UNIVERSITY OF ALBERTA

SURVEY OF ADULT LEARNING STYLES

BY

© LU ZHANG

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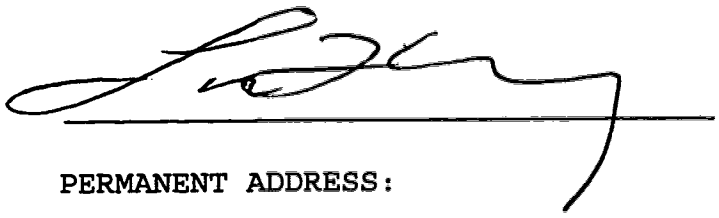

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research, for acceptance, a thesis entitled **SURVEY OF ADULT LEARNING STYLES** submitted by **LU ZHANG** in partial fulfilment of the requirement for the degree of **MASTER OF EDUCATION**.

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ABSTRACT

The purpose of this study was to find out the learning style preferences of Chinese, Chinese-Canadian and Canadian adult learners, and determine the effect of gender, age, cultural background and academic major upon learning style preferences.

The researcher surveyed 119 adult students in an educational diploma program in Beijing, China, Chinese-Canadians in undergraduate programs and Canadians in an educational diploma program in an urban Canadian university. These participants completed a learning style inventory which was adapted from the learning style inventories of Lucas (1989), Dunns (1987), Hunt (1978), Kolb (1981) and Renzulli (1978). Data collected were analyzed by the Statistical Package for the Social Science (Nie, Hull, 1981) to obtain frequency and percentage distributions for the demographic characteristics, means and standard deviations of learning style preferences, factor analysis and factor scoring, and F tests to determine significant difference in the learning style preferences by gender, age, cultural background and academic major.

Seven learning style factors were derived from the data, statistical analysis results of the study indicated that gender was not related to learning style preferences. Age, cultural background and academic major were related to learning style preferences. The younger adults scored higher

on supervision and lower on class participation, while older adults scored lower on supervision and higher on class participation. The respondents between 22 to 29 years of age preferred more creativity and class particiaption.

Chinese students preferred less class participation but preferred more for learning through creativity. Chinese-Canadian students preferred supervision, reading, psychomotor activities and deadlines in their learning. Canadian students preferred to learn by participating class activities, doing and hands-on activities (psychomotor) and accomplished well within deadlines.

Respondents in business/economics preferred less class participation but more for learning through creativity; respondents in arts/science majors preferred more supervision and hands-on activities, but less class participation; students in education majors preferred more class particiaption, psychomotor activities and learning by deadlines.

Adult educators teaching similar populations should consider designing programs which reflect the learning style preferences of students. More supervision would benefit the younger adults, while older adults would prefer less supervision, more self-directed learning and class particiaption. Structured supervision could be more beneficial for Chinese-Canadian students.

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Chapter One

The Problem

Everyone has a preferred learning style. How adults learn is not a new concern to adult educators. Each learner possesses unique learning style preferences. Understanding differences in learning style preferences would enable adult educators to develop appropriate learning experiences in the curriculum. Yet, each learner will approach these learning experiences from a preferred individualized learning style.

In Nikos Kazantzakis' novel, "Zorba the Greek" described how individuals learn new things differently:

> Zorba scratched his head [and said]: "I 've got a thick skull boss, I don't grasp these things easily. Ah, if only you could dance what you've just said, then I'd understand ... or if you could tell me all that in a story, boss." (Smith, 1982, p60)

In Kazantzakis' story, Zorba identified some clear personal preferences for understanding new information and knowledge. Observing and listening were both acceptable to Zorba, and he preferred to have the ideas presented concretely through action. Similarly, all adult learners also have their own preferred learning styles.

Learning style refers to an individual's preferred ways of grasping and transforming information (Kolb, 1984). Preference does not imply that these ways would be the only or perhaps even the best ways for the individual to learn. They

are, however, the styles with which the individual has the greatest experience and therefore represent the individual's learning strengths.

Understanding how adults learn can help increase adult learners' self-confidence and chance for success. As Pat Guild (1990) stated, "One of the things learning styles does is focus on students' strengths rather than weaknesses" (p.4).

Insights into how adults learn should help increase their opportunities for academic success. According to Smith (1982), adult learning will be enhanced by an understanding of learning style because "a central task of learning how to learn is developing awareness of oneself as a learner"(p.57).

Learning problems often relate to the type and level of the cognitive processes required to learn the material. Recent researchers have found the importance of learning in helping adult learners succeed academically. Even (1987) identified learning style as one of seven factors affecting adult learning. Knox (1986) pointed out that knowledge of learning style is helpful in "recognizing and selecting conditions under which adults with various characteristics are likely to learn effectively"(p.26).

Brookfield (1986) stated that a non-threatening learning environment can benefit adult learners most where various learning styles are considered. Dixon (1985) suggested using learning style information to help students understand themselves as learners, encouraging learners to expand their

own learning approaches. Therefore, when efforts are made to match an individual learning style with an instructional environment, the outcomes of learning can be positively affected. Knowledge of an individual's learning style can enable educators to make the students' learning experiences more effective and rewarding.

Background to the Problem

Adult educators face the task of providing proper instruction to adults whose individual approaches to learning vary considerably. All adults entering an educational program have certain background characteristics which affect their learning style preferences, to a greater or lesser degree.

In recent years, more and more Chinese have come to Canada to pursue their education in Canadian universities. They come with Chinese culture and educational backgrounds which differ from that of Canadians. As they study in the Canadian universities, their learning styles may gradually be influenced by the Canadian educational system, and they may adapt their learning styles to help them learn more effectively in Canadian universities. This is especially true of the Canadian-Chinese who have lived in Canada for a long time and who have been influenced by the Canadian educational system until their learning styles mor or less resemble that of Canadian students.

Compared with Canadian students, Chinese adult learners have their own preferred learning styles; they prefer a more structured learning environment. With more Chinese students coming to study in Canadian universities, the different learning style preferences have come to the attention of adult educators and the adult learners as well. How adults can achieve academic success in a different cultural environment and with different academic backgrounds is a challenge to adult educators. Do learning style preferences differ according to gender, age, cultural background and academic majors of adult learners?

Canadian adult learners appear to be more independent and self-directed in choosing their own learning activities and career paths. Chinese adult learners, however, appear to be more dependent on the structure, guidance and direction from their instructors. It is also interesting to observe that many of the younger Chinese generation of Hong Kong, Taiwan, and south east Asian extraction, are born in Canada and educated in Canadian universities. Have they totally adapted to the Canadian educational system, or do they still possess some learning style preferences similar to those of other Chinese? How do these three groups of learners differ in their preferred learning styles? Answers to these questions could be helpful in developing appropriate learning activities for adult learners in their own cultural environment as well as in a different cultural setting.

Statement of the Problem

The purpose of this research was to compare the preferred learning styles of adult students enroled in an adult education program in China with those of adult students enroled in university programs in Canada.

Sub-problems

1. What are the learning style preferences among adult learners in an adult education program in China?
2. What are the learning style preferences among Chinese adult learners in a Canadian university?
3. What are the learning style preferences among Canadian adult learners in a Canadian university?
4. How do learning style preferences differ by gender, age, cultural background and academic program of respondents?

Delimitations

1. This study did not predict the success of any particular learning styles.
2. The study did not determine nor evaluate the achievement of the adult learners.
3. The study was limited to Chinese adult learners enroled in an adult education program in a Chinese university and to Chinese and Canadian students in a Canadian university.

Limitations

1. The instructional settings and academic programs varied among the three groups. No controls were established to ensure the comparability of the learning environments.
2. The questionnaire may have restricted the nature of the data generated on the learning style preferences of respondents.
3. No attempt was made to determine the respondents' understanding of the items in the inventory.

Assumptions

1. The learning style inventory was both valid and reliable.
2. The translation of the inventory was accurate and meaningful.
3. Students answered honestly, describing their preferences rather than an ideal perspective on learning.
4. The data were comparable even though they were collected in varying environments.

Definitions of terms

For the purpose of this study the following definitions were used:

Adult is an individual who has reached a specified

minimum legal age of adulthood, usually 18 years (Shafritz, 1988, p.17).

Adult education is defined as any organized, sustained activity engaged in by adults for the purposes of changing their knowledge, skills, or attitudes in any area (Cranton, 1989).

Adult education program is a program of instruction primarily for adults and youth beyond the age of compulsory school attendance (Shafritz, 1988).

Adult student/learner is an adult who is enroled in any course of study, whether formal or informal, to develop new skills or qualifications, or improve existing skills and qualifications (Shafritz, 1988).

Culture, in general, reflects the values, beliefs, customs and creations of a people who regard themselves as a coherent group (whether large or small) (Rowntree, 1981).

Instructional setting is used to refer to the place or environment where the teaching or training can take place (Shafritz, 1988).

Learning generally involves any behaviour change occurring because of interaction with the environment (Shafritz, 1988).

Learning style includes the "cognitive, affective, and physiological traits that serve as relatively stable indicators of how learners perceive, interact with, and respond to the learning environment" (Keefe, 1982, p.44).

Perception is the process by which a person obtains and interprets information from the environment, using any of the senses (sight, hearing, touch, etc.) (Derek, 1981).

Preference is the act, fact, or principle of giving advantages to some over others (Webster's Ninth New Collegiate Dictionary).

The Importance of The Study

There are substantial differences in adult learning from one person to another and from one setting to another. A learning style developed at one place in one educational system is not necessarily suitable in a different educational system. Teaching and learning in China differ considerably from common educational experiences in Canada. The adult learners in the adult education program in China have an

oriental cultural and educational background which differs from that of adult learners in Canada. Similarly, the learning style of adults in a Canadian university may also be influenced by cultural backgrounds

From the experiences and observations of the researcher, it is important that adult learners understand their own learning styles to help them identify and maximize their strengths while minimizing their weaknesses. Knowledge about learning styles could help adults participate more fully in activities that contribute to their learning.

This study provided an opportunity to compare the preferred learning styles of Chinese adults in Beijing with those of Chinese adults and also other adult learners in Canada. The study also compared preferred learning styles by gender, age, cultural background and university program of adult learners in these settings.

The findings of this study could contribute to our understanding of learning styles of adults in different settings and, thereby, enhance the teaching and learning experiences of adults. The results could be helpful to adults in both Chinese and Canadian settings. Comparative analyses could help instructors better understand their students and plan instructional activities accordingly. Chinese students planning to attend a Canadian university could also get a better idea of the differences between Chinese and Canadian teaching and learning styles and, therefore, they could

prepare themselves more appropriately for overseas studies.

Organization of the Thesis

Chapter one contained an introduction to the study. Chapter two presents a review of related literature, and chapter three provides an overview of the methodology used in the study. The findings of the study are contained in chapter four, and chapter five presents the summary, conclusions and implications of the study.

Chapter Two

Related Research

This chapter provides a review of related literature that defines learning styles, meaning of learning, and explores the learning style theories of previous researchers, and try to find out how learning style preferences were influenced by age, cultural background and academic program.

Learning Styles

The term "Learning Style" was first used by Herb Thelen in 1954 (Ferrell, 1988). UNESCO (1979) defined learning style as " the sum of the ways of problem solving, thinking and learning habitually used by an individual" (p.51); it is one predictor of the mode of learning most beneficial to each student (Gagné and Briggs, 1974). Keefe (1982), an expert on learning styles at the National Association of Secondary School Principals, defined learning styles as "cognitive, affective, and physiological traits that serve as relatively stable indicators of how learners perceive, interact with, and respond to the learning environment" (p.44).

The cognitive aspect refers to the ways information is processed, representing "a person's typical modes of perceiving, thinking, remembering and problem solving" (Messick, 1969, p.21). As Keefe (1982) pointed out, "each

leaner has preferred ways of perception, organization and retention that are distinctive and consistent. These characteristic differences are called cognitive styles" (p. 45).

According to Keefe (1982), cognitive styles include the following: 1). Perceptual modality preference describes the learner's tendency of using varies sensory modes to understand experience, including the kinesthetic (psychomotor), visual and auditory modes. 2). Field independence vs. dependence. The field independent learner tends to be highly analytic and systematic; the field dependent learner, on the other hand, tends to be holistic.

Affective learning style, according to Keefe (1982), refers to one's "motivational process viewed as the learner's typical modes of arousing, directing, and sustaining behaviour" (p.48). Keefe (1982) indicated that affective styles were the products of different influences, such as the cultural environment, pressures from parents and peers, school practices, and one's personalities.

Physiological styles were defined by Keefe (1982) as "biologically based modes of response that are founded on sex-related differences, personal nutrition and health, and reaction to the physical environment" (p.49). Physiological factors have the most obvious effect on adult learning. The environmental elements and time rhythms are the elements that illustrate the physiological styles. The environmental

elements, according to Keefe (1982), refer to light, sound, and temperature. Time rhythms refer to the learner's preference to the time of the day for learning activities.

Dunn, Dunn and Price (1979) have given considerable attention to the environmental, sociological and physical aspects of learning style. Sound, light, temperature and design were considered as environmental aspects. Motivation, persistence, responsibility, and structure were the emotional elements. The preference to learn from an instructor as opposed to learn from one's peers was seen as the sociological elements.

Dubin and Taveggia (1968) defined learning style as an attribute of the individual which interacts with instructional circumstances to produce differential learning achievement. Rezler and Rezmovic (1981) defined learning style as the manner in which a person perceives and processes information in a learning situation, and they distinguished it from learning preference, which they defined as the choice of one learning situation over another. Learning styles and preferences are often used interchangeably, but different instruments measure characteristics as widely diverse as cognitive style, psychological attributes, or preferences for environmental situations.

Learning Style Research

Interest in how people learn has been pursued for many

centuries. Learning style research has appeared in the literature since 1892, with most of the research before 1940 concerned with the relationship between memory and oral or visual teaching methods (Keefe, 1979). As early as 1921, Jung (1921) used the term "psychological type" to describe the way people preferred to process information.

During the 1920s and 1930s, F. H. Allport (1920), Hartshorne, May, and Shuttleworth (1930), and Lewin, Lippitt, and White (1939) studied personality consistency and predictability. In 1937, G. W. Allport discussed "style of life" and "modes of adaptation" as ways to identify characteristic personality types. Gardner et al. (1959) found that a response to a stimulus is "coerced not by stimulus alone, but also by the organizational dispositions of the responding system" (p. 3).

Klein (1951) termed this organizational process, "cognitive control principles" (p.10). Gardner (1953) limited "cognitive style" to those control principles only within the individual. Boverman (1960) analyzed the research of Gardner and Klein and concluded that cognitive styles seemed to be appropriate parameters for ordering the "perplexing array of individual differences in human behaviour" (p. 183).

In the 1970s, researchers such as Dunn and Dunn (1972), Gregorc (1979), Hunt (1979), Kolb (1971), Ramirez and Castaneda (1974), and Schmeck, Ribich, and Ramanaiah (1977)

developed individual models, definitions, instructions, and techniques for assessing learners' characteristics. Although these models differed from one another, they were essentially similar and were mutually supportive (Dunn, DeBello, Brennan, & Murrian, 1981).

Kolb (1985) designed a learning style inventory based on experiential learning theory which measured people's learning style. With this instrument learners were measured on their emphasis on four learning abilities: concrete experience (CE), reflective observation (RO), abstract conceptualization (AC), and active experimentation (AE). Four types of learning styles were developed from this research: converger, diverger, assimilator, and accommodator.

The converger is characterized as having learning abilities which are abstract conceptualization (AC) and active experimentation (AE). The diverger is opposite to the converger. The assimilator's dominant learning abilities include abstract conceptualization (AC) and reflective observation (RO). The accommodator is the opposite of the assimilator. These four stages constitute the Experiential Learning Model (see Figure 2.1).

Kolb's Learning-Style Inventory (1985) was based on the interactions among the four basic modes to identify four kinds of learners: accommodators, assimilators, convergers and divergers. Accommodators are "action-oriented, hands-on" learners who grasp experience concretely and transform it

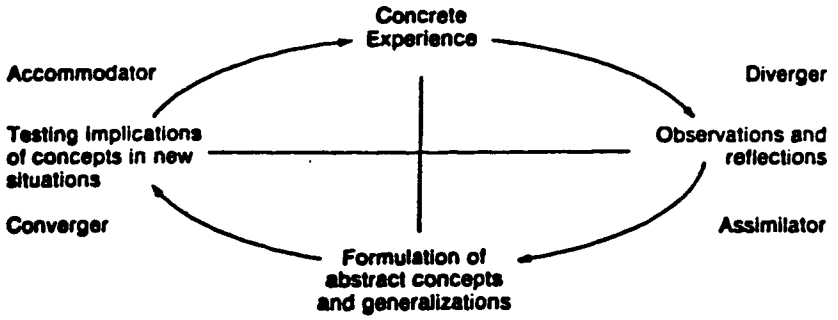

Figure 2.1 Experimental Learning Model (Smith, 1982, p.63)

through active experimentation (extension); their decisions are based on intuition rather than analysis (p.7). Assimilators are idea rather than people oriented; they prefer working with information and theory. These learners grasp experience through abstract conceptualization and transform it reflectively or intentionally. Convergers are interested in the practical application of theory and excel at technical problem solving. They grasp experience through abstract conceptualization and transform it through active experimentation (extension). Divergers are happiest when observing concrete situations, and considering all possibilities, but they are often reluctant to act. They grasp experience concretely and transform it reflectively (intentionally) (Kolb, 1985).

Gregorc (1979) contended that learning styles were "mind-qualities" which emerge as dualities. These dualities formed four distinct learning patterns: concrete sequential (CS), concrete random (CR), abstract sequential (AS), and abstract

random (AR).

Concrete sequential learners are characterized as needing to gather information through direct, "hands-on" experiences. They like order and logic and have highly developed senses. These learners prefer step-by-step instructions. They seek out and follow directions and roles and prefer ordered presentations and quiet environments (Robinson, 1983).

Abstract sequential learners are characterized as having good decoding abilities with written, verbal, and image symbols. They prefer presentations that have substance and are rational (Gregorc, 1979). These learners use reading and listening skills well. Robinson (1983) also indicated that they prefer to learn from authorities and well organized and meaningful lecture.

Concrete random learners are characterized as having an experimental attitude and behaviour. They use the trial-and error approach, and tend to learn well independently or with small groups (Gregorc, 1979). As Robinson (1983) stated, they also prefer to work on their own and prefer the authority stay away. They can grasp the information quickly and progress in unstructured problem-solving.

Abstract random learners are characterized by their attention to human behaviour. They are able to interpret and sense "vibrations," and prefer to learn in an unstructured environment and prefer group work (Gregorc, 1979). Robinson (1983) pointed out that they prefer to spend their time

gathering information and organize material through reflection.

Keefe (1979) listed three dimensions of learning style in his study: cognitive, affective, and physiological. The cognitive dimension was further classified as reception and retention styles.

Reception styles dealt with perception and analysis of data. The reception style included:

1. Perceptual modality preferences (preferred sensory modes such as visual, aural, and psychomotor)
2. Field independence versus dependence
3. Scanning
4. Constricted versus flexible control
5. Tolerance for incongruence or unrealistic experiences
6. Strong versus weak automatization
7. Conceptual versus perceptual

The concept formation and retention style included:

1. Conceptual tempo
2. Conceptualizing styles
3. Breadth of categorizing
4. Cognitive complexity versus simplicity
5. Levelling versus sharpening

The second dimension of Keefe's (1979) learning style was referred to as affective style. The affective style can also be classified as either attention or expectancy and inventive

styles. The attention style included:

1. Conceptual level (how much structure students need)
2. Curiosity
3. Persistence or perseverance (student's willingness to work beyond required time, withstand the difficulties in learning process)
4. Level of anxiety
5. Frustration tolerance

Expectancy and incentive style included:

1. Locus of control
2. Achievement motivation
3. Self-actualization
4. Imitation
5. Risk taking versus cautiousness
6. Competition versus cooperation
7. Level of aspiration
8. Reaction to reinforcement
9. Social motivation
10. Personal interests

The physiological style included:

1. Masculine-feminine behaviour
2. Health-related behaviour
3. Time rhythms
4. Need for mobility
5. Environmental elements

Recent research on perceptual learning style conducted by

adult educators James and Galbraith (1985) provided new evidence concerning age and perceptual styles. Perceptual styles had seven elements:

1. Print--learn best through reading and writing
2. Aural--learn best through listening
3. Interactive--learn best through group discussion and interaction with people.
4. Visual--learn best through observation.
5. Haptic--learn best through the sense of touch, "hands-on" experiences.
6. Kinaesthetic--learn best while moving, constant motion.
7. Olfactory--learn best through senses of smell and taste.

Fischer and Fischer (1979) characterized students by using the following specific learning styles:

1. Incremental learners. These learners need a lot of structure during the learning process.
2. Intuitive learners. These learners are unable to relate what they have learned in an organized and systematic way.
3. Sensory specialists. This kind of learner depends upon one of the senses, although all senses are functioning adequately.
4. Sensory generalists. Learners tend to use all of their senses during learning process.

5. Emotionally involved. These students depend upon an environment which can provide them with physical and mental stimulation.
6. Emotionally neutral. These students require an environment with less or no stimulation.
7. Explicitly structured. These learners need organized assignments and clear objectives.
8. Open-ended structure. Opposite of the explicitly structured, these learners prefer an open-ended environment.
9. Damaged learners. These learners hold a negative attitude about learning resulting from a damaged self-concept and social skills.
10. Eclectic learners. These individuals have a preferred learning style, yet, they can change their style to fit different occasions.

Bernice McCarthy (1979) combined the major findings of learning style researchers and developed four styles: innovative learners, analytic learners, common sense learners, and dynamic learners. She emphasized that all four types were equally valuable. The following is a description of her four types.

Innovative learners seek meaning and absorb reality. They need to be personally involved and learn by listening and sharing ideas. Innovative learners perceive information concretely and process it reflectively. They like to be

involved with and interact with people; showing interest in culture is another characteristic of this style.

Analytic learner adapts to experts and needs to know what the authorities think. They learn by seeking facts. They are more interested in ideas and concepts rather than people. They can adjust well to the traditional classroom where they get support for their learning style.

Common sense learners seek "usability." They like to find out how things work, and they learn through theories in ways which make sense to them. Information is perceived abstractly and processed actively. They enjoy problem solving, "hands-on" experience.

Dynamic learners seek hidden possibilities. They learn through mistakes and self-discovery. Information is perceived concretely and processed actively. These learners are not afraid of challenge and change and can adapt reading to change. Risk-taking is a part of their style.

The research of Dunn, Dunn and Price (1979) emphasized the environmental, emotional, sociological, and physical elements of learning style. The environmental elements included light, sound, temperature, and design. Emotional elements of learning style indicated by these researchers were: structure, persistence, motivation, responsibility. Sociological elements, such as individuals prefer to learn from their peers rather than from an instructor, were also seen as relevant. Dunn also pointed out that learning styles

were equally important and perceptual strengths, intake, time, and mobility were involved.

In the late 1960s, Rita and Kenneth Dunn (1978) began their learning research as part of a project helping youngsters who were experiencing reading difficulties. The study concluded that learners were affected by four factors: immediate environment (sound, light, temperature and design), own emotionality (motivation, persistence, responsibility and need for structure or flexibility), sociological needs (self, pair, peer, team, adult or varied), and physical needs (perceptual strengths, intake, time and mobility).

Before the 1960s, learners were not aware of if they were able to best learn through their aural or visual perceptions. Researchers were unaware "that some people learn through their actual sense, and others require experiential or whole body (kinaesthetic) experiences in order to learn and to retain what was learned" (Dunn and Dunn, 1978, p.13). Some students can learn best through a combination of two or more styles.

The importance of considering youngsters' perceptual modality strengths while teaching them to read was verified through studies conducted by Carbo (1980), Urbschat (1977) and Wheeler (1983), and (R. Dunn, 1985) revealed that students "whose perceptual strengths were tactual/kinaesthetic --rather than auditory or visual-- did not learn well through either phonics or word recognition reading approaches. Such youngsters achieved statistically better when taught

tactually" (p. 15). In order to make the connection between "word formations and meanings," youngsters who learn best through their tactual sense require a sense of touch. These individuals should be allowed to trace, write, mould, piece together, select by feel, and paste words and letters in a variety of materials. Children who rely upon their kinaesthetic sense will find little meaning in words unless they are a part of actual experience (Dunn and Dunn, 1978, pp.13-14).

Following are several other findings from Dunn and Dunn (1978). Individuals' abilities to concentrate will vary depending upon their different reactions to levels of sound, light, temperature and type and arrangement of furniture. Some students may concentrate more efficiently and feel less anxious if they are allowed to eat, drink, chew gum or move around the classroom setting. Not all students learn equally well at all times of the day. Students respond differently to the sociological dynamics of learning. While some students become anxious in a teacher-centred environment, others may be unable or unwilling to learn from their peers. Students will vary in the amount of structure they require for efficient learning. Dunn and Dunn (1978) defined structure as the "establishment of specific rules for working on and completing an assignment"; structure defines time spans, limits choices and determines the "mode of either learning, responding, or demonstrating achievement" (p.11).

The Dunns (1978) also discovered that, since students differ in their willingness or ability to persist until a task is completed, it would be better if the lengths and types of assignments were varied. Students with short attention spans may be best helped by a form of self-pacing wherein objectives are clearly spelled out and completion is expected, but the time period is flexible. Students perceived as being "responsible" would persist, with a minimum of supervision, until they complete a task to the best of their ability. On the other hand, "irresponsible" students will lose interest at the first sign of difficulty and turn their attention to non-productive or disturbing activities. If students can meet the requirements and expectations placed on them without fearing failure or embarrassment, they can be much more likely to behave "responsibly."

For Dunn and Dunn (1984), the key to lessen many learning problems lies in addressing students' perceptual strengths and weaknesses. The disadvantage and unpleasantness experienced by many students in classrooms where instruction involves only the visual and auditory perceptual modes is further documented in the following description of "poor readers" as needing "intake and mobility," being "adult rather than self-motivated," having "reduced persistence" and nonconforming behaviour, and having "an increased need to learn tactually and kinaesthetically" (p.15).

Hunt (1985) defined learning style as "nothing more than

a formal attempt to capture what goes on in two steps:"reading and flexing" (p.2). Within this context, "reading and flexing are like perception and action, one leading to, or occurring simultaneously with, the other" (Hunt, 1985, p.2).

According to Hunt (1979), a student's learning style describes him "in terms of those educational conditions under which he is most likely to learn" (p.27). The instrument designed for assessing conceptual level is the Paragraph Completion Method (Hunt, Butler, Noy and Rosser, 1978). Learners with a low conceptual level (CL), according to Hunt (1971), are "categorical, dependent on external standards and incapable of generating their own concepts" (p.43). They contrast significantly with high CL learners who are "capable of generating new concepts, having a greater degree of internal standards and taking on different perspectives" (p.44). Students who were low in CL would learn most effectively in a "highly structure environment," while those with a high CL would learn best in a "low structure environment, or learn equally well in a variety of environments" (Hunt, 1982, p.89). Highly structured environments are teacher-centred, include pre-organized material and involve very specific instructions and expectations. Educational environments that are low in structure are more likely to be determined by the student, involve general instructions and include material that is not pre-arranged (Hunt, 1979). For instance, the lecture method

is highly structured, while the discovery approach is an example of low structure. More examples of the application of structure are found in the sequencing of rules and examples during the introduction of new material. In a highly structured format, a rule is presented, followed by an example. An example presented by itself represents low structure (Hunt, 1971).

Hunt's (1971) strategies for matching learning style with environment differ from those of several researchers in that they are based on the principle of compensation rather than preference. His system classifies learners as needing very much structure, much structure and less structure. Learners who require maximum (very much) structure are characterized by short attention span, constant activity, and frequent physical and verbal fights. They cannot function in groups or discussions and will guess at a problem's solution rather than think it through. They will try the rules often and look to their peers for approval. These students work only because the teacher says they must. Learners who need much structure take on the rule of the "good student"; they work neatly and provide the right answers. It is important that the teacher be constantly present as they often seek teacher approval. In fact, these students cannot readily adjust to different teachers, visitors or schedule changes. They prefer to work alone at their desks. Learners belonging to this group are confused by choices.

Learners who need less structure seem much more actively involved in their own learning (Hunt, 1979). They like to ask questions, volunteer information, discuss and argue. Unafraid of making mistakes, they are enthusiastic and eager to solve things on their own. They are imaginative, open to alternatives and often digress and follow tangents. These learners dislike detail and working sequentially. They may initially seem self-centred and unconcerned about the responses of others--even teacher rewards.

The relationship between a student's conceptual level and his ability or intelligence is a complex, but "relatively distinct" one. Students who require structure will have a "wide range of ability" and, in fact, many students with high ability need structure. Low ability students are less likely, however, to function well with little structure. "Therefore," concluded Hunt (1979), "learning style and ability show a low, but significant relation, yet they are distinct from one another. Further, the relation decreases as students grow older" (p.30). Despite Hunt's contention that teachers are the best assessors of learning style, he does point out that they often equate learning style with ability. This is especially true with younger students when there is a tendency to assume that those with high verbal ability will require little structure.

Most of the research and instruments have focused on the learning styles of elementary, secondary, and transitional

college student (Peterson & Eden, 1981). Some inventories can be used with adults as well as secondary and college-aged students and a few have been developed specifically for an adult population.

Learning Style and Gender

Researchers have indicted that males and females do differ in learning style to some extent. Kraft (1976) found that males and females differed in the following ways:

1. Females are dependent upon teachers and peers;
2. Females tend to participate more than males in class-related activities;
3. Males are more independent in their learning styles;
4. Males are more avoidant of classroom work.

Research based on Kolb's learning style inventory has provided information concerning the relationship of gender and learning styles. Kolb (1976) explained that on the average females and males scored differently on his learning style inventory. Females scored higher on the concrete experience orientation, while males scored higher on abstract conceptualization.

Brainard and Ommen (1977) conducted research comparing the learning styles of adult men and women. These researchers conducted a study with 1,769 males and 1,369 females using the learning style inventory developed by Canfield and Lafferty, which was designed to measure personality and attitudinal

values believed to interact with the teaching and learning situation. The findings indicated that women preferred more structured learning situation, while men preferred more competitiveness and independence. Women preferred listening while males tended to prefer direct experience.

Witkin (1977) indicated that men showed more interest in analytic skills; women preferred activities which involved contact with people; and more men were field-independent. However, Wegner's (1980) study of the relationship of learning styles and gender and age found that there was no significant relationship between gender and learning styles. Similarly, Curtis (1984) found the same result in his study.

Learning Style and Age

More researchers agree that age is a factor in learning style preference (Long, 1983). Hunter's (1977) research on difference between younger and older learners indicated that learners less than 24 years of age preferred peer association, listening, listing, and direct experience. In contrast, learners 24 years old and older preferred traditional class organization, qualitative emphasis, detail and interpersonal competition, and visual and aural activities.

Keefe's (1979) research showed that there was some age differences in the ways people perceive reality. The three basic ways of perceiving reality were: visual (reading and viewing); aural (hearing and speaking; and psychomotor

(doing). Most students' perceptual preference seemed to evolve from psychomotor to visual and aural with maturity. Early in life a dominant preference for a perceptual style usually formed, and did not change significantly with age.

According to Davenport (1985), a study on the effects of classroom variables on older learner preference and performance found that the older learners learned significantly more in group discussion than in a lecture situation. However, according to Peterson & Eden's (1981) study, the older learners were not fearful of formal learning settings and felt comfortable in a traditional classroom setting.

Price (1986) conducted research on the relationship between learning styles and age. A total of 1475 individuals were randomly selected. The participants were divided into the following age groups: ages 18 to 24; 25 to 34; 35 to 44; and 55 and over. The results indicated that all groups differed significantly from those in the age group of 18 to 24. The 55 and older group was also significantly different from those 25 to 34 years old. The findings of the study also indicated that older adults preferred more structure and more mobility, preferred to learn through their aural modality, like a formal design, and they could learn either by themselves or within groups. While the younger adults preferred to learn through their kinesthetic sense, they were persistent, and liked supervision and guidance. These studies

all indicated that there were some learning style preferences among different age groups.

However, some researchers did not feel that there have been significant relationships between age and learning style. Shooter, et al. (1956) indicated that most people were consistent over time in their thinking, the way they experience and behave toward their environment.

Learning Styles and Cultural Background

Among the many factors that affected adult learning styles, perhaps the relationship between learning styles and cultural background is the most explosive relationship explored by researchers.

Researches of relationships between learning styles and culture are not new (Cole, Gay, Glick & Sharp, 1971). Swisher & Deyhle (1989) and Cooper (1990) suggested a strong link between culture and learning styles. Banks (1988) focused on minority groups in the U.S., especially black Americans. He reported that some researchers had found that cultural background had a significant effect on learning behaviour. Anderson (1988) also suggested that cultural aspects of cognitive/learning style, such as "cultural assets, were important to more effective educational service delivery.

During the 1980s, eight studies were reported on the relationship between cultural background and learning style preferences. Samples were selected from children to adults in

rural, urban and suburban areas of the United States and other countries. The cultural groups selected within the United States were black, white, Chinese, Greek and Mexican; the groups outside of the United States were Cree Indians, Puerto Ricans, Jamaicans and Asian from Singapore (Dunn and Griggs, 1990). Jalali (1989) indicated that Chinese-Americans, Mexican-Americans, and Afro-Americans required more structure during the learning process; and Chinese-Americans and Mexican-Americans were the most peer-oriented students. Chinese-Americans and Mexican-Americans required more variety than did Afro-American and Whites (Dunn & Price, in press). Greek Americans (Jalali, 1989) and Euro-Americans (Jacobs, 1987) both preferred more auditory learning. Asians were more auditory than were Whites (Lam-Phoon, 1986). Asians (Lam-Phoon, 1986) and Black American (Sims, 1988) were visual learners, while Whites (Lam-Phoon, 1986; Sims, 1989) were relatively less visual.

Guild and Garger (1985) concluded that socialization played a role in the development of learning style differences in people of different cultures. Young (1987) also stated that, "There is valid research data that children from identifiably different cultural groups overwhelmingly exhibit certain learning styles" (p.18).

In the research on Chinese students' learning style preferences, Melton (1990) concluded that Chinese students preferred kinaesthetic, tactile and individual learning as

major styles, that Chinese students considered visual and auditory as minor learning styles, while group learning was a negative learning style.

These studies indicated that students of different cultural backgrounds exhibited different learning styles.

Learning Style and Academic Major

There was also research evidence available concerning learning style preferences and academic majors. Roe (1956) and Holland (1966) suggested that personality variables were major determinants of a student's choice of an academic major and a subsequent career. As a personality variable, learning style may relate to the selection of an academic major.

Hunt (1979) concluded that there was a tendency for students with structured learning styles to perform better in engineering and mathematics, while students who preferred less structure performed better in the social sciences. One reason for the differences may be the nature of the examinations since students who preferred structure performed better on objective tests; students who required less structure performed better on subjective tests (Hunt, 1979). Learning style research indicated that the majority of students were not auditory learners, which does not support the widespread use of the lecture method of teaching (Dunn, Dunn, & Price, 1979).

Payton, Heuter, and McDonald (1979) used the Canfield-

Lafferty Inventory in a national study to identify the learning preferences of first-year physical therapy students. The typical student preferred well organized and logical course work in which assignments and requirements were clearly detailed, was not inclined to perform independently, work alone, or compete with groups of people, preferring instead to work with people. The typical student preferred to learn by listening and direct experience, and was not interested in reading.

The Learning Preference Inventory (LPI) had been used extensively with allied health and pharmacy students (Rezler & French, 1975; Rezler & Rezmovic, 1981) and yielded six scores indicating a student's degree of preference for various learning situations. Even though using a different instrument, the data resulted from Rezeler & French (1975) and Rezler & Rezmovic's (1981) studies for physical therapy students were compatible with those found in the study of Payton, Heuter and McDonald (1979), and also showed that these students preferred course work that was logically organized, could be learned through direct experience, and involved working with other people rather than individually.

Horton(1978) administered the LPI to medical records practitioners and found that most medical records personnel preferred to learn independently, unlike the physical therapy students.

Ostmoe et al. (1984) developed and administered a

learning preference questionnaire to nursing students. It was found that students preferred learning situations that were teacher-directed, highly organized, and traditional in nature. Johnson (1984) used the Rezler LPI to compare learning preferences of nursing students enroled in a traditional program with those of students enroled in an independent study curriculum. The findings for the traditional sample were the same as those found in the Ostmoe et al. (1984) study: students who selected the nontraditional format were consistent with those of Rezler and Rezmovic (1981) who found that freshman pharmacy students selecting an independent study program preferred learning conditions which they could structure themselves, unlike their peers who opted for the traditional curriculum and preferred teacher-directed learning situations.

In 1990, Melton conducted research on Chinese students' learning style preferences. A total of 331 participants were drawn from four academic majors: English; English literature; business/economic; and medicine/science. English literature majors were significantly different from medicine/science majors in the area of kinaesthetic learning style. All groups chose tactile learning as a major learning style, visual and auditory learning as a minor learning style, group learning as a negative learning style. The significant difference were found in kinaesthetic learning. The study showed that English and English Literature majors regarded it as a major learning

style, while Business/Economic and Medicine/Science majors regarded it as a minor one (p.41). All these studies indicated that there were clear learning style preferences among different academic majors. These variables reflected that the academic programs also influence on people's learning styles.

Ways To Assess Learning Styles

There are variety of learning style instruments to measure one or many aspects of adults' learning styles. Some are time consuming to administer. Others require only 15 minutes. Several require special training to administer and interpret; others are informal instruments that can be used by following a few simple directions. Although the instruments vary in length, format, and complexity, they have many similarities and basically were used to measure the learning style preferences of the learners.

According to O'Neil (1990), the following five are the most widely used instruments:

1. Rita and Kenneth Dunn (1979) developed The Learning Style Inventory (LSI) for use with students of grades 3 to 12 and the Productivity Environmental Preference Survey (PEPS) for Adults. These two instruments can be used to determine a person's specific learning style preference. Respondents can finish the survey in about 30 minutes. The questions are about their environmental, emotional, sociological and

physical preferences and the ways they think they respond to different situations.

2. The Gregorc Style Delineator, which was developed by Anthony Gregorc (1979), can be used to determine a person's visual, processing and organizing information preferences. Four distinct patterns of style were identified: concrete sequential style, abstract sequential style, concrete random style, and abstract random style.

3. The Myers-Briggs Type Indicator (MBTI) was based on Carl Jung's (1971) theory. He indicated that people view their environment in two ways: "sensation" and "intuition," and people make decisions in a "thinking" way and a "feeling" way.

4. Herman A. Witkin's (1977) Embedded Figures Test. Being different in format, it required people to find a simple figure within a more complex design. Each item of this instrument is marked either "correct" or "incorrect," and the score can show wether the participant is "field dependent" or "field independent."

5. NASSP Learning Style Profile adopted by the National Association of Secondary School Principals (1988) was used to assess the learning skills and environment preferences which affect students' school performance.

Summary

Chapter 2 began with a short introduction and exploration

of research literature on the concept of learning styles. It explained the essential components of learning styles and attempted to differentiate between learning styles and cognitive styles. An historical background for learning style research was presented. Literature on the relationship between learning style preferences and gender, age, cultural background and academic program was examined. Finally, several ways of assessing learning style preferences were also introduced. This chapter provides the basis for the discussion of the methodology in the following chapter.

Chapter Three

Methodology

Methodology

The purpose of the study was to determine whether similarities in learning styles exist among groups of adult learners. The study sought to explore variations in preferred learning styles according to gender, age, cultural background and academic program. Data for the study were collected by questionnaire from Chinese-Canadian undergraduate students in a Canadian university, Canadian adult diploma and B.Ed students in a Canadian university, and Chinese adult diploma students in Beijing, China.

Nature of the Research

The research was a descriptive study. The researcher used a quantitative rather than a qualitative approach. Data collection was less costly both in time and money by the use of a questionnaire than through interviews or other qualitative methods. The questionnaire could be readily translated and also administered in Beijing by a research associate. By using the comparative analysis of data, the effect of gender, age, cultural background and academic program on adult learning style preferences could be determined. By using statistical analyses, the learning style

preferences could be more readily compared than with qualitative approaches. Learning style preference data could provide a clear picture of the respondents' preferences. These data could also be used to determine statistically significant relationships between the demographic data and the learning style preferences.

Instrumentation

A review of the literature helped to make the decision to adapt Betty Lucas' (1989) Learning Style Inventory with additional items drawn from instruments developed by Dunn, Dunn and Price (1987), David Kolb (1981), David Hunt (1978) and Renzulli and Smith (1978), focusing upon three areas: (a) preferred perceptual modality, (b) required amount of structure and (c) tendency toward reflectivity or impulsivity. The inventory for this study included 73 items, each requiring a response on a five-point Likert-type scale ranging from strongly disagree to strongly agree (See Appendix 2). Its format was modelled upon the Learning Style Inventory (Dunn, Dun and Price, 1987).

Of the 73 items, 49 items were adapted from Betty Lucas' (1989) Learning Style Inventory, 18 items were adapted from Dunns and Price's(1987) Learning Style Inventory, 3 items were from David Kolb (1981), 2 from Hunt (1978), and one item was from Renzulli and Smith (1978).

There were 23 items that dealt with preferred perceptual

modality (visual preference, including reading and viewing, aural preference and psychomotor preference), of these 12 were adapted from Betty Lucas (1989), 7 were identical or modifications of Dunn, Dun and Price (1987) learning style inventory, 3 were from David Kolb and one was from Renzulli and Smith (1978). In adapting items from these surveys the researcher could collect data that described how the preferred perceptual modality influenced adult learning styles.

There were 26 items related to required amount of structure (including deadlines, completion time, material assignments, independent vs. group work, breaks and supervision). Eighteen items were identical to or modifications of Lucas' (1989) learning style instrument and 8 were identical to or modifications of Dunn, Dun and Price (1987) learning style inventory mentioned above. By adapting these items, the researcher could collect data that best described how the required structure influenced adult learning styles.

The 26 structure items were divided into two groups: 9 indicating a high level of internal structure (i.e., the ability to structure one's own learning environment) and 18 indicating a low level of internal structure (i.e., the need for externally imposed structure in the learning environment). Within the impulsivity sub-set, 7 items were classified as describing impulsive behaviour, while 16 items described reflective behaviour.

Finally, 23 items focused upon reflectivity and impulsivity. Eighteen items were drawn from Lucas' learning style instrument, 3 of the items were modifications of Dunn, Dun and Price (1987) learning style inventory, and the other 2 items were modifications of Assessing Conceptual Level by David Hunt (1978).

Demographic

Demographic questions were developed to supplement the information from the learning style preference inventory, and to provide a descriptive profile of the sample. Gender, age, cultural background and academic program were surveyed to provide a general description of the participants. As indicated in the literature these factors have been associated with learning style preferences. The relationships between these independent variables and the learning style preferences were also determined in this study. Demographic data also provide a description of the participants so that implications can be made and ideas for further research identified.

Validity and Reliability

By using questionnaire items from research instruments developed by other researchers, both validity and reliability were adequately addressed. According to Borg and Gall (1989, p.249-250), validity is the " degree to which a test measures what it purports to measure." Asher (1976) defined validity

as "a concept indicating authenticity, truth, or genuineness of test results or observations which is useful for a purpose..., the extent to which accurate conclusions about cause-and-effect can be tested" (p.283). Fox (1969) stated, "For many data-gathering procedures, such as questionnaires and interview guides, content validity is the strongest technique available to the researcher" (pp.369-370).

Since the study was descriptive, the questionnaire must by valid for the data to be trustworthy. More specifically, the questionnaire must measure what it sets out to measure. Since these items were used by other researchers to measure learning style preferences, they could be used with confidence to do the same in this study.

Reliability was defined by Fox (1969)as "the accuracy of the data in the sense of their stability, repeatability, or precision" (p.353). Reliability concerns itself with dependability or consistency of results. If the same instrument were used a second time, would the results be consistent with the first? Again, reliability of the instrument was assumed on the basis of the use of these items in previous research.

Pilot testing of the questionnaire was completed with a sample of adult students in a graduate program at the University of Alberta. Feedback from the pilot test resulted in very minor revisions of questionnaire items.

Sample

Three target groups were identified in the sample. The first target group was a sample of Chinese adult students in Beijing, China. The 45 Chinese students who participated in the research were in a diploma program in Beijing. The Chinese sample was purposively selected from classes in an adult education program by arrangements with the administration of the educational institution. The institution was chosen because it provided a convenient opportunity to conduct the study with adult students in a diploma program.

The Canadian samples were selected from two target groups in a large urban university in western Canada. The Chinese-Canadian students were enroled in undergraduate programs at the Canadian university. These students were members of the Chinese-Canadian community on campus, and 40 were invited to participate in the study.

The second target group at the Canadian university consisted of students enroled in an adult education diploma program. A sample of 50 was drawn from two introductory classes in the program to participate in this study. In each instance, the researcher selected respondents that were easily identified as belonging to one of the target groups.

Data Collection

The inventory used in this study consisted of two

components: demographic background and learning style preferences of adult students. The target groups were Chinese, Chinese-Canadian and Canadian adult learners in a variety of academic programs. Letters were sent to the president of an adult education Institute in Beijing requesting permission to administer the questionnaire. A covering letter and a copy of the questionnaire were sent to the president and selected adult education teachers. The covering letter included a brief description of the study and invited students to participate in the study. Permission to administer the questionnaire in Beijing was received from the president. A copy of the covering letter in Chinese is contained in Appendix 3.

Similarly, instructors in the adult diploma program in an urban Canadian university were approached in person for permission to administer the questionnaire in two sections of an adult education course. The researcher clarified the purpose of the research and permission was granted. Arrangements were made to distribute the questionnaires to all students in this course.

The Chinese-Canadian students, however, were not enroled in a single course; indeed, they were enroled in different academic programs at the same Canadian university. These students were contacted individually by the researcher and invited to participate in the study.

Data collection began in late October, and ended on

December 7, 1993. Forty-five copies of the questionnaires were sent directly to Beijing, China, inviting Chinese adult diploma program students to participate in the study. The covering letter included a brief description of the purpose of the study and assured respondents of confidentiality and anonymity, as well as the right to opt out of the study.

Under the supervision of an instructor, students completed the inventory during class time. In each instance, instructors invited students to complete the survey at the end of a class session, allowing students to opt out if they did not wish to participate. The inventory was administered during class time in October, 1993. Respondents completed the survey anonymously and were asked to indicate only their gender, age and program of study. Forty-five completed questionnaires were returned before the end of November, 1993.

The researcher made a presentation about the purpose of the research to the adult diploma students in a Canadian university. The researcher assured the students of confidentiality and anonymity, as well as the right to opt out, and then invited them to participate in the study. Fifty questionnaires were distributed. The participants were invited to complete the survey questions at home and return them to the researcher as soon as possible. The researcher maintained personal contact with the instructors during the data collection process and requested that students be reminded to return their completed questionnaires to a mailbox

for the researcher. When data collection ended, 42 questionnaires had been returned.

The Chinese-Canadian students were gathered from undergraduate programs in the same urban Canadian university. The researcher individually distributed 40 questionnaires with a covering letter explaining the nature of the study. The letter assured students of confidentiality and anonymity, as well as the right to opt out of the study. The researcher contacted individual students for follow-up purposes. The students were thanked if they had already returned the questionnaire and once again invited to do so if not. In the end, 32 questionnaires were completed.

The distribution and return of the questionnaires is outlined in Table 3.1. The questionnaires were distributed to adult students in Beijing and two groups of students in a Canadian university.

The final completion rate was 88 percent (119 out of 135). All of the adult students in Beijing completed the questionnaire, perhaps because they were invited to do so at the end of a class. With reminders, 80% or more of the two groups at the Canadian university returned completed questionnaires. The questionnaires were returned to the researcher for data compilation and analysis.

Scoring of Data

Each inventory was given a code number. The respondent's

Table 3.1

Distribution and Return of Questionnaires

Location	Sent	Returned	Percent
Beijing University	45	45	100
Canadian University			
Chinese-Canadian	40	32	80
Canadian students	50	42	84
Total	135	119	88

cultural background, gender, age and academic program were also coded. The researcher assigned the following age categories:

1 = 18 to 21 years

2 = 22 to 29 years

3 = 30 years and older

Academic program was designated as follows:

1 = Administration/Economics

2 = Accounting

3 = Business

4 = Art

5 = Science

6 = Education, B.Ed.

7 = Education, Diploma

The responses for each item in the inventory were then transposed to a summary sheet and entered onto a computer file at the University of Alberta for data compilation and analysis. Appropriate descriptive and inferential statistics were compiled to address the research questions of the study.

Analysis of Data

The data gathered by the survey questionnaire were compiled to derive descriptive statistics of central tendency and variability. These data provided a descriptive profile of the respondents and of their preferred learning styles. Using factor analysis, a rotated factor matrix generated clusters of items with high intercorrelations. These clusters constituted the dimensions of learning style preferences among the respondents. The t-test and one way analysis of variance, followed by a Scheffé test, were used to compare responses on each factor score according to the respondents' gender, age, cultural background and academic program.

As indicated earlier, respondents in the survey were treated as a composite of the total sample. Confidentiality and anonymity for both the individual and the institution were maintained throughout the presentation and discussion of the findings of this study.

Summary

This chapter included a discussion of the nature of the research, research methodology, the development of the questionnaire and its validation, and data compilation and analysis. The data for this study were collected by the use of a two-part survey questionnaire. The first part of the questionnaire focused on the demographic data to obtain a profile of the adult students, while the second part consisted of 73 questions on learning style preferences.

Chapter Four

Findings and Analysis of the Data

This chapter contains a description of the result of this study. The first section contains a demographic description of the sample. The second section describes the perceptions of the respondents' preferred learning styles, while the final section presents the analysis of data.

Demographic Profile

Sample

The sample was drawn from three different cultural groups: Chinese adult students at an adult education institute in Beijing; Chinese-Canadian undergraduate students at an urban Canadian university, and Canadian adult education diploma students at the same urban Canadian university.

The sampling frame yielded a total of 135 names. Through follow-up by telephone and personal contact with some of the Canadian and Chinese-Canadian students on campus, 119 usable questionnaires were returned, representing an 88 percent return. According to Babbie (cited in Best, 1986:178), a return of 50 to 60 percent is adequate in survey research (see Table 3.1).

The questionnaire contained two parts. The first part

contained five questions designed to provide a demographic and academic profile of the respondents. The second part contained 73 questions designed to provide a profile of the respondents' learning style preferences. Table 4.1 provides data on the personal and academic characteristics of the respondents.

Demographic Characteristics

Table 4.1 portrays demographic characteristics and the academic program of respondents. Of the total sample, 37.8 percent of these respondents were Chinese adult students from Beijing, China; 26.9 percent of the respondents were Chinese-Canadian undergraduate students, and the rest of the sample (35.3%) were Canadian students from an urban Canadian university.

Among the participants, the female respondents accounted for 60.5 percent while male respondents accounted for 39.5 percent. In the age distribution, the largest group of respondents (38.7%) were in the 22 to 29 age group.

Academic Programs

Table 4.1 portrays the specific academic majors of the respondents. The respondents were drawn from 7 different academic programs: administration/economics, accounting, business, science, arts, education (B.Ed and diploma programs). The largest number of respondents were in the

Table 4.1
Demographic and Academic Profile of Respondents

Variable	Frequency	Percent
Cultural Background		
Chinese	45	37.8
Canadian	42	35.3
Chinese-Canadian	32	26.9
Total	119	100.0
Gender		
Female	72	60.5
Male	47	39.5
Total	119	100.0
Age		
18-21	35	29.4
22-29	46	38.7
30 and older	38	31.9
Total	119	100.0
Academic Majors		
Admin/Economics	10	8.4
Accounting	35	29.4
Business	6	5.0
Art	5	4.2
Science	17	14.3
Education, B.Ed.	4	3.4
Education, Diploma	42	35.3
Total	119	100.0

education diploma program (35.3%), followed closely by students in accounting (29.4%). Administration/economics and accounting were part of a diploma program for adult students

offered by the adult education institution in Beijing. Business, science, arts and education (B.Ed.) programs were undergraduate programs taken by Chinese-Canadian students in an urban university in Canada. The education diploma program was offered to post-degree adult learners at the same Canadian urban university.

For analytical purposes it seemed appropriate to group these majors into three large clusters. The largest category was related to business (42.8%), including specific programs of accounting (29.4%), administration/economics (8.4%) and business (5.0%). The second cluster was education (38.7%), including both post-degree diploma (35.3%) as well as undergraduate (B.Ed.) students. The third cluster was liberal studies (18.2%), including science (14.3%) and arts (4.2%).

These clusters or sub-groups were used for analytical purposes in the data analysis: group 1, business and economics; group 2, arts and science; and group 3, education.

Data Relationships Among Independent Variables

This section contains an analysis of the relationships among independent variables in the study. Only those variables for which statistically significant relationships were found are presented (see Table 4.2).

Majors by gender. Of the total 119 respondents, female respondents accounted for 60.5%, and male respondents

Table 4.2

Data Relationships

Major	Gender		Age Groups			Cultural Groups		
	F	M	18-21	22-29	29+	Chinese	Chinese-Canadian	Canadian
Admin Econ	4.2	14.9	2.9	2.2	21.1	22.2		
Accounting	36.1	19.1	22.9	47.8	13.2	77.8		
Business	6.9	2.1	17.1				18.8	
Arts	4.2	4.3	11.4	2.2			15.6	
Science	5.6	27.7	42.9	4.3			53.1	
Educ.	2.8	4.3	2.9	6.5			12.5	
Diploma	40.3	27.7		40.0	60.0			100.0
	P≤ 0.01		p≤ 0.00			p≤ 0.00		

Cultural Group	Age Groups		
	18-21	22-29	29+
Chinese	20.0	51.1	28.9
Chinese-Canadian	81.2	18.8	
Canadian		40.5	59.5
	p≤0.00		

accounted for 39.5% (see Table 4.1). There was a significant difference in the distribution of academic majors by gender of respondents. Table 4.2 shows that female respondents were drawn predominantly from the educational diploma program (40.3%) and from accounting (36.1%). Male respondents, conversely, exceeded female respondents in science (27.7%) and administrative/economics (14.9%).

Majors by age. Among the 119 respondents, 35 (29.4%) were 18 to 21 years of age, 46 (38.7%) were 22 to 29 years of age group, 38 (31.9%) were of 30 years or older (see Table 4.1). As shown in Table 4.2, the younger respondents (18 to 21 years of age) majored predominantly in science(42.9%) and in business (17.1%). Among the 22 to 29 years of age group, 47.8% majored in accounting, while the older aged adults (30 or older) dominated in the educational diploma program (60.0%) and in administrative/economics (21.1%).

Majors by culture. Among the 119 respondents, 45 were Chinese adult students, 32 were Chinese-Canadian students, and 42 were Canadian students (see Table 4.1). As indicated in Table 4.2, only the Chinese respondents were enroled in accounting (77.8%) and administrative/economics (22.2%); only the Chinese-Canadian participants were enroled in science (51.3%), business (18.8%), arts (15.6%), and education (12.5%); all of the Canadian respondents were enroled in an educational

diploma program.

Cultural origin by age. The 119 respondents included 45 Chinese students, 32 Chinese-Canadian students, and 42 Canadian students (see Table 4.1). Table 4.2 indicates a statistical difference between respondents' cultural origin and age. The largest number of the youngest respondents were Chinese-Canadian; the preponderance of respondents aged 22 to 29 years were Chinese; while students aged 30 and older were largely Canadian. These differences by demographic and academic variables may help to interpret the effect of these independent variables on learning style preferences.

Learning Style Preferences

A Likert scale was used to solicit the respondents' perceptions of the importance of each statement as an indicator of their learning style preferences:

1= Strongly Disagree

2= Disagree

3= Undecided

4= Agree

5= Strongly Agree

Data from the survey were analyzed by means of Statistical Package of the Social Sciences (SPSS) (Nie, Hull, 1981). The mean scores and standard deviations for the items are shown in Table 4.3. The items are arranged in order of learning style

Table 4.3

Learning Style Preference

Items	MEAN	SD
30. Remember how to do task by doing it	4.41	.63
17. Learn best when actually doing it	4.35	.75
68. Prefer material followed by examples	4.28	.61
70. Like instructors to recognize my efforts	4.24	.56
48. Rather "guess" answer than leave blank	4.14	.94
72. Like to think thing out when not sure	4.08	.57
69. Prefer study with someone who knows material	4.03	.79
45. When lots of study I like to work alone	4.00	.93
44. Prefer assignments with outlined instructions	3.98	.83
19. Prefer assignments let me choose what to do	3.97	.90
64. Prefer things explained by showing	3.97	.74
61. I stay at a task until it is finished	3.95	.70
49. Try do task even if I may not success	3.91	.74
25. When task difficult I move on to next	3.84	.79
4. Remember best if I go through one step a time	3.83	1.03

Table 4.3 (con't.)

Items	MEAN	SD
21. Enjoy tasks that allow me to take breaks	3.83	.80
59. Usually finish test in allowed time	3.81	.89
8. Get more work done when I take breaks	3.79	1.05
27. I learn better when I read instructions	3.79	.95
53. I like to learn by talking to people	3.79	.86
67. Usually successful meeting deadline	3.78	.77
40. Learn best when I watch carefully	3.74	.86
52. I learn best from observation	3.74	.79
37. When task difficult I try to figure it out	3.73	.84
35. I always finish tests or exams	3.71	.90
60. Listen to others then make up my mind	3.71	.88
66. Prefer courses that let me do experiments	3.67	.92
5. Always successful in meeting deadline	3.65	.98
2. Remember things best I have seen on films	3.64	.95
47. Do better on tests when I have time	3.63	1.02
3. Remember things best I have read	3.62	.97

Table 4.3 (con't.)

Items	MEAN	SD
63. Prefer creating reading	3.62	.91
42. Like building up things when I study	3.58	.86
46. Performance improves if work checked	3.56	1.02
54. I take lots of notes during lectures	3.56	1.02
16. Prefer learn new material in lecture	3.55	.93
28. I really enjoy television	3.52	1.02
58. Like my teacher to check my school work	3.50	.94
56. Prefer materials with lots of exercises	3.48	1.02
36. Spend long time weighing all factors	3.46	.96
7. Prefer tasks that allow me to work alone	3.44	1.05
33. I enjoy working in groups	3.40	1.04
1. Prefer to learn new material by reading	3.39	1.03
14. Learn better by reading than listening	3.38	1.09
34. Person of auth stay away until complete	3.38	1.16
15. Like to learn something new by movie	3.35	1.04
55. Prefer to have deadlines set by instructor	3.34	.94

Table 4.3 (con't.)

Items	MEAN	SD
51. Things I remember best I saw in books	3.33	.84
24. Marks best when put down first answer	3.27	.88
43. Can work on several projects at once	3.26	1.01
38. Volunteer answer only if correct	3.25	1.08
57. Job I like best I do with group of people	3.24	1.11
11. Usually make quick decision about work	3.22	1.00
9. Like instructor that checks work often	3.19	1.16
6. Prefer questions with one answer only	3.16	1.28
50. Often express my ideas during class	3.15	.99
71. Prefer test with specific timelimit	3.15	.99
73. If task very difficult I lose interest	3.14	1.16
39. Remember instructions best when I read	3.13	1.20
29. Prefer learn new material listen to lecture	3.12	1.08
65. Things I remember best are things I hear	3.05	.89
32. Prefer question with several correct answers	3.03	1.12
12. If task difficult, I ask right away	2.98	1.12

Table 4.3 (con't.)

Items	MEAN	SD
22. Rarely consult instructor about my work	2.96	1.03
13. I often volunteer answer in class	2.93	1.10
10. Usually one of the first to finish	2.88	.92
62. Rarely express opinion in class	2.78	1.04
41. Like to be told exactly what to do	2.65	1.20
26. I never volunteer an answer in class	2.56	1.04
31. I often have difficulties completing task	2.46	1.01
20. Usually class discuss waste of time	2.16	1.02
23. Rarely finish tests with time limits	2.15	1.03
18. Never successful in meeting deadline	1.75	.81

preferences; the greater the mean score the stronger the learning style preference.

Respondents did not strongly agree with any of the learning style preferences. There were 38 items on which they agreed with means ranging between 3.5 and 4.4. As shown by the standard deviations, there was a high level of consensus among respondents on most of these items (SD<1.0). Respondents were undecided about their preferences of their learning styles on 31 items, with means ranging from 2.56 to 3.48. There was less consensus on these items as shown by the large number of standard deviations above 1.0. And finally, respondents did not agree with four of the learning preference items (means above 2.5).

By looking at the first group, the top three items and items 4, 66, 42 were related to active learning. Items 64, 27, 40, 52, 2, 3, 63 were related to reading and viewing (visual). Items 59, 67, 35, 60, 5, and 47 were related to deadlines. The respondents had stronger preferences for these learning styles than they did for other learning styles.

Respondents were undecided about their preferences of their learning styles on 31 items, with means ranging from 2.56 to 3.48. There was less consensus on these items as shown by the large number of standard deviations above 1.0. Items 7, 33, 57 related to independent vs. group work. Items 1, 14, 15, 51 were related to reading and viewing. Items 34, 9, 22 were related to supervision. Items 38, 50, 13, 62, 26

were related to class participation. Therefore, the respondents were undecided whether they preferred the above learning styles.

Finally, respondents did not agree with items 31, 23, 18 related to deadlines, and item 20 related to class participation (means below 2.5). Respondents disagreed that they could not complete tasks within deadlines and that class discussion was a waste of time, indicating a preference for deadlines and class participation.

Learning Style Factors

The 73 statements contained in the Learning Style Inventory were factor analyzed using varimax rotation to identify commonalities among the items. The purpose of this analysis was to explore the data for patterns of relationships in order to describe the data by a smaller set of factors of learning style preferences.

Several factor solutions were considered to find the most meaningful solution. After considering the amount of gain between the various solutions and the number of items that would be omitted based on the criteria that were used, a seven factor solution was selected.

Factor analysis was completed by computation of a correlation matrix using principal components, extraction of seven factors and varimax rotation. Items were considered to

contribute to the meaning of a factor if they satisfied the following generally accepted criteria (Streiner, 1986) for this type of study:

1. Items which loaded 0.40 or higher on a factor were considered part of that factor.
2. An item should load decisively on one factor only. If an item loaded above 0.40 on more than one factor, it was assigned to the factor on which it had the highest loading if it was at least .05 higher, or else they were considered equal for the purposes of factor interpretation.
3. Items included in a factor should contribute logically to the meaning of the factor.

These seven factors accounted for 42.6 percent of the total variance percent variance explained by each factor was also reported (Table 4.4). Although the factors contained a composite set of items, they were lablled as follows:

1) Supervision
2) Class participation
3) Deadlines
4) Reading Preference
5) Creativity
6) Active Learning
7) Independent Learning

The statistical analysis resulted in means (factor scores) for each of the seven factors (Table 4.4). After

Table 4.4

Seven Factor Solution For Learning Style Inventory

Factors/Items	I	II	III	IV	V	VI	VII
Supervision							
4. Remember best if one step a time	**.70**	.20	.16	.03	-.24	.14	.09
56. Prefer materials with lots of exercises	**.68**	.10	.09	.06	-.23	.09	-.12
58. Like teacher check my work	**.68**	-.05	.04	-.09	.21	-.04	-.17
12. If task difficult, I ask right away	**.58**	.02	-.09	.06	.24	-.17	-.29
48. Rather guess than leave blank	**.58**	-.01	.19	.02	-.16	.05	.31
46. Performance improves if work checked	**.57**	.16	-.02	.07	-.12	-.06	.14
55. Have deadlines set by instructor	**.56**	.12	.22	.03	-.34	-.12	.11
41. Like to be told what to do	**.50**	.37	.05	.07	-.25	-.14	-.09
9. Like instructor to check work often	**.49**	.25	-.15	-.11	.12	-.12	-.27
54. Take lots of notes during lecture	**.43**	-.02	-.16	.20	.08	.10	.09
Class Participation							
26. Never volunteer answer in class	-.05	**.71**	-.18	-.07	.02	-.02	.03
50. Express ideas during class	-.21	**-.67**	-.03	-.05	.18	.06	-.24
62. Rarely express opinion in class	-.06	**.66**	-.10	-.03	-.16	-.20	.09
13. Volunteer answer in class	.02	**-.61**	-.04	.09	.18	.02	-.06
38. Volunteer answer only if correct	.12	**.58**	-.16	.02	.22	.08	.07

Table 4.4 (con't.)

Factors/Items	I	II	III	IV	V	VI	VII
Class Participation (con't)							
6. Prefer question with one answer	-.02	**.51**	.10	.19	.43	-.16	-.01
32. Prefer question with several answers	-.32	**-.49**	-.16	-.32	.02	.11	-.08
28. Really enjoy television	.34	**.48**	.01	-.12	.06	.20	.17
44. Prefer assigments with instructions	.30	**.48**	.10	-.06	.28	.05	-.20
72. Think things out when not sure	.04	**-.47**	.23	.05	.06	.33	.21
73. If task difficult I lose interest	-.03	**.45**	-.33	-.12	-.06	-.20	-.31
Deadlines							
35. Always finish test or exams	-.06	.02	**.74**	.03	.18	.06	-.08
59. Usually finish test in allowed time	.05	-.06	**.71**	.12	.01	-.03	-.13
67. Usually successful meeting deadline	.13	-.07	**.62**	.08	-.10	.12	.19
23. Rarely finish tests with time limts	.07	.03	**-.55**	-.20	.18	-.08	-.06
31. Often have difficulties completing task	.19	.03	**-.55**	-.38	.12	-.45	-.09
53. I often have difficulties completing task	.19	.03	**-.55**	-.38	.12	**-.45**	-.09
10. Usually one of the first to finish	.08	-.15	**.51**	.01	.35	-.09	-.10
47. Do better on tests when have time	.02	.20	**-.51**	-.02	.18	.19	.21
18. Never successful meeting deadline	.06	.10	**-.46**	-.09	.07	-.31	-.10
5. Always successful meeting deadline	.24	.22	**.44**	.13	.04	.12	.04

Table 4.4 (con't)

Factors/Items	I	II	III	IV	V	VI	VII
Reading Preference							
14. Learn better by reading than by listening	.15	-.05	-.01	**.78**	-.02	-.08	.02
39. Remember instructions when I read	.11	-.11	.10	**.69**	-.07	-.15	.08
3. Remember things I read	-.02	.17	.07	**.64**	.26	-.13	-.05
1. Learn new material by reading	-.03	.05	.16	**.62**	.17	-.11	-.09
29. Learn new material listen to lecture	.13	.07	-.09	**-.58**	.31	-.28	.14
65. Things I remember are things I hear	-.07	.11	-.14	**-.52**	.20	-.01	-.14
27. Learn better when I read instructions	.10	-.02	.04	**.46**	-.08	-.02	.03
51. Things I remember best I saw in books	.07	.25	.09	**.46**	**.40**	-.01	.12
Creativity							
2. Remember things on film	.06	-.09	-.03	.01	**.56**	.18	.02
42. Like building up things when study	-.08	-.24	-.03	-.31	**.52**	-.05	.02
52. I learn best from observation	-.04	.23	.23	-.06	**.51**	.26	-.02
66. Prefer courses let do experiments	-.18	-.10	-.21	-.09	**.50**	.08	-.01
49. Try to do task even if not succeed	.08	.00	.24	-.11	**.47**	-.02	.24
63. Prefer creative reading	-.21	-.26	-.24	-.00	**.42**	-.21	.02

Table 4.4 (con't.)

Factors/Items	I	II	III	IV	V	VI	VII
Active Learning							
53. Like to learn by talking to people	.00	-.11	.16	-.15	.02	**.68**	-.14
20. Class discussion waste of time	.03	.28	.16	.08	.06	**-.57**	.01
30. Remember how to do task by doing it	.20	.12	-.04	-.19	.20	**.54**	-.03
17. Learn best when doing it	.38	-.07	.02	-.13	.13	**.53**	.06
19. Prefer assigments let me choose what to do	-.18	-.19	-.09	.27	.30	**.45**	.04
15. Like to learn by movie	.02	-.02	.19	-.01	.08	**.40**	-.03
Independent Learning							
45. When lots of study I like to work alone	.20	-.01	-.02	.26	.01	.05	**.62**
7. Prefer task that allow me to work alone	-.02	-.10	.10	-.07	.17	-.26	**.57**
36. Spend long time weighing all factors	.05	.15	-.18	-.11	.06	.16	**.50**
57. Job I like best I do with people	.38	.12	-.21	-.13	.28	.14	**-.50**
34. Person of auth stay away until complete	.16	-.11	.04	-.15	.04	-.33	**.47**
8. Get more work done when take breaks	-.14	.04	-.24	.06	.23	.23	**.46**
Omitted Item							
11. Usually make quick decision about work	-.02	-.15	.37	.03	.26	-.11	-.38
16. Learn new material in lecture	.16	.22	-.03	**-.40**	**-.40**	.24	-.07
21. Enjoy tasks allow me to take breaks	.38	-.14	-.06	.09	.14	-.05	.18

Table 4.4 (con't.)

Factors/Items	I	II	III	IV	V	VI	VII	
Omitted Item (con't)								
22. Rarely consult instructor about my work	-.36	.02	-.01	.04	-.20	-.16	.11	
24. Marks best when put down first answer	-.01	-.07	.05	-.18	.16	.05	-.34	
25. When task difficult I move on to next	.22	.22	.07	.07	.02	.10	-.02	
33. I enjoy working in groups	.39	-.08	-.13	-.10	.01	.34	-.39	
37. When task difficult I try to figure out	-.24	-.27	-.06	-.23	.18	.16	.31	
40. Learn best when I watch carefully	.12	.31	.14	-.25	.19	.22	-.11	
43. Can work on several projects at once	.07	-.38	.33	-.05	.27	-.19	.22	
60. Listen to others and make up my mind	.37	.00	.21	-.11	-.29	.27	.01	
61. I stay at a task until it is finished	-.15	.09	.29	-.04	.19	.01	.32	
64. Prefer things explained by showing	.34	.21	.02	-.16	.29	.27	-.10	
68. Prefer materials followed by examples	.33	.11	.16	.08	-.14	.30	.17	
69. Study with someone who knows material	.22	.28	-.16	-.03	.18	.16	-.29	
70. Like instructors to recognize my efforts	.35	.09	-.07	.10	.07	.03	-.02	
71. Prefer test with specific time limit	.01	.10	.33	-.07	.03	-.35	-.29	
Percent Variance	**9.5**	**8.2**	**6.6**	**5.3**	**4.7**	**4.2**	**4.1**	**42.6**

grouping of items within seven factors, the average mean for each factor was calculated. These factor scores were calculated by averaging the means of items within each factor after reversing these with negative loadings on the factor. When the factor mean score fell between 3.5 to 4.4, it indicated that the respondents agreed with the learning style portrayed by these factors. However, if the factor mean score fell between 2.5 to 3.4, the respondents felt undecided about these factors.

Demographic data were compiled in frequency and percentage distributions for each of the factors so that a composite picture of the sample emerged.

1) Supervision (3.4)

Factor I, labelled as supervision, contained 10 items as shown in Table 4.3, describes the attitude and behaviours which demonstrate the learners' learning style preferences in terms of instructor's supervision. They preferred the instructor to check their work often, and believed that their performance would improve if their work was being checked. They also preferred to learn by questioning, step by step, taking notes during lectures, and doing exercises which required the guidance, instruction and supervision of the instructor. In summary, the group showed a tendency to rely on supervision by the instructors, although the overall mean for this factor fell in the 'undecided' range.

2) Class Participation (3.06)

Factor II, labelled as class participation, describes the respondents' reaction to the preference for class participation during the learning process. Respondents were decided on 3 items (28, 44 72) showing their preference for class discussion. They were undecided on 8 items indicated that respondents would think things out when they felt not sure about the answer or the questions being asked, and they tended to lose interest if the task was too difficult.

3) Deadlines (3.54)

Factor III, labelled as deadlines, describes the attitudes and behaviours that demonstrate the respondents' reaction to the style of deadlines set for completing tasks and assignments during the learning process. Almost all the statements in this factor demonstrated a positive attitude toward setting deadlines. Learners felt they could do a better job within deadlines, and found no problem completing timed tasks and tests. They showed preference for specific deadlines.

4) Reading Preference (3.31)

Factor IV, labelled as reading preference, indicates the attitudes and behaviours that demonstrate the learners' reaction to the preference for visual perceptual modality (reading, viewing) during the learning process. Six

statements indicated learners preferred to use reading skills as their major style of learning. Two others showed that they did not prefer to learn through listening, indicating that the visual skill was their preferred learning style.

5) Creativity (3.62)

Factor V, labelled as creativity, indicates respondents' attitudes toward learning creatively. Six statements in this factor indicated that the respondents preferred to learn by getting involved in problem solving, learning by hands-on activities, and absorbing creative ideas, they liked to learn in a situation which was creative and encouraging.

6) Active Learning (4.13)

Factor VI, labelled as psychomotor, describes the attitudes and behaviours toward the active learning. The statements emphasize the preference of comunicating with people, building new things, actually practising and doing experiments during the learning process.

7) Independent Learning (4.48)

Factor VII, labelled as independent learning, indicates the attitude and reaction toward learning through independent vs. group work during the learning process. The statements addressed the preference for learning individually, without supervision, and learners felt they could get more work done

if they worked alone.

Differences in Learning Style Preferences

Appropriate analysis of variance tests were conducted to address research question 4:

4. How do preferred perceptual learning styles differ by gender, age, cultural background and academic program of respondents?

Gender

There were no significant differences in learning style preferences by gender of the respondents.

Age

There were three factors that affected learning style preferences of respondents by age: supervision, class participation, and creativity (Table 4.5). Respondents in group 1 (aged from 18 to 21) preferred to learn under instructional supervision more strongly than did respondents aged 22 years and older. Since the items in the participation scale were reflected, the higher the mean the lower the preference for this learning style. Therefore, respondents in the 18 to 21 age group had stronger preferences for a learning style that did not involve class participation than did groups 2 and 3. They were less positive about class participation

Table 4.5

Learning Style Differences By Age

Factors	Mean Scores Group 1 (18-21)	Group 2 (22-29)	Group 3 (30+)	F	p	Significant Pairs
1. Supervision	3.73	3.29	3.30	6.82	.01	1>2,3
2. Class Participation	3.39	3.02	2.82	10.28	.00	1>2,3
5. Creativity	3.50	3.80	3.51	4.85	.01	2>1,3

than were other respondents.

Respondents in the 22 to 28 age group, on the other hand, preferred creativity as a learning style more strongly than did either younger or older respondents. No significant differences by age were observed on factors 3, 4, and 6.

Cultural Background

Table 4.6 shows that six out of seven factors indicated significant learning style preferences by cultural background. Chinese-Canadian respondents showed greater preference for the instructor's supervision (Factor 1) during the learning process than did Chinese and Canadian respondents.

Compared with Chinese and Chinese-Canadian respondents, Canadian students felt they could learn better by participating in class activities (Factor 2), but the Chinese students preferred a creative learning environment (Factor 5) more than did the Chinese-Canadian and Canadian respondents.

Chinese-Canadian and Canadian respondents preferred learning styles with deadlines (Factor 3) and active learning (Factor 6) more than did Chinese respondents. Chinese-Canadian respondents also preferred a reading style (Factor 4) more than did Chinese respondents.

Academic Major

There were five significant differences in comparing factor mean scores by academic majors (Table 4.7).

Table 4.6

Learning Style Differences By Cultural Group

Factors	Mean Scores Group 1 Chinese	Group 2 Chinese Canadian	Group 3 Canadian	F	p	Significant Pairs
1. Supervision	3.28	3.85	3.27	13.09	.00	2>1,3
2. Class Participation	3.20	3.38	2.68	19.53	.00	1,2>3
3. Deadline	3.25	3.66	3.75	10.88	.00	2,3>1
4. Reading Preference	3.16	3.54	3.30	3.64	.03	2>1
5. Creativity	3.92	3.40	3.46	16.30	.00	1>2,3
6. Active Learning	3.89	4.22	4.31	8.71	.00	2,3>1

Table 4.7

Learning Style Differences By Academic Major

Factors	Mean Scores Group 1 Bus/Econ	Group 2 Arts/Sci	Group 3 Education	F	p	Significant Pairs
1. Supervision	3.30	3.91	3.32	10.22	.00	2>1,3
2. Class Participation	3.22	3.51	2.68	25.40	.00	1,2>3; 2>1,3
3. Deadline	3.31	3.55	3.78	9.27	.00	3>1
5. Creativity	3.85	3.38	3.48	10.75	.00	1,2>3
6. Active Learning	3.93	4.23	4.30	.94	.01	2,3>1

*** Academic Majors:** **Group 1=Admi. Econ, Acounting, Business; Group 2=Arts, Science**

Group 3=Education B.Ed and Diploma

Respondents majoring in arts/science had a stronger preference for the instructor's supervision during the learning process than did other respondents.

Respondents in business/economics and arts/science preferred less class participation than did respondents in education. Indeed, respondents in arts/science indicated the least preference for this learning style compared with respondents in each of the other groups.

Education respondents preferred deadlines during the learning process more strongly than did business/economics students. Compared with respondents in education, respondents in business/economics and arts/science indicated greater preference for the creative learning style (Factor 5).

Both arts/science and education students preferred active learning (Factor 6) when they were learning than did business/economics students.

The findings of this study indicated that learning style preferences were affected by:

Age differences. Younger aged students preferred to learn in an environment where guidance and supervision were available. Older adult learners preferred less supervision and more self-directed learning. This finding was similar to the findings of Price (1986) that younger aged students liked supervision and guidance.

The finding in this research that younger respondents did not prefer class activities and discussion was not similar to

Hunter's (1977) finding that learners less than 24 years of age preferred peer association. This research also found that respondents in the 22 to 29 age category preferred to learn in creative ways.

Cultural background. Cultural background can also affect adults' learning style preferences. The Chinese-Canadian respondents preferred more instructors' supervision compared with the other two groups. This finding was similar to the result of Jalali's (1989) research that Chinese-American students required more structure during the learning process. The finding of this research showed that Chinese respondents preferred less class participation was similar to the finding of Melton's (1990) study that Chinese students considered group learning as a negative learning style. This research also found that Chinese preferred more creativity learning compared with other two cultural groups which was also similar to the finding of Melton's (1990) research that the Chinese students preferred kinesthetic and tactile as major learning styles.

Academic major. Academic major also influenced adults' learning style preferences. Table 4.7 showed that five out of seven factors indicated significant learning style preferences by academic majors. Respondents in arts/science indicated stronger preference for the instructor's supervision, (similar to the findings of Hunt [1979] and Payton, Heuter and McDonald [1979]), and creativity than did respondents in

education. While respondents in education showed greater preference for active learning, practising and meeting deadlines than did respondents in business/economics. This was similar to the finding of Melton (1990) that English and English Literature majors regarded kinesthetic as their major learning style. Respondents of education also showed greater preference for the class participation than did the other two academic major respondents.

Summary

This chapter provided a description and analysis of the data collected by the questionnaire. The first section contained the respondent profile, including demographic characteristics, cultural background and academic program.

The second section presented the respondents' learning style preferences. The data were factor analyzed and seven dimension were identified: supervision, class participation, deadlines, reading preference, creativity, active learning and independent learning. The third section presented the results of the statistical analyses determining the effect of independent variables on learning style preferences.

The final chapter summarizes the study and findings, and presents the conclusions and implications about learning style preferences.

Chapter Five

Summary, Conclusion, and Implications

This chapter provides a summary of the study, draws some general conclusions about the concept of learning style preferences, and suggests implications for practice and further research. The summary section of this chapter provides an overview of the purpose of the study, its methodology and the analysis of the data. The major findings are presented as they relate to the four research questions that guided the study. In the conclusion, the findings of this study are compared with related literature on the concept of learning style preferences. The implications include suggestions derived from this study and also some proposals for further research.

Summary of the Study

This section provides a summary of the purpose of the study, the design of the study, instrument development, selection of respondents, data analysis, and findings of the study.

Purpose of the Study

The purpose of this research was to compare the preferred

learning styles of adult students enroled in an adult education program in China with those of adult students enroled in university programs in Canada.

The problems addressed in this study were:

1. What are the learning style preferences among adult learners in an adult education program in China?
2. What are the learning style preferences among Chinese adult learners in a Canadian university?
3. What are the learning style preferences among Canadian adult learners in a Canadian university?
4. How do learning style preferences differ by gender, age, cultural background and academic program of respondents?

Methodology

The research was exploratory in nature. The literature review on learning style preferences provided comprehensive lists of indicators or learning style preferences and factors which affect learning style preferences. These were used in the preparation of the questionnaire. The questionnaires with a cover letter was sent to adult learners in Beijing and also distributed to Chinese-Canadians and Canadians in an urban university in Canada.

Instrumentation

Information gathered from the literature review,

including an examination of various measurement approaches, was used in the design of the survey questionnaire. The questionnaire consisted of two parts: part one contained questions designed to determine the demographic profile of the respondents and part two was designed to determine the learning style preferences of the respondents.

The initial draft of the questionnaire was reviewed by a panel of experts, used in a pilot test, and appropriate revisions were made. The revised questionnaire was prepared for data collection in Chinese and English.

Respondents

Permission to conduct the study was requested and received from the president of an adult education institute in Beijing and instructors of an adult education course at a Canadian university. Forty-five questionnaires with cover letters were sent to Beijing, China; 40 questionnaires with cover letters were distributed individually to Chinese-Canadian undergraduate students at a Canadian university, while 50 questionnaires with cover letters were distributed to students in an adult education diploma program at the same university. Anonymity and confidentiality were assured and the questionnaires were numbered for follow-up purposes.

A total of 135 questionnaires were distributed. One hundred and nineteen usable questionnaires were returned, representing an 88 percent return.

Forty-five (38%) of the respondents were Chinese adult learners from Beijing, China; 32 Chinese-Canadians in undergraduate programs (26%) and 42 Canadian students in an adult diploma program (36%) were from a Canadian university.

The statistical analysis also resulted in means (factor score) for each of the seven factors. After grouping of items within seven factors, the average mean for each factor was calculated.

Data Analysis

The data gathered by the survey questionnaires were compiled to provide descriptive statistics of central tendency and variability. Appropriate tables were prepared to present a demographic profile of respondents and their learning style preferences. Factor analysis was used to identify common factors among the learning style preferences, and F tests were used to determine the effect of demographic and academic variables on learning style preferences.

Findings

Demographic Profile of Respondents

The largest percentage of the respondents were female (60.5%), while male respondents accounted for 39.5 percent. Devereaux (1985) and Caron (1984), in a Canadian survey of adult education, also found the highest participation rate

among a similar age group as indicated in this study. This group was within the period of adulthood with strong interests in upgrading their education.

In the age distribution, the largest group of respondents (38.7%) were in the 22 to 29 years of age group. The older (30 years or older) aged group accounted for 31.9%, and the younger (18-21) aged group accounted for 29.4%.

Of the total of 119 respondents, 38% were Chinese adult students, 27% were Chinese-Canadian undergraduate students, and the rest of the sample (35.3%) were Canadian students from an urban Canadian university.

Academic Major of the Respondents

The 119 respondents were drawn from seven different academic programs: administration/economics, accounting, business, science, arts, education (B.Ed and diploma programs). The largest number of respondents were in the education diploma program (35.3%), followed closely by students in accounting (29.4%). Administration/economics and accounting were part of a diploma program for adult students offered by the adult education institution in Beijing. Business, science, arts and education (B.Ed.) programs were undergraduate programs taken by Chinese-Canadian students in an urban university in Canada. The education diploma program was offered to post-degree adult learners at the same Canadian urban university.

The largest category was related to business (42.8%), including specific programs of accounting (29.4%), administration/economics (8.4%) and business (5.0%). The second cluster was education (38.7%), including both post-degree diploma (35.3%) as well as undergraduate (B.Ed.) students (3.4%). The third cluster was liberal studies (18.5%), including science (14.3%) and arts (4.2%).

Learning Style Preferences

The learning style inventory used contained 73 items. Respondents learning style preferences were indicated on a 5-point Likert scale. Data were analyzed by means of Statistical Package of the Social Science (SPSS) (Nie, Hull, 1981). By examining the data, respondents did not strongly agree with any of the learning style preferences. There were 38 items on which the respondents agreed with means ranging between 3.5 and 4.4, which means respondents preferred active learning (psychomotor), reading and viewing (visual), and deadlines and timed tests during the learning process more than they did for other learning styles.

Respondents were undecided about their preferences of their learning styles on 31 items, with means ranging from 2.56 to 3.48. The respondents were undecided with the following learning styles: independent vs. group work, reading and viewing, supervision, class participation.

And finally, respondents did not agree with four of the

learning preferences items (means below 2.5). Items 31, 23, 18 related to deadlines, and item 20 related to class participation. Respondents did not agree that deadlines was not their preferred learning style.

Learning Style Factors

The 73 statements contained in the inventory were factor analyzed using varimax rotation to identify commonalities among the items. A seven factor solution was selected after considering the amount of gain between the various solutions and the number of items that would be omitted based on the criteria that were used. Factor analysis was completed by computation of a correlation matrix using principal components, extraction of seven factors and varimax rotation. Items were considered to contribute to the meaning of a factor if they satisfied common criteria (Streiner, 1986). The seven factors were labelled as: supervision, class participation, deadlines, reading preference, creativity, active learning, and independent learning and accounted for 42.6% of the total variance.

Differences in Learning Style Preferences

Appropriate analysis of variance tests were conducted to determine learning style preferences by gender, age, cultural background and academic program of respondents.

Gender

Having examined the data analysis, there were no significant differences in learning style preferences by gender of the respondents.

Age

The findings of this study showed that age differences do have an impact on respondents' learning style preferences. There were three factors that affected learning style preferences of respondents by age: supervision, class participation, and creativity. Compared with respondents of 22 years and older, younger aged students (18 to 21 years of age) preferred structured supervision and guidance while learning. This result was similar to the findings of Price's (1986) study that younger aged students liked supervision and guidance in their learning. The younger aged students did not prefer class participation compared with those aged 22 years and older. This finding was different from that of Hunter (1977) that learners less than 24 years of age preferred peer association and direct experience.

Respondents in the 22 to 29 age group, on the other hand, preferred creativity as a learning style more strongly than did either younger or older respondents.

The older adults (30 years and older) in this study preferred less supervision, and more individual and self-directed learning. This finding confirms the theory of

Knowles (1980) that adult learners are more self-directed and problem-centred. Knowles (1980) stated that "adults have a deep psychological need to be generally self-directed" (p.43); and "the psychological definition of adulthood is the point at which individuals perceive themselves to be essentially self-directing" (p.46). The older adults in this research also preferred learning in a less creative environment, a finding similar to that of Peterson and Eden (1981) that older adult students were very comfortable in a traditional classroom situation.

No significant differences by age were observed on factors 3, 4, and 6.

Cultural Background

The findings of this study indicated that cultural background could influence adult learning style preferences.

Compared with Canadian students, Chinese students preferred creativity, a finding similar to that of Melton (1990) that Chinese students preferred kinesthetic and tactile as their major learning style. Chinese students preferred less class participation than did the Canadian students which confirmed the finding of Melton (1990) that Chinese students regarded group learning as negative learning style.

Chinese-Canadian students preferred more supervision, a finding similar to Jalali's (1989) study that Chinese-American students required more structure, and reading, deadlines and

active learning than did Chinese students.

Compared with Canadian students, Chinese-Canadian respondents preferred less class participation but more creative learning which were similar to the Chinese respondents. Chinese-Canadian respondents preferred to learn by using reading skills more than did Chinese students.

Compared with Chinese respondents, Chinese-Canadian and Canadian respondents preferred to have deadlines set up, timed tests, and enjoyed active learning.

From these findings we can see that Chinese-Canadian students learning style preferences were influenced by both Chinese and Canadian cultures. Chinese-Canadian students' learning style preferences were similar to those of Chinese respondents' in terms of class-participation and learning through creativity; on the other hand, the Chinese-Canadian respondents' learning style preferences were also similar to those of Canadian respondents' in terms of deadlines and active learning.

Chinese respondents' learning style preferences were different from that of Canadian respondents' except that they both preferred less supervision during learning process.

Academic Major

Some significant differences in learning style preferences also related to academic majors.

Arts/science respondents had stronger preferences for the

instructor's supervision than did business/economics and education respondents, findings similar to those of Hunt (1979) and Payton, Heuter and McDonald (1979).

Business/economics and arts/science respondents preferred less class participation but more creativity than did education respondents; similar to education respondents and arts/science respondents also preferred active learning more than did the respondents majoring in business/economics.

Respondents in education demonstrated stronger preferences for deadlines and timed tests during the learning process than did business/economics respondents; they also showed greater preferences for active learning.

Conclusions

Following are some conclusions based on the study's findings:

1. Learning Styles

This research has confirmed the usefulness of learning styles information about adult learners. The results of this study were similar to those of other learning style research. Some respondents preferred class participation, some preferred to learn by reading, others preferred to learn through doing, etc. These findings showed that all adults have their own preferred way of learning.

Knowledge of learning style preferences can allow adult

educators to develop profiles of particular adult students and enable them to choose instructional methods accordingly. It would be appropriate to provide older adults with more learning opportunities using self-direction, while younger adults would benefit more from structured supervision and guidance. Learning assignments should allow adult students to choose the way they feel most comfortable in completing them. Some may prefer to work individually, others may choose to work in groups; some may want to follow specific structures provided by the instructor, while others may prefer to meet the requirements by doing a self-directed project or case study. Flexibility is very important in allowing adult learners to choose their preferred learning style. The approach to grading adult learners' work should also reflect their learning style preferences.

2. Learning Style Factors

Different learning style inventories yielded different factors. There were 22 factors in the learning style inventory of Dunn, Dunn and Price (1987) and nine factors in the inventory of Renzulli and Smith (1978). This research yielded seven learning style factors; caution is required in using the labels for these factors. While the factors may vary from one assessment approach to another, they provide a meaningful way to identify major components of learning style preferences.

3. Learning Style Inventories

There are variety of ways by which adult learners' learning style preferences can be assessed. Different inventories have different approaches. Kolb's deals with cognitive style, Renzulli and Smith's (1978) measures student's preference for instructional techniques, Dunn, Dunn and Price's (1987) learning style inventory assesses multiple characteristics that significantly affect individual learner's achievement, and Hunt's (1985) instrument assesses student's learning style through class observation. Different approaches may provide different learning style profiles, but each approach makes a valid contribution to understanding learning style preferences.

The 73-item learning style inventory used in this research was mainly adopted from the instruments of Betty Lucas (1989) and Dunn, Dunn and Price (1987); other items were selected and revised from the inventories of David Kolb (1985), David Hunt (1978), and Renzulli and Smith (1978). These inventories provided an efficient way of collecting data on learning style preferences. They require less time than would be required in interviewing or observing learners directly. The items in these inventories describe specific learning areas or activities; and unlike the true/false or three-point scale, the five-point Likert-type scale provides for a wider range of responses. Finally, the inventories require only 20 to 30 minutes to complete.

4. The Effect of Independent Variables

The findings of this research confirmed the results of previous research on the relationships between learning style preferences and gender, age, cultural background and academic majors.

However, this research differed from that of some other studies on Chinese adult learning style preferences. In this study, the Chinese respondents preferred more learning through creativity and fewer deadlines than did the Canadian students. This finding differed from the idea that Chinese students were more teacher-centred, structured and dependent upon the instructor's supervision and guidance. Melton (1990) found that Chinese students preferred kinesthetic, tactile and individual learning as major styles, and visual and auditory as minor learning style, group learning as a negative learning style. Reid's (1987) study showed that Chinese students regarded group learning as a minor learning style preference, and concluded that Chinese students appeared to have multiple learning styles.

The different results of this study could be attributed to the fact that the Chinese respondents in this study were in an adult diploma on-the-job training program in Beijing. What they were learning was more directly related to their work experience and interests, therefore, they preferred to learn more creatively and felt that they could learn better without the deadlines and make progress based on their own pace.

Implications

A number of significant findings with respect to adult learning style preferences have resulted from this study. The following implications must be taken into consideration in adult education and further research.

Implications for Adult Education

Some significant findings with respect to learning style preferences of the adult learners have resulted from this study. A number of implications were identified for the education of adults both in Canada and in China. The findings indicate that:

1. With more Chinese students coming to Canada and more different aged adults involved in adult education programs, it would be appropriate for Canadian and Chinese universities to develop greater awareness of the characteristics of adults and their preferred learning styles.

2. In order to make teaching/learning more efficient, adult educators should use a variety of teaching methods and strategies with adult learners by planning teaching activities which best suit the adult learners' learning style preferences.

3. Instructors should take into consideration the different learning style preferences by different age groups

while planning teaching approaches. For younger students, the instructor may need to utilize more specific structure, and provide greater supervision and guidance. For the older adults who are more self-directed learners, the teaching strategies could be more student-centred with less supervision and more peer/group work.

4. Adult educators should also use teaching strategies that reflect the learning style preferences of students in different academic majors. Science students for example, prefer the style of doing and the use of experiments; they also prefer more supervision. Education students, however, prefer more hands-on activities.

Implication for Further Research

This study provided valuable information about adult learning style preferences. Additional research studies need to be developed in the following areas:

1. A replication study could be conducted with more adult students from different programs in different Canadian universities and other adult education programs in China.

2. To increase the potential for greater generalization, further studies should include larger samples from a wider range of respondents. For example, respondents could be drown from several universities, faculties, and cultural backgrounds.

3. Since learners in adult education vary significantly

in terms of age, an in-depth study with different age groups could be conducted to gain more generalized results about learning style preferences of specific age groups.

4. As a country of immigrants, Canada embraces a great variety of cultures which play an important role in adult education. An in-depth study including different cultural settings could be helpful in developing greater variety in instructional approaches.

5. An interview study on learning style preferences of adults could be conducted by means of Assessing Conceptual Level by the Paragraph Completion Method (Hunt, 1978), and the results could be compared with those using the learning style preferences questionnaire.

6. Other learning style instruments, like Gregorc's (1979), or NASSP Learning style Profile, etc, could be used to examine the learning style preferences of similar groups to see how the results would compare with those of this research.

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October 28,1993

Dear Students:

It is my pleasure to have you participate in this Learning Style Inventory survey. I hereby sincerely thank you for your time and help.

The purpose of my research is to survey adults' learning style preferences. The study seeks to find out the learning style preferences of Chinese, Chinese-Canadian, and Canadian students; and try to determine the relationship between learning style preferences and gender, age, cultural background, and academic major.

There are 73 items in this Learning Style Inventory. You are invited to participate in this survey of your own will. Please note that the participation is anonymous and confidential. The findings of the study will be reported collectively and all survey material will be destroyed upon completion of the research report.

I would appreciate your cooperation and help by completing this survey. Please return the inventory to me when you have finished. Thank you!

Sincerely yours

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LEARNING STYLE INVENTORY

Office Use

SEX: Female____ 1--4
Male_____ 5
Age_____ 6
Faculty or Program _____ 7

This inventory contains 73 statements. Each statement is followed by five response choices:

SD=Strongly Disagree
D=Disagree
U=Undecided
A=Agree
SA=Strongly Agree

Please respond to each of the item by checking the appropriate response or circling the response that best describes your reaction to the statement. As you make your selections, remember there are no "right" or "wrong" answers. No one response is better than another.

Select only ONE response for each statement.

1. I prefer to learn new material by reading	SD D U A SA	8
2. I remember best things I have seen in films or videos	SD D U A SA	9
3. I remember best things I have read	SD D U A SA	10
4. I remember what I learn best if I go through one step at a time	SD D U A SA	11
5. I am always successful in meeting deadlines	SD D U A SA	12
6. I prefer questions or problems that have only one correct answer	SD D U A SA	13
7. I prefer tasks or projects that allow me to work alone	SD D U A SA	14
8. I get more work done when I can take a break whenever I want to do	SD D U A SA	15
9. I like to have an instructor or supervisor check my work often	SD D U A SA	16
10. I am usually one of the first in a group to finish tasks or projects	SD D U A SA	17
11. I usually make quick decisions about my work	SD D U A SA	18
12. When I find a task or question difficult, I ask for help right away	SD D U A SA	19
13. I often volunteer answers in class	SD D U A SA	20
14. I learn better by reading than by listening	SD D U A SA	21
15. I like to learn something new by seeing a movie	SD D U A SA	22
16. I prefer to learn new material in a lecture	SD D U A SA	23
17. I learn best when I am actually doing or practicing what I am learning	SD D U A SA	24

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18. I am never successful in meeting deadlines	SD D U A SA	25
19. I prefer assignments that let me choose what I want to do	SD D U A SA	26
20. I usually find class discussions a waste of time	SD D U A SA	27
21. I enjoy tasks that allow me to take breaks	SD D U A SA	28
22. I rarely consult an instructor or supervisor about my work	SD D U A SA	29
23. I rarely ever finish tests or exams when there is a time limit	SD D U A SA	30
24. My marks are usually best when I put down the first answer I think of	SD D U A SA	31
25. When I find a task or question difficult, I leave it and go on to the next	SD D U A SA	32
26. I never volunteer an answer in class	SD D U A SA	33
27. I learn better when I read instructions	SD D U A SA	34
28. I really enjoy television	SD D U A SA	35
29. I prefer to learn new material by listening to a lecture or a tape	SD D U A SA	36
30. I remember how to do a task best by actually doing it	SD D U A SA	37
31. I often have difficulty completing tasks or projects	SD D U A SA	38
32. I prefer questions or problems that have several correct answers	SD D U A SA	39
33. I enjoy working in groups	SD D U A SA	40
34. I prefer persons in authority stay away until I have completed my work	SD D U A SA	41
35. I always finish tests or exams	SD D U A SA	42
36. I spend a long time weighing all the factors before I make a decision	SD D U A SA	43
37. When I find a task or question difficult, I try to figure it out for myself	SD D U A SA	44
38. I volunteer an answer only when I am sure it is correct	SD D U A SA	45
39. I remember instructions best when I read, rather than when I am told	SD D U A SA	46
40. I learn best when I watch carefully	SD D U A SA	47
41. I like to be told exactly what to do	SD D U A SA	48
42. I like building or making new things when I study	SD D U A SA	49
43. I can successfully work on several projects at once	SD D U A SA	50
44. I prefer assignments that have all the instructions carefully outlined	SD D U A SA	51
45. When I really have a lot of studying to do I like to work alone	SD D U A SA	52
46. My performance improves if I know my work will be checked	SD D U A SA	53
47. I do better on tests and exams when I have as much time as I want	SD D U A SA	54
48. I would rather "guess" an answer than leave a question unanswered	SD D U A SA	55
49. I keep trying to accomplish a task even if it appears that I may not succeed	SD D U A SA	56
50. I often express my opinions and ideas during class discussions	SD D U A SA	57
51. The things I remember best are those I have seen in a book or a magazine	SD D U A SA	58
52. I learn best from observation	SD D U A SA	59
53. I like to learn by talking with people	SD D U A SA	60

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54. I take lots of notes during lectures	SD D U A SA	61
55. I prefer to have deadlines set by my instructors or supervisors	SD D U A SA	62
56. I prefer study materials that have lots of practice exercises	SD D U A SA	63
57. The one job I like doing best, I do with a group of people	SD D U A SA	64
58. I like my teacher to check my school work	SD D U A SA	65
59. I usually finish tests and exams in the time allowed	SD D U A SA	66
60. I listen to other people's opinions and then try to make up my mind	SD D U A SA	67
61. I stay at a task until it is finished	SD D U A SA	68
62. I rarely express an opinion or idea in a class discussion	SD D U A SA	69
63. I prefer creative reading, putting a lot of ideas together	SD D U A SA	70
64. I prefer to have things explained to me by showing them to me	SD D U A SA	71
65. The things I remember best are the things that I hear	SD D U A SA	72
66. I prefer courses that allow me to do experiments	SD D U A SA	73
67. I am usually successful in meeting deadlines	SD D U A SA	74
68. I prefer study materials that present concepts followed by examples	SD D U A SA	75
69. I prefer to study with someone who really knows the material	SD D U A SA	76
70. I like my instructors or supervisors to recognize my efforts	SD D U A SA	77
71. I prefer tests and exams that have a specific time limit	SD D U A SA	78
72. I like to be able to think things out when I am not sure	SD D U A SA	79
73. If the task becomes very difficulty, I tend to lose interest in it	SD D U A SA	80

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敬有关同学：

我很荣幸能邀请你们参加这次学习方法测试．在此，我感谢你们为此付出的时间及帮助．

此项研究是有关成人学生的学习方法的比较．其目的是找出中国，华裔加拿大，及加拿大学生的学习方法，及年龄，性别，文化背景，及所学专业对学习方法的影响．

这份测试题中有七十三个问题．参加这项测试是出于自愿．并请注意，参试者的姓名属于保密．研究结果将做出总结性报告．所有的材料将在研究结束后销毁．

我将十分感谢你们的合作帮助完成这次测试．请尽快将所做好的试题送回．谢谢！

祝好！

Lu Zhang

一九九三年十月

学 习 方 法 测 试 题

性别： 男_____

女_____

专业： _____

这个测试包括有七十三个问句，每个问句后都有五个选择：

-极不赞同
-不赞同
-不肯定
-赞同
-极赞同

请用笔圈出最合适的一个选择。请记住，在选择时没有"对""错"之分，任何一个选择都是正确的。

例如：我喜欢一个人做事.....极不赞同 不赞同 不肯定 赞同 极赞同

* 每句话只选择一个答案。

1. 我喜欢以读的方式学习新的教材.....极不赞同 不赞同 不肯定 赞同 极赞同
2. 凡是看过的电影或录像里最精采的部分
   我能记得住.....极不赞同 不赞同 不肯定 赞同 极赞同
3. 凡是读过的书里最精采的部分我能记得住....极不赞同 不赞同 不肯定 赞同 极赞同
4. 如果按步就班地学，我就能非常清楚地
   记住所学到的东西.....极不赞同 不赞同 不肯定 赞同 极赞同
5. 我总能在规定时间之内完成要做的事.....极不赞同 不赞同 不肯定 赞同 极赞同
6. 我喜欢只有一个正确答案的问题.....极不赞同 不赞同 不肯定 赞同 极赞同
7. 我喜欢一个人单独做作业.....极不赞同 不赞同 不肯定 赞同 极赞同
8. 如果我可以随意安排自己的休息时间，
   我的工作效率会更高.....极不赞同 不赞同 不肯定 赞同 极赞同
9. 我喜欢老师或导师时常检查我的功课.....极不赞同 不赞同 不肯定 赞同 极赞同
10. 我通常是组里第一个完成学习任务或作业
    的人之一.....极不赞同 不赞同 不肯定 赞同 极赞同
11. 我通常能很快做出有关学习方面的决定.....极不赞同 不赞同 不肯定 赞同 极赞同
12. 当我在学习中遇到困难或难题时，我会
    马上去寻求帮助.....极不赞同 不赞同 不肯定 赞同 极赞同
13. 我常常在课堂上主动回答问题.....极不赞同 不赞同 不肯定 赞同 极赞同
14. 我用阅读的方法比用听的方法学的更好.....极不赞同 不赞同 不肯定 赞同 极赞同
15. 我通过用看电影的方法学习新的东西.....极不赞同 不赞同 不肯定 赞同 极赞同

16.我喜欢以课堂讲授的方式学习新的教材.....极不赞同 不赞同 不肯定 赞同 极赞同
17.通过实际操作或实践正在学的东西，
我能学的最好.....极不赞同 不赞同 不肯定 赞同 极赞同
18.我从未在规定的时间内做完该做的事.....极不赞同 不赞同 不肯定 赞同 极赞同
19.我喜欢允许我有自由选择余地的作业.....极不赞同 不赞同 不肯定 赞同 极赞同
20.我通常认为课堂讨论是浪费时间.....极不赞同 不赞同 不肯定 赞同 极赞同
21.我喜欢允许我有休息时间的作业.....极不赞同 不赞同 不肯定 赞同 极赞同
22.我很少向老师或导师请教学习中的问题.....极不赞同 不赞同 不肯定 赞同 极赞同
23.如果有时间限制，我很少能按时完成考试
或测验.....极不赞同 不赞同 不肯定 赞同 极赞同
24.在考试中，每当我选择第一个想到的答案，
我考试的成绩通常最好.....极不赞同 不赞同 不肯定 赞同 极赞同
25.当我遇到困难的问题时，我会空过去
做下一道题.....极不赞同 不赞同 不肯定 赞同 极赞同
26.在课堂上我从不主动回答问题.....极不赞同 不赞同 不肯定 赞同 极赞同
27.如果我仔细阅读教材内容，我可以学的
更好.....极不赞同 不赞同 不肯定 赞同 极赞同
28.我非常喜欢看电视.....极不赞同 不赞同 不肯定 赞同 极赞同
29.我喜欢以听课或听录音的方式学新教材.....极不赞同 不赞同 不肯定 赞同 极赞同
30.通过实际操作，我可以记住怎样把事情
做的最好.....极不赞同 不赞同 不肯定 赞同 极赞同
31.我在完成功课或计划时常遇到困难.....极不赞同 不赞同 不肯定 赞同 极赞同
32.我喜欢有多种正确答案的问题.....极不赞同 不赞同 不肯定 赞同 极赞同
33.我喜欢参加小组形式的学习活动.....极不赞同 不赞同 不肯定 赞同 极赞同
34.我不喜欢在我做完作业前有人在旁边
监督我.....极不赞同 不赞同 不肯定 赞同 极赞同
35.我总能做完测验或考试题.....极不赞同 不赞同 不肯定 赞同 极赞同
36.在我做出决定前，我总是花很长时间
权衡利弊.....极不赞同 不赞同 不肯定 赞同 极赞同
37.当我在学习中遇到困难或难题时，我
总是试着自己去解决.....极不赞同 不赞同 不肯定 赞同 极赞同
38.当我对答案有绝对把握时，我才主动回
答问题.....极不赞同 不赞同 不肯定 赞同 极赞同
39.我是通过读而不是让别人讲给我听
来记住教材内容.....极不赞同 不赞同 不肯定 赞同 极赞同
40.通过认真观查，我的学习效果最好.....极不赞同 不赞同 不肯定 赞同 极赞同
41.我喜欢让别人告诉我做什么.....极不赞同 不赞同 不肯定 赞同 极赞同
42.每当我学新的东西时，我喜欢动手操作.....极不赞同 不赞同 不肯定 赞同 极赞同
43.我可以同时很好地完成几项学习任务.....极不赞同 不赞同 不肯定 赞同 极赞同
44.我喜欢做要求清楚的作业.....极不赞同 不赞同 不肯定 赞同 极赞同
45.当我有许多功课要做时，我喜欢独自做.....极不赞同 不赞同 不肯定 赞同 极赞同
46.如果我知道作业将会被检查，我会注意
做好我的功课.....极不赞同 不赞同 不肯定 赞同 极赞同

47.如果我有足够的时间，我的测验或考试
会做的更好.....极不赞同 不赞同 不肯定 赞同 极赞同
48.我宁愿猜出一个答案，而不愿空着不答.....极不赞同 不赞同 不肯定 赞同 极赞同
49.尽管似乎我不一定能成功，但我也要
坚持把事情做完.....极不赞同 不赞同 不肯定 赞同 极赞同
50.在课堂讨论时，我常发表我的意见或见解....极不赞同 不赞同 不肯定 赞同 极赞同
51.我记住的最清楚的东西是我从书本或杂
志里看到的.....极不赞同 不赞同 不肯定 赞同 极赞同
52.我通过观察学的最好.....极不赞同 不赞同 不肯定 赞同 极赞同
53.我喜欢以同别人交谈的方式学习.....极不赞同 不赞同 不肯定 赞同 极赞同
54.在听讲时，我做很多笔记.....极不赞同 不赞同 不肯定 赞同 极赞同
55.我喜欢让老师或导师给规定完成作业
的时间.....极不赞同 不赞同 不肯定 赞同 极赞同
56.我喜欢有很多练习的教材.....极不赞同 不赞同 不肯定 赞同 极赞同
57.我喜欢与大家一起学习.....极不赞同 不赞同 不肯定 赞同 极赞同
58.我喜欢让老师检查我的功课.....极不赞同 不赞同 不肯定 赞同 极赞同
59.我通常在规定的时间内做完测验或考试题....极不赞同 不赞同 不肯定 赞同 极赞同
60.我先听取别人的意见然后再做出自己的
决定.....极不赞同 不赞同 不肯定 赞同 极赞同
61.我坚持先把一件事情做完.....极不赞同 不赞同 不肯定 赞同 极赞同
62.我很少在课堂讨论中发表我的意见或见解....极不赞同 不赞同 不肯定 赞同 极赞同
63.我喜欢读汇集各种见解的创意性读物.....极不赞同 不赞同 不肯定 赞同 极赞同
64.我喜欢别人以举例的方式给我解释问题.....极不赞同 不赞同 不肯定 赞同 极赞同
65.我记得最清楚的东西是我所听过的.....极不赞同 不赞同 不肯定 赞同 极赞同
66.我喜欢那些让学生有机会做实验的课.....极不赞同 不赞同 不肯定 赞同 极赞同
67.我通常在限定的时间内做完事情.....极不赞同 不赞同 不肯定 赞同 极赞同
68.我喜欢读有用实例解释概念的教材.....极不赞同 不赞同 不肯定 赞同 极赞同
69.我喜欢同真正了解教材内容的人一起学习....极不赞同 不赞同 不肯定 赞同 极赞同
70.我希望我做出的努力能得到老师的承认.....极不赞同 不赞同 不肯定 赞同 极赞同
71.我喜欢有固定时间限制的测验或考试.....极不赞同 不赞同 不肯定 赞同 极赞同
72.当我不肯定时，我喜欢能把事情思考出来....极不赞同 不赞同 不肯定 赞同 极赞同
73.如果功课太难的话，我就会对其失去兴趣....极不赞同 不赞同 不肯定 赞同 极赞同