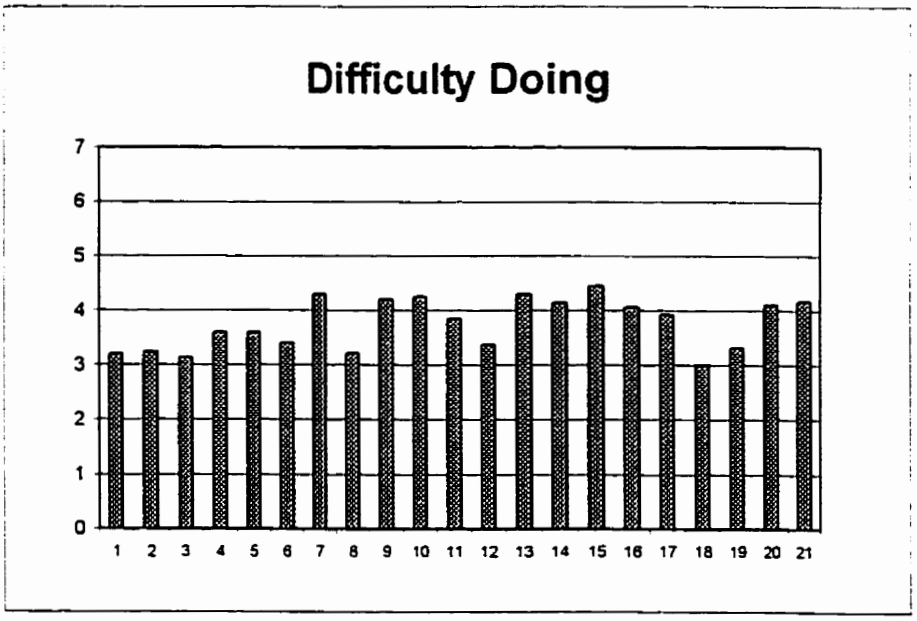
Key

1. Managerial teamwork: two-way working relationships with subordinates.
2. Managerial teamwork: holding regular meetings with all immediate subordinates
3. Context setting: updating subordinates on the relevant background of the unit's overall work.
4. Task assignment: assigning tasks to assistant supervisors and directly to workers, specifying task details.
5. Task assignment: explaining your expectations regarding collateral relationships.
6. Task assignment: receiving prompt feedback from your subordinates.
7. Personal appraisal: assessing each subordinate's performance regularly.
8. Coaching: coaching subordinates to develop their capabilities and improve performance.
9. Training: ensuring subordinates are getting the training they require.
10. Training: assessing the effectiveness of the training subordinates are receiving.
11. Selection: participating in the selection process
12. Induction: introducing new subordinates to the unit using some induction-orientation process
13. Performance counseling: taking timely actions to deal with unsatisfactory performance.
14. Continual improvement: taking timely actions to continually improve processes.
15. Change management: identifying change strategies when making decisions about managing change.
16. Event prevention: applying the error and event prevention principles.
17. Event prevention: using the event prevention tools to reduce errors.
18. Safety: actively promoting safety in the workplace.
19. Performance management: increased use of positive reinforcement to manage subordinates' behaviour.
20. Performance management: using appropriate reinforcements.
21. Negotiation and conflict resolution: resolving conflicts using interest-based principles.

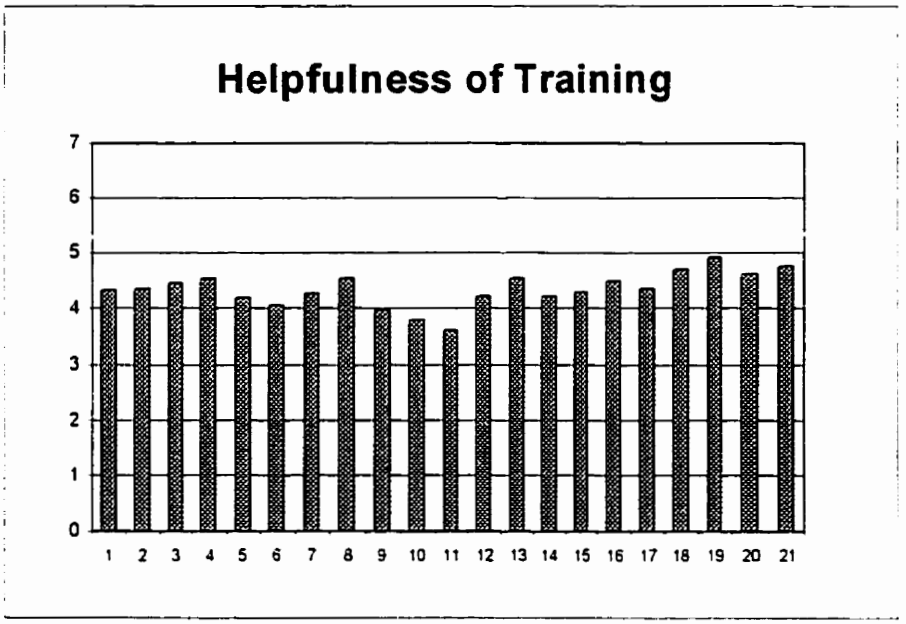
The following graph indicates the extent to which the respondents are doing the practices discussed and presented at the Supervisor's Academy.



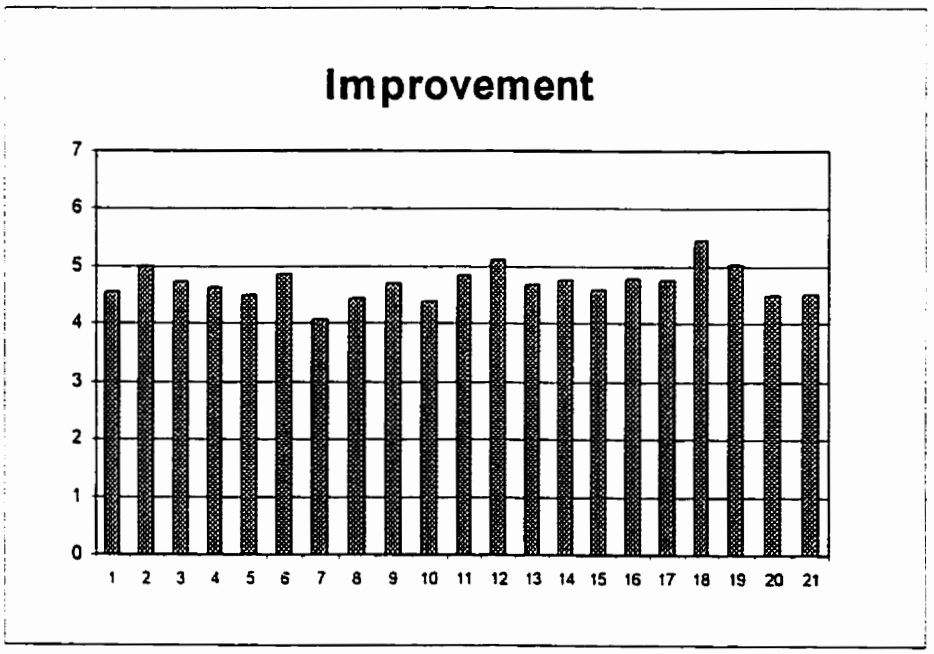
The following graph indicates the extent to which the respondents feel the respective practices are difficult to do.



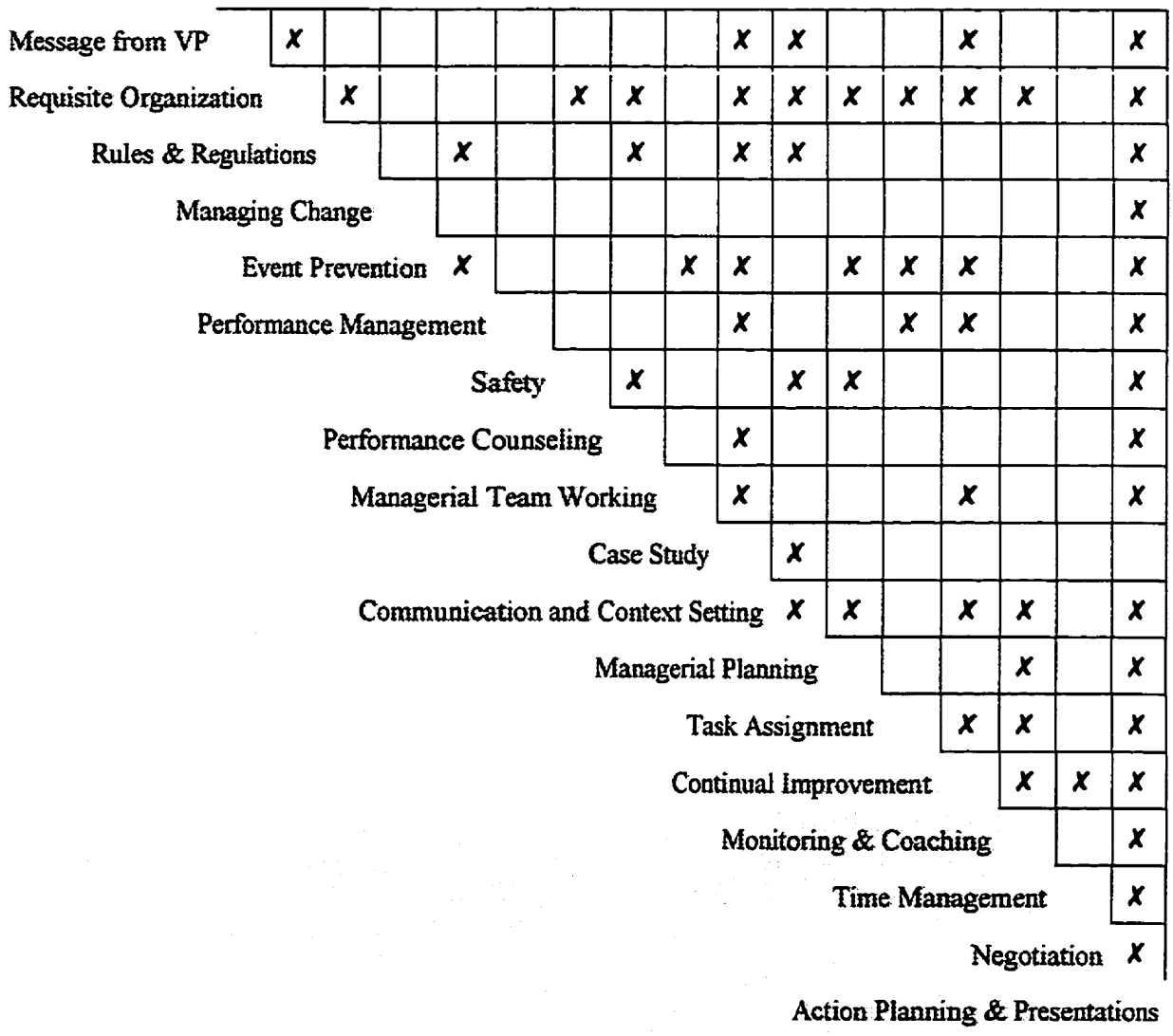
The following graph indicates the extent to which the respondents felt the training was helpful in doing these practices.



The following graph indicates the amount of trainee improvement in doing these practices since the training, as rated by their immediate supervisors.

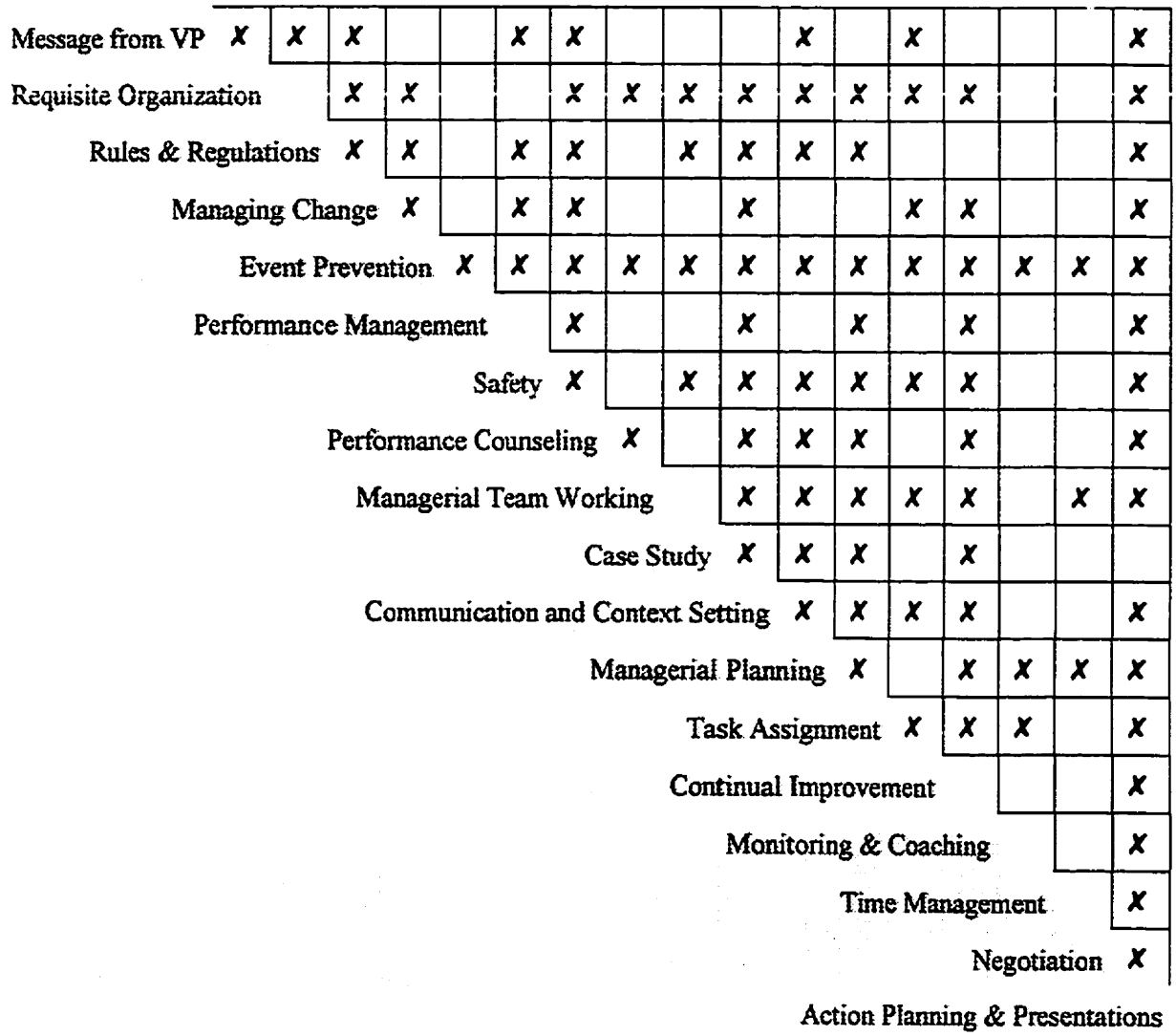


Appendix C: Observed Subject Linkages for Course Delivery 3



✗ indicates where links among major subject areas were distinctly made by the facilitator

Intended Subject Linkages



✗ indicates where links should be made among major subject areas