A COMPARISON OF LEARNING OUTCOMES OF SECONDARY AND ADULT STUDENTS ENROLLED IN BUSINESS AND COMPUTER TECHNOLOGY PROGRAMS IN OKLAHOMA AREA VOCATIONAL TECHNICAL SCHOOLS AND COMPREHENSIVE HIGH SCHOOLS

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Submitted to the Faculty of the
Graduate College of the
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in partial fulfillment of
the requirements for
the Degree of
DOCTOR OF EDUCATION
July, 1996

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ACKNOWLEDGEMENTS

It is with great relief and appreciation that I conclude this study by acknowledging those who have been instrumental in providing constructive guidance, inspiration, and friendship throughout the study. To my committee, Dr. Garry Bice, Dr. Juanita Bice, Dr. Ed Harris, and Dr. Connie Anderson, who have given of their time and expertise to help make this dream become a reality.

To Dr. Garry Bice, my committee chairperson, I express sincere gratitude and appreciation for all of the encouragement he has given me throughout my entire academic endeavor. He never gave up on me even when I gave up on myself. To Dr. Juanita Bice, my dissertation chairperson, my mentor, my friend. Thanks for all the encouragement and support. I could not have done this without you.

To Dr. Ed Harris, I offer sincere gratitude for the support and encouragement you provided during my graduate work at Oklahoma State University. Sincere appreciation is extended to Dr. Connie Anderson, for her willingness to support my study.

A very special heartfelt thanks is in order for those individuals who, without their love and support, this would never have been possible. To my parents, Raymond and Margie Jackson. While you are not physically able to share in my

joy, I know that you are looking down from above, and are very proud of my accomplishments. Thanks for instilling in me the desire to achieve.

To my son-in-law, Karis Reavis. Thanks for all the many hours you spent proofreading my manuscript. Your continual love and support has made my burden lighter. To my daughter-in-law, Paige Stith. Thanks for all the help you gave in grading the tests. Thanks for understanding and supporting this project. To my grandchildren, Karis Lee Jr. and Makensi Paige. Thanks for making Nanna stop and smell the roses.

To my wonderful children, Monica Reavis and Michael Stith. Thanks for all your love and support throughout this endeavor. Thanks for being their in times of crisis and for understanding how important this study has been to me. Your belief in me has been a source of strength. I have truly been blessed with wonderful children.

Last, but certainly not least, thanks to my best friend and husband, Kenneth Stith. Words cannot express what your presence has meant to me during this journey. You have been my support, my guide, my inspiration, and my rock. It is to you this study is dedicated.

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CHAPTER I

INTRODUCTION

The shift from an industrial society to a technological society is causing fundamental structural changes in all sectors of the economy. Technology has profoundly influenced the kinds of jobs available and the way work is organized and performed (Daggett, 1990). Changing equipment, work tasks, and responsibilities yields jobs that are always in transition. If vocational education is going to respond to the nation's economic needs, it must move beyond its present way of thinking about educating the modern workforce (Daggett). It must teach the skills, knowledge, attitudes, and behaviors employers have identified as crucial to workplace success. Vocational education, in the twenty-first century, must be perceived and operated as a system that prepares individuals to enter and advance in a technological workplace.

In the future, "change" will be the password to success for vocational education programs. Today's employment requires much more sophisticated skills than in times past (Daggett, 1990). Changes in the workplace structure ultimately result in changes in the education system. This paradigm shift presents many interesting challenges to

Oklahoma's vocational education programs. As major sectors of the job market change from task-oriented employment to technologically-based employment, more adults will be returning to the vocational classroom to acquire the skills necessary for the workplace. Meanwhile, vocational education will continue to train the secondary population for the world of work. Proper placement is critical in meeting the needs of the adult population, secondary population, and the workplace.

Oklahoma is known nationwide as a premier vocational education system. In his study on vocational education systems in the United States, District of Columbia, and five trust territories, Peters (1988) found Oklahoma to be one of three states perceived to have the highest quality vocational education system. Its delivery system provides vocational education programs, services, and activities to 120,481 secondary students and 222,384 adult students in 495 comprehensive high schools, 29 area school districts, operating at 54 different campuses, and 13 skill centers in Oklahoma's prison system (Oklahoma Department of Vocational and Technical Education, Information Analysis Division, personal communication, February 29, 1996).

Contrary to common practices in other states, Oklahoma's vocational education system has a policy of mixing secondary and adult students in the same vocational classroom. Among those states that do not practice mixing secondary and adult students in the same vocational

classroom are: (a) Alabama (Dr. Stephen Franks, personal communication, March 29, 1995), (b) Texas (Dr. Bettie Herring, personal communication, March 20, 1995), and (c) Georgia (Dr. William Johnson, personal communication, March 20, 1995).

The concept of mixing secondary and adult populations has been based on a pragmatic understanding of economics and demographics. Enrollment trends in Oklahoma's vocational education system during the last decade revealed the adult population increased dramatically, while the secondary population remained fairly constant (Oklahoma Department of Vocational and Technical Education, 1990). Implications were that fewer secondary students will be available for participation in vocational education programs, while the adult population will continue to increase. Vocational education systems in many states are having to cope with new, and often confining, graduation requirements which contribute to the nongrowth at the secondary level. For example, in 1993, Oklahoma increased the total credits required to graduate from 44 to 46 (Oklahoma City Public Schools Student and Parent Handbook, 1996). As the secondary population decreases and the market demand for skilled workers increases, empty slots will continue to be made available to adults.

Research indicated there are vast differences in the way adults and children approach learning. Lawler (1991) argued, because adults are significantly different from

traditional age students, educational institutions are ethically obligated to acknowledge these differences and take them into consideration as programs are planned, administered, and taught. If her arguments are true, that is, if it is found there are significant differences in the way adults and children approach learning, Oklahoma's delivery system may be doing a disservice to the adult learner, the secondary learner, and the workplace by placing them in the same classroom. The available knowledge and the practical implications for vocational education, as it relates to the secondary and adult learner, can prove to be a rich resource for vocational administrators and faculty in meeting the challenges these two populations bring to their campuses.

Statement of the Problem

Funding educational programs is becoming more and more difficult as school districts attempt to keep pace with the changes in technology and the changes in the workforce. The cost to educate a vocational student in Oklahoma has nearly doubled in the last decade. In 1984, Oklahoma's average cost per student was $4.40 (Oklahoma Department of Vocational Technical Education Cost Per Program Report, 1984). In 1994, the per pupil cost averaged $7.63 (Oklahoma Department of Vocational Technical Education Cost Per Program Report, 1994). As costs for educational programs continue to increase and competition for available resources increase,

it is becoming more important that educational policies be implemented to improve the efficiency and effectiveness of educational programs. The problem is that it is not known if the practice of mixing secondary and adults students in the same vocational classroom contributes to the effectiveness of learning among students.

Purpose of the Study

The purpose of this study was to determine if the practice of mixing secondary and adult students in the same Business and Computer Technology classroom contributes to the effectiveness of learning among students.

Research Questions

The following questions provided guidance to the direction of the study:

1. Is there a significant difference between cognitive mean scores of adult students and secondary students when their classes were totally adult or totally secondary compared to a group of adult students and secondary students in mixed classes?

2. Do certain teacher characteristics make a difference in cognitive mean scores among students enrolled in Business and Computer Technology programs (e.g.,teacher age, years of experience teaching vocational education, teaching style, years of experience teaching adults, education level, and formal training in adult education)?

Assumptions

The study was conducted with the following assumptions:

1. Teachers who administered the pretest and posttest followed the directions provided by the researcher.

2. The groups contained a mixture of student learning styles.

Limitations

The study is limited to the following:

1. Teachers selected for this study may have varying degrees of effectiveness in promoting student learning.

2. No attempt was made to control for individual teaching styles or student learning styles.

3. Constraints were imposed on the design of the study as a result of the need to test intact groups.

4. The researcher had no control over the testing environment for the administering of the pretest/posttest.

5. Generalizability is only to schools participating in the study.

Definition of Terms

Adult Student: For the purpose of this study, an adult student is defined as an individual who has completed high school, or its equivalent, and has assumed responsibility for his/her own life. The adult student has the flexibility of attending class at the area school for three hours a day or six hours a day.

Secondary Student: For the purpose of this study, a secondary student is defined as an individual who is at the sophomore, junior, or senior high school level and attends a comprehensive high school, private school, or is home schooled and attends an area vocational school for three hours a day or is enrolled in a vocational program at the comprehensive high school.

Secondary Classroom: For the purpose of this study, a secondary classroom is defined as a vocational program whose student population consists of all secondary students.

Adult Classroom: For the purpose of the study, an adult classroom is defined as a vocational program whose student population consists of all adult students.

Mixed Classroom: For the purpose of this study, a mixed class is defined as a vocational program whose student population consists of a mixture of adult and secondary students.

Cognitive Learning: For the purpose of this study, cognitive learning is defined as the difference in pretest and posttest scores.

Organization of the Study

Chapter I has introduced the study and presents the problem, purpose, objectives, research questions, assumptions, limitations, and definitions used in the study. Chapter II provides a review of related literature regarding diversity among students. Learning processes and

learning outcomes and factors influencing learning processes and learning outcomes are examined. Chapter III presents the procedural methodology used in the study. Chapter IV reports the findings. Chapter V offers the findings, conclusions, and recommendations related to the study.

CHAPTER II

REVIEW OF LITERATURE

Introduction

The review of literature focused on: (a) the diversity among learners, (b) learning processes and learning outcomes, and (c) factors influencing learning processes and learning outcomes.

Diversity Among Learners

In his book "A Place Called School" Goodlad (1984) stated, "Vocational education, including guided work experiences, is an essential, not merely an elective, part of general education" (p. 147). The implication is that vocational education is for all students, adult and secondary alike. Adults are a potential growth market for vocational-technical schools, and Oklahoma is no exception.

As the number of adults enrolled in vocational programs continues to increase, educational institutions face new challenges in recognizing the diversity among students. Lawler (1991) recognized these challenges when she wrote:

> The impact of adult students on our campuses and in our classrooms is more than a statistical consideration, more than a monetary advantage. It is a shifting of

> perspective in which we must consider the uniqueness of this population and work on meeting their needs. (p. 11)

There is evidence that Oklahoma's vocational education system has made significant progress in addressing the uniqueness of the adult population. Many area schools are offering short-term classes during the day to accommodate adults who cannot take evening classes. For example, Metro Tech AVTC has a policy of allowing adults to enter their fulltime programs during the day to receive short-term training. Francis Tuttle AVTC and Gordon Cooper AVTS have traveling computer vans that conduct on-site training for local business and industry. Some area schools are offering classes off campus to accommodate adults. For example, Metro Tech AVTC rents space at two local office complexes for the purpose of offering day and evening short-term computer classes. Wes Watkins AVTC and Kiamichi AVTS, McAlester campus, recognized it was difficult, if not impossible, for many adults to attend the Business and Computer Technology programs during the daytime. As a result, fulltime evening programs were developed to serve these unique individuals. Examples of other occupational training areas that offer fulltime evening programs include Health Occupations and Aviation Technology.

For decades schools have treated students as if they all learned alike. The terms "andragogy" and "pedagogy" are frequently used to address the differences between adults and children, respectively. Laird (1985) had the following

to say about andragogy and pedagogy: "the difference is quite simple, 'Ped' is a Latin root meaning child; 'andra' derives from the greek 'aner', meaning man, not boy" (p. 124). Thus, andragogy studies how adults learn while pedagogy is the art and science of teaching children.

Knowles (1980), a noted writer and teacher in the field of adult education, suggested that andragogy is grounded on the assumption that, as a person matures, his or her self-concept moves from one of a dependent personality toward one of a self-directing human being. Another assumption is that the accumulated experiences of the adult provides a rich resource for learning. Also, as individuals mature, there is a change in time perspective from one of future application of knowledge to immediacy of application. As a result, an adult is more problem-centered than subject-centered in learning (Knowles).

Darkenwald and Merriam (1982) suggested that as individuals function in society, mature, and gain experience, they become more and more differentiated from one another. That is, children tend to be more of a homogenous group while adults tend to be heterogenous. Therefore, a group of adults involved in the educational process is likely to be more diverse than a group of children. Kelley (1992) concurred with Darkenwald and Merriam when she suggested adults are a very heterogeneous population with different educational backgrounds, socioeconomic backgrounds, reasons for returning to school,

educational and career goals, and life experiences. Knowles (1978) maintained, for children, experience is something that just happens while experience for adults serves to determine who they are; it is their self identity, their self worth.

Research indicated that adults and children are further differentiated by age and the emphasis placed on learning. Aslanian and Brickell (1980) suggested that adults return to the educational setting as a result of a "trigger" event in their lives such as career change, divorce, geographical move, empty nest, loss of employment, or completing a previously set goal. Education, for children is compulsory and they begin their educational journey at about the same age and progress at the same psychosocial and physical development. Adults, on the other hand, might range in age from 18 to 80 and be at different stages of psychosocial and physical development. In their research on learning processes, Darkenwald and Merriam (1982) found an adult's readiness to learn depends on the amount of previous learning. They also found that intrinsic motivation, repetition, active participation, and environmental factors affect learning. Lawler (1991) contended that adults who choose to reenter school have a sense of commitment and sincerity rarely found in high school students.

In the first major survey of adult learning activities, Johnstone and Rivera (1965) concluded that the emphasis in adult learning is on the practical rather than on the

academic. They further concluded that adult learning is application-based rather than theory-based and that a significant amount of adult learning activities included subject matter directly useful in the performance of everyday tasks and obligations. It is their belief that it is the close relationship between learning and living that most distinguishes adult education from the schooling of children.

Recently, the notion of self-direction has attained something of a "cult" status in the literature of adult education (Candy, 1991). Knowles' (1980) concept of andragogy indicated that adults desire self-direction and tend to become more self-directed as they mature. According to Caffarella (1993), this assumption is the basis of a great deal of educational practice because many adult educators perceive their role as cultivating self-directed learners. Dejoy and Dejoy (1987) suggested that self-directed learning refers to the self-motivated and self-managed planning process adults use to learn, change, and improve.

Brookfield (1993) contended that self-direction is affected by the degree of control adults have over their lives as well as the amount of access they have to learning resources. The desire for self-direction depends on a number of factors (Brockett & Hiemstra 1991; Brookfield 1986; Ellsworth 1992; Robinson 1992). In summary, those factors are: (a) learning styles, (b) exposure to self-direction,

(c) familiarity with subject matter, (d) expectations of schooling and learning, (e) motivations, (f) length of time away from formal schooling, and (g) social and political context.

Recent research has challenged the assumption of self-direction as a unique adult phenomenon. Eisenman (1990) proposed that children are naturally curious and internally motivated to pursue learning but are forced to be dependent and passive by the very nature of the formal education structure. Still others have asserted that no act of learning is fully self-directed; that is, no individual is so self-reliant that he or she can exclude all external sources or stimuli (Brookfield, 1986). Candy (1991) maintained that self-direction is a social and psychological construct, a philosophical model, and a literal impossibility. He further maintained that self-direction is nothing more than a supplement to and a substitute for the formal education system.

Learning Processes

The basic idea about learning is that the outcomes of learning reflect differences in learning processes (Shute, 1992). According to Shute, individuals approach any new learning task with differing profiles of knowledge, skills, and traits. When cognitive researchers described learning as a process (Bruner, 1960; Marzano et al., 1988; Marzano, 1992), they concluded the preconditions for learning reside

in the open attitudes, dispositions, and values of the learner. According to Shute, the claim is no less true for adults than it is for children. An adult's readiness and orientation to learning, according to Darkenwald and Merriam (1982), are a function of a developmental framework different from that of a child. It is their belief that facilitating the learning experience for adults requires an understanding of the adult learner in conjunction with the learning process.

Theoretical Assumptions

The field of psychology has made significant contributions to the understanding of learning processes as they relate to the adult learner. Humanistic psychologist Carl Rogers (1969) described the learning process as a continuum of meaning ranging from nonsense and meaningless memorizing to significant, meaningful, experiential learning. Maslow, considered to be the major theoretician of the humanistic psychology movement in America, offered a theory of human motivation based on a hierarchy of needs. According to Maslow (1954), the needs at the lowest are physiological, such as hunger and thirst, and must be attended to before a person can cope with the next levels; safety needs, love, self-esteem, and self-actualization. He further maintained that self-actualization was only possible in adulthood.

While most of Piaget's research focused on children, it

is also important for the psychology of adult learning. He identified significant changes in cognitive capacities, processes, and phenomena as a function of age, experience, and intellectual sophistication (Anderson & Ausubel, 1965).

Learning Styles

When teachers contemplate what to teach, the nature of learning and learning styles must be considered. Learning style has been defined many different ways. According to Dunn and Dunn (1978), learning style is the way people focus on, personalize, and retain newly acquired knowledge and skills. Baron (1985) suggested that learning styles are intellectual personality traits. Keefe (1985) described a learning style as the cognitive, affective, and physiological traits that serve as relatively stable indicators of how learners perceive, interact with, and respond to the learning environment. Shute (1992) suggested some learning styles affect learning processes which produce quantitatively different outcomes, while other learning styles affect learning qualitatively.

The academic term for learning styles is "modalities", and according to Flaherty (1992), there are four: (a) kinesthetic, (b) tactual, (c) auditory, and (d) visual. Kinesthetic learners are hands on learners, tactual learners are very sensitive individuals, auditory learners are talkers, and visual learners are academic achievers. She maintained, because the traditional high school is not

structured for kinesthetic learners, students with this type of learning style are frequently recommended for vocational training. She further maintained, because of bad experiences in high school, adults who are kinesthetic learners may be reluctant to return to school for retraining or further education.

Dunn and Dunn (1978) developed one of the most popular approaches to learning styles. They found students differed in terms of their response to four key dimensions of learning which included: (a) environment, (b) support, (c) peer interaction, and (d) modality. As they applied these dimensions to students, they found significant individual differences in terms of learning preferences.

There is a body of evidence to support the idea that interactions with major socializing agents (peers) are linked to cognitive development. Several studies (Anderson, 1970; Walberg, 1971; Walberg & Anderson, 1972) found a positive correlation between cognitive learning and student perception of peer friendships. Moos and Moos (1978) found achievement increased as peer interaction increased. Pascarella and Terenzini (1991) concurred with Moos and Moos when they suggested that environmental factors that maximize attainment include a cohesive peer environment.

According to Laird (1985), 75 percent of what adults know is acquired through seeing, 13 percent from hearing, and the remaining 12 percent through touch, smell, or taste. Learning style preferences are not mutually exclusive. Jung

(1923) suggested that a person can exhibit a combination of learning style preferences and over time, a person's preference(s) may strengthen or weaken.

In her study of Ohio vocational students, Fleming (1989) found a variety of learning style preferences among individuals at the junior and senior level. These preferences included a like for or dislike of variables within five general types of stimuli: (a) environmental, (b) emotional, (c) sociological, (d) physical, and (e) psychological. She concluded that students have distinct learning style profiles that can and should be assessed.

Using the Myers-Briggs Type Indicator, Soliday (1992) found a significant difference existed between the personality type/learning styles of vocational-technical education secondary students and nonvocational-technical education secondary students. The most frequently occurring personality type/learning style among the vocational secondary students was SP (sensing-perceiving). NP (intuitive-perceiving) and SJ (sensing-judging) were found to be the two highest frequencies among the nonvocational secondary students. Based on her findings, Soliday concluded that due to the educational needs of the two groups, different teaching techniques, curricular objectives, learning environments, and evaluation procedures should be implemented to accommodate the personality type/learning styles of vocational-technical education secondary students.

Teaching Styles

Student achievement depends to a great degree on developing teacher strengths in several crucial areas that can be described as teaching style (Dunn & Frazier, 1990). Fischer and Fischer (1979) defined teaching style as the unique way a teacher approaches the learner. Examples of different teaching styles included in the Fisher model are: (a) being task oriented, (b) cooperative planner, (c) child centered, (d) learning centered, (e) subject centered, and (f) emotionally exciting. Dacey (1976) took a more holistic approach in defining teaching style. In summary, he argued that teaching style is a cohesive behavior containing five factors: (a) goals, (b) leadership role, (c) expectations, (d) self-image, and (e) directness of influence. Gregorc (1979) purposed that teaching style is more than a methodology. He maintained that a teaching style can place subjective demands upon the learner whose learning style may or may not be able to deal with such demands.

Teaching is complicated because of differences in teaching styles and student learning styles. However, when a student's learning style is congruent with a teacher's teaching style, academic growth and improvement are realized (Cafferty, 1980; Dunn, Beaudry, & Klavas, 1989). Simon and Bryam (1977) maintained that while it is difficult to change one's personality, one can change their behavior. It was their suggestion that teachers learn to "style-flex". The ability to shift away from your own primary style to a more

appropriate style is the heart of effective teaching (Simon & Bryam). Schroeder (1993) had the following to say about the differences in teaching styles and learning styles: "...the greatest contributions we can make to student learning is recognizing and affirming the paths that are different from our own (p. 26)."

Fleming (1989) maintained that a student will have a positive learning experience when the teacher's natural teaching style happens to match a particular student's learning style. She further maintained that a student will have a negative learning experience if the teacher's style is not congruent with the learning style of the student. Kelly (1992) suggested teachers use a learning style inventory to identify their own learning style preference so they will have an understanding of how their learning preference differs from those of their students. Flaherty (1992) proposed that if instructors do not modify their teaching styles to the different learning styles of students, many of them will not graduate.

Type theory has been instrumental in explaining many of the personality and behavior differences among teachers. It has also raised new issues about educational delivery systems. Type theory indicates that teachers have up to sixteen types to teach. Teaching becomes complicated because teachers fall into one of the sixteen types and can be expected to begin teaching with a teaching style that is natural to their own type (Myers-Briggs & McCaulley, 1988).

In their book "Please Understand Me" Keirsey and Bates (1984) used type theory to describe the characteristics and behaviors of teachers who exhibit a particular teaching style. Using the four basic personality types of the Myers-Briggs indicators to categorize teaching styles, they concluded that vocational teachers tend to fall in one of two personality types. Clerical and business teachers tend to have a SJ (sensing-judging) teaching style while technology teachers demonstrate an NT (intuitive-thinking) teaching style. Based on Keirsey and Bates and Soliday's (1992) findings, one could argue that vocational teachers teaching styles are more congruent to the learning styles of nonvocational students than vocational students.

Learning Outcomes

According to Shute (1992), learning outcomes are typically the end product of learning; what the learner walks away with for a learning task. Jacobsen, Eggen, and Kauchak (1989) described learning as a change in behavior. They maintained that a change of behavior is a result of experiences rather than growth. Moon (1989) reported that student learning outcomes were products of student physical development, student experiences, student learning styles, teacher effectiveness, delivery systems, and curriculum. In addition, he suggested that administrators could use learning outcomes to evaluate delivery systems, teacher effectiveness, and curriculum as well as identify particular

student learning styles.

Learning Domains

Research indicated a significant relationship exists between appropriate methods of evaluation and learning outcomes. Shute (1992) argued it is important that desired learning outcomes correspond to specific goals and objectives. Otherwise, it becomes very difficult to accurately measure the learning experience. Jacobsen et al. (1989) maintained that goals can be described in terms of the type of learning that is intended. Bloom (1956/1984) established an educational taxonomy that categorized objectives into three learning domains: (a) cognitive, (b) affective, and (c) psychomotor. Sax (1989) and Jacobsen et al. stressed that categorizing learning behaviors into domains does not necessarily imply that the domains are mutually exclusive.

The cognitive domain includes objectives which focus on the recall or recognition of knowledge at the low end and the development of intellectual abilities and skills at the high end (Bloom, 1956/1984). The largest proportion of educational objectives fall into this domain and according to Krathwohl, Bloom, and Masia (1964), it is the domain in which most of the work in curriculum and test development has taken place.

The affective domain, according to Bloom (1956/1984), includes objectives which emphasize a feeling tone, an

emotion, or a degree of acceptance or rejection. Literature expressed such objectives as interests, attitudes, appreciations, values, and emotional sets or biases (Bloom). Identifying objectives in the affective domain have been very difficult. In summary, it has been difficult for the following reasons: (a) objectives in the affective domain are not stated very precisely, (b) teachers have trouble identifying learning experiences which are appropriate to this domain, and (c) behaviors appropriate to affective objectives are difficult to describe (Bloom).

The psychomotor domain, according to Bloom (1956/1984), includes objectives which emphasize muscular strength and neuromuscular coordination. Jacobsen et al. (1989) suggested that learning outcomes in the psychomotor domain are easily observable in vocational curricula. According to Bloom, the research in this domain is limited to speech, handwriting, physical education, trade, and technical courses.

Teacher Effectiveness

For decades researchers have concerned themselves with teacher effectiveness. However, it was not until the late sixties that studies surfaced establishing a relationship between teaching behaviors and student learner outcomes (Tomic, 1992). Tomic proposed such research could contribute to influencing learning achievements in a positive way. He further maintained that understanding the relationship between teaching behaviors and student learning outcomes is

essential for individuals in teacher training programs as well as those active in the teaching profession.

Leach (1992) conducted a study for the purpose of identifying the traits and pedagogical expertise needed by vocational educators. He suggested vocational education program excellence is often a direct reflection of the vocational teacher, and while teacher excellence is of critical concern to teacher educators and vocational administrators, there is limited information regarding the personal and psychological makeup of excellent vocational teachers. Tomic (1992) agreed with Leach that vocational teachers have, for the most part, been excluded in the research on effective teaching.

Leach (1992) proposed vocational instructors can be found in three distinct settings: (a) business and industry, (b) post-secondary institutions, and (c) secondary institutions. Results from his study suggested there are differences from setting to setting in personality traits and psychological characteristics of instructors. He maintained that having an understanding of the differences among the instructors in each setting can be useful in structuring appropriate curriculum for preparing vocational instructors to work in each setting.

Research indicated teachers spend too little time preparing for the classroom experience. While other professions require some type of residency, internship or apprenticeship, beginning teachers are expected to perform

like master teachers from the very beginning. Camp and Heath-Camp (1990) stated that beginning teachers, "...are hired, introduced to the classroom and school, and then left on their own to sink or swim" (p. 22). Glenn and Walter (1990) stated:

> The goals of vocational teacher preparation are to equip a prospective teacher with state-of-the-art technical knowledge, a sound background in general education, and pedagogical competencies that will facilitate student learning in the classroom/laboratory setting. (p. 102)

Many vocational teachers are teaching a specific skill area for which they are not qualified. In a study of occupational education teachers in Nevada, Quon and Smith (1991) found that 40 percent of the teachers did not have appropriate occupational endorsements to teach the vocational classes they were teaching. Edmunds (1989) suggested that vocational teacher education preparatory programs have a tendency to focus on secondary education, and as a result, graduates are not prepared to teach the adult learner.

Kelly (1992) asserted that faculty in vocational programs need to gain an awareness of students they serve. She identified qualities that adults prefer in instructors. In summary, adults prefer instructors that: (a) are content experts, (b) provide relevance, (c) are well organized, (d) do not waste time, (e) state clear learning goals, (f) are willing to modify the learning goals, (g) individualize instruction, (h) use active learning and problem solving, (i) encourage self-directed learning, and (j) are supportive

and nonthreatening.

It has been the practice of vocational education to employ specialists from business and industry to serve as vocational teachers. These individuals enter teaching by virtue of their trade experience, occupational competencies, or a college degree in a related subject area and have had little if any professional education experience (Edmunds, 1989). Several states, including Oklahoma, have enacted policy that allows an individual to become employed and credentialed as vocational teachers without the educational requirements that most teachers must meet.

Recent research indicated this trend to be changing. Heath-Camp and Camp (1992) conducted a two year study of beginning vocational teachers in American Public Schools. They found 75 percent of new vocational education teachers had at least a bachelor's degree. Approximately 60 percent of new vocational education teachers have teacher education degrees. Kaufman (1992) reported similar findings. In a survey on vocational and nonvocational public school teachers in grades 9-12, he found 71 percent of vocational teachers had a teacher education degree.

Learning Environments

A school's primary goal should be to develop a love of lifelong learning among its students. However, Krumboltz (1987) proposed the present system's environment encourages the reverse. He further maintained the current environment

is perfect if its goal is to make students hate school, teachers, and learning. Bogotch and Piggott (1992) concurred with Krumboltz when they maintained an environment conducive to learning is not self-evident within schools.

How students perceive their learning environments significantly influences learning outcomes (Doyle, 1977; Fraser, 1989; & Walberg, 1971). In describing the learning process, Herman (1977) wrote:

> Learning takes place everywhere all the time. It is often a haphazard affair, just as much a matter of luck as of deliberate planning if an individual leaves the kitchen, pool hall, movie house, local bar, or the street with learning that is beneficial. (p. 93)

However, Herman maintained that one place where learning should not be haphazard is in school.

Learning environments should foster learning rather than retard it (Kleberg, 1992). Mastery of content and cognitive development are enhanced when students are actively engaged in their classrooms (Pascarella & Terenzini, 1991). Architectural settings, according to Taylor (1993), can stimulate or stifle learning, foster creativity, or delay mental perception. She maintained that school restructuring efforts have not addressed the physical learning environment as a support system for education. She further maintained that, in an effort to foster lifelong learning, new environments are needed.

Teachers and administrators tend to ignore the importance of and preconditions for learning. This is especially true in adult learning environments (Cross, 1988;

Kushman, 1992). It is Tomic's (1992) belief that learning environments should be considered well in advance of the student entering the classroom. Ongoing assessment of both student learning and the learning environment is essential in meeting student needs (Schroeder, 1993).

Over the past quarter century, extensive empirical studies on learning environments have been conducted at all levels of education, including vocational education. In his study of vocational apprenticeship programs of the United States and Germany, Hamilton (1990) recommended the United States develop an apprenticeship program that would capitalize on the use of actual workplace learning environments. Students at the Queensland University of Technology, Australia, were surveyed to gather their perceptions about the activities and behaviors they experienced in six different learning environments: (a) large group lectures, (b) small group lectures, (c) seminars/tutorials, (d) one-to-one teaching, and (e) practical settings both on and off campuses. Clarke (1994) found strong links between what students liked and what they claimed helped them learn, and vice versa.

Kleberg (1992) conducted a study on quality educational environments at Ohio State University. University staff, students, faculty, and experts from several fields all over the country were brought together to discuss issues and tour facilities in Europe and the United States. His findings indicated a strong relationship between school environment

and learning outcomes. Taylor and Vlastos (1983) found that children learn best in stimulating and diverse physical environments. Gardner's (1983) study on multiple intelligences found that children need learning environments that facilitate a wide variety of access to knowledge and its application.

Summary of Review of Literature

Chapter two provided a review of the literature and research relating to the diversity among adult and secondary learners. In addition, learning processes, learning outcomes, and previous studies were reviewed.

Research indicated there are significant differences in the way adults and children approach learning. The terms andragogy and pedagogy were found throughout the literature as a means of describing these differences. Implications were that facilitating the learning experience for adults requires an understanding of the adult learner in conjunction with the learning process (Darkenwald & Merriam, 1982). As the number of adults enrolled in vocational programs continue to increase, educational institutions face new challenges in recognizing the diversity in student populations.

Theoreticians such as Rogers, Maslow, and Piaget were found to have made significant contributions to the understanding of learning processes. Their theories provided a wealth of information on the substantial differences

between adults and children. It is these differences that necessitate approaching the adult learner differently from the traditional student (Darkenwald & Merriam, 1982).

There was much agreement that individuals approach the learning process with differing learning styles. The literature revealed a number of definitions of the term learning style as well as several instruments to assess one's learning style. It was found that teachers have individual teaching styles that are direct descendants of their learning style (Fleming, 1989). Implications were that achievement is greater when the teacher's teaching style and the student's learning style are compatible (Cafferty, 1980; Dunn et al., 1989).

Learning outcomes were described as the end product of learning (Shute, 1992). It was reported that learning outcomes were products of student physical development, student experiences, student learning styles, teacher effectiveness, delivery systems, and curriculum (Moon, 1989). Learning outcomes should correspond to specific goals and objectives of a learning task (Shute). Goals and objectives were categorized into three learning domains: cognitive, affective and psychomotor.

Research indicated a relationship exists between teaching behaviors and student learner outcomes (Tomic, 1992). It was suggested that vocational teacher education preparatory programs have a tendency to focus on secondary education, and as a result, graduates are not prepared to

teach the adult learner (Edmunds, 1989). Vocational education places a great deal of importance on skill competency. Therefore, many vocational teachers come from business and industry rather than traditional teacher preparatory programs.

Research found a strong correlation between learning environments and learning outcomes (Doyle, 1977; Fraser, 1989; & Walberg, 1971). Implications were that an environment conducive to adult learning is not self-evident within schools (Bogotch & Piggott, 1992). Also, the importance of and preconditions for learning tend to be ignored by teachers and administrators (Cross, 1988; Kushman, 1992).

The literature review was very instrumental in providing information about diversity among learners, learning processes, and learning outcomes. However, no studies were found that specifically addressed if mixing secondary and adult students in the same Business and Computer Technology classroom contributed to the effectiveness of learning among students.

CHAPTER III

METHODOLOGY

The purpose of this study was to determine if the practice of mixing secondary and adult students in the same Business and Computer Technology classroom contributes to the effectiveness of learning among students.

Presented in this chapter are the methods and procedures followed in conducting the study. The following items are detailed: (a) type of research, (b) population and sample, (c) subjects, (d) instrument, (d) data collection procedures, and (e) analysis of data and statistical analysis.

Type of Research

The researcher used a preexperimental design. It was preexperimental rather than true experimental in that there was a pretest/posttest, but no control group or random assignment of subjects. Shavelson (1988) had the following to say about preexperimental designs:

> Pre-experimental designs are so named because they represent pieces of the ideal model, true experimental designs....They lack an appropriate control group, and they lack random assignment...When random assignment of subjects to groups is impossible or undesirable, pretests can be used to examine the possibility of prior existing differences. (pp. 26-27)

He maintained that it is wrong to ignore data because statistical adjustments are required to equate groups. He further maintained that if statistical adjustments are used with extreme caution the use of these adjustments seems warranted.

Population and Sample

The population for this study consisted of all secondary students (n = 8,467) and fulltime and parttime adult students (n = 2,089) enrolled in fulltime Business and Computer Technology programs in Oklahoma's area vocational technical schools and comprehensive high schools during the fall semester of 1995. The combined enrollment totaled 10,556. The student population information was provided by the Information Analysis Division of the Oklahoma Department of Vocational-Technical Education, Stillwater, Oklahoma.

The study was conducted using a purposive cluster sample (n = 264). Kerlinger (1986) defined purposive sampling as:

> another type of non-probability sampling, which is characterized by the use of judgment and a deliberate effort to obtain representative samples by including presumably typical areas or groups in the sample. (p. 120)

He maintained that nonprobability samples do not use random sampling which makes them unacceptable for generalizing back to the population. However, the assumptions underlying purposive sampling, according to Ary, Jacobs, and Razavieh (1985), is that erroneous judgments in the selection of the

elements from the population will counterbalance one another.

More often than not, individuals conducting educational research must obtain their sample from an actual school setting. Popham (1967) had the following to say about intact groups:

> Disregarding the fact that often the only available source for the appropriate student sample will be found in a school classroom, there is a decided advantage in using realistic school situations to investigate relationships between educational variables. (p. 221)

He further proposed that such research is frequently most generalizable when the investigation is conducted in the surroundings of an authentic school environment.

Subjects

The individuals tested in the study were secondary and adult students enrolled in Business and Computer Technology programs in comprehensive high schools and area vocational-technical schools in Oklahoma. To secure the appropriate clusters for the study, the researcher utilized the computer software SYSTAT Version 5.03 to generate a list of 30 random numbers. Using the 1994-95 ODVTE personnel directory and the 30 computer-generated numbers, 17 comprehensive high schools and 13 area vocational-technical schools were selected as possible participants. A questionnaire was sent to the Business and Computer Technology instructors inquiring about their class mixture (i.e. pure secondary, pure adult, and a mixture of secondary and adult) and the curriculum to be

taught during the 1995, fall semester. Sixteen programs were selected based on curriculum and class mix. Eight area vocational-technical schools located at nine different campuses and four comprehensive high schools participated in the study.

Instrument

Based on the curriculum information provided by the selected instructors, four competency-based tests in the area of Business and Computer Technology were developed by the researcher (see example, Appendix A). The instruments contained test items consisting of true/false, multiple-choice, matching, and short-answer questions which measured learning outcomes in the cognitive domain. In addition, the instruments included questions about the status of the student (secondary or adult), and social security number (last four digits). Those items were collected specifically to facilitate student location at posttest time and data analysis.

The research instruments were field tested using 56 students enrolled in Metro Tech AVTC's short-term evening computer classes. The field tests were conducted in an effort to validate the instruments in the following areas: (a) completeness and understanding of instructions, (b) clarity of test items, (c) relevancy of test items, and (d) estimated time of completion. An item analysis was performed on the instruments utilizing Quattro, a computerized

spreadsheet developed by Borland International (1990), a nationally recognized software development corporation. The spreadsheet contained the necessary formulas to calculate the mean, standard deviation, item variance and item discrimination. The test/retest method was used to test for reliability. Reliability coefficients ranged from -.07 to .79.

In addition to the preexperimental portion of the study, the researcher designed a faculty demographic survey (see Appendix B) to construct profiles of the faculty. Data collected included social security number (last 4 digit), information on class mixture, age, degree status, vocational teaching experience, experience teaching adult students, and formal training in adult education. The Myers-Briggs Type Indicator (MBTI) survey was administered to instructors for the purpose of identifying teaching styles.

Data Collection Procedures

Preliminary Arrangements

Following the selection of the programs to be included in the sample, the researcher obtained participation agreements from program administrators (e.g.,school superintendent, principal, and/or director) and instructors at each of the proposed sites. The decision was made that instructors of the participating programs would serve as test administrators and the pretest would be given during the week of October 15, 1995.

Pretest Administration

After administrative and instructor participation had been granted, each instructor was provided a packet of materials for the study. The packet contained a cover letter (see Appendix C) explaining the instructions for administering the pretest, testing instruments, faculty demographic survey, MBTI survey, and consent forms for secondary students. Following the pretest, subjects participated in the treatment (instruction) for approximately nine weeks at which time the posttest was administered. The same tests were used for both the pretest and posttest.

Instructors were requested to return the pretest, faculty demographic survey, MBTI survey, and consent forms immediately following test administration. Pretest instruments, faculty surveys, and MBTI surveys were received from all sixteen programs. The number of pretests received totaled 264.

Posttest Administration

The posttest packet was distributed during the first week of December 1995. The packet included a list of pretested students (identified by last four digits of their social security number), administration instructions, and a self-addressed stamped enveloped for mailing the materials to the researcher. Posttests were to be administered before the end of the 1995, fall semester and returned to the

researcher immediately following test administration. Follow-up letters were sent and personal phones calls were made to obtain the highest number of posttests possible. Instruments were received from all sixteen programs. A total of 180 posttests were received, representing 68.18 percent of the original pretested students.

Analysis of Data and Statistical Analysis

Following data collection the researcher entered the student and faculty coded data into a database management system using an IBM microcomputer. The items were collected specifically to facilitate student and instructor location and to construct a profile for data analysis. The unit of analysis was the classroom. The unit of measurement was the student. To ensure confidentiality only the researcher had access to the data.

Metro Tech's Assessment Center computer-scored the MBTI answer sheets using a computer software program specifically designed to score the survey instrument. A profile was computer-generated for the purpose of identifying teachers' teaching styles. Teachers' teaching styles were added to the database file. The testing instruments were hand scored by the researcher. Students' pretest and posttest scores were then added to the database file.

To organize and analyze the data, the data file was sorted according to groups of pure adult (Group A), mixed secondary and adult (Group B), and, pure secondary (Group

C). The mixed group (Group B) was further subgrouped by adult students in the mixed group and secondary students in the mixed group to facilitate data analysis.

The researcher utilized SYSTAT version 5.03 computer software as a tool for data analysis. The statistical procedures used were the analysis of covariance (ANCOVA) and when appropriate, the HSD (honestly significant difference) Tukey test. ANCOVA is a statistical procedure that is frequently used to improve the precision of a research design by employing an extraneous variable that is correlated with the dependent variable (Ary et al., 1985). The likelihood of committing a Type II can be reduced using ANCOVA (Ary et al.). Popham (1967) had the following to say about the analysis of covariance:

> For the educational research worker, analysis of covariance is an extremely valuable statistical technique, since it allows one to test for mean differences between two or more intact groups while compensating for initial differences between the groups with respect to relevant variables. (p. 230)

While the ANCOVA reports differences among means, it does not reveal where the differences among means occurred. The HSD Tukey test is a post hoc strategy used for discovering where differences lie. Shavelson (1988) had the following to say about the Tukey test:

> Post hoc comparisons refer to comparisons of means which have not been planned but which look interesting to the researcher on the basis of the sample data. They allow the researcher to snoop through the data to find out where the differences occurred which gave rise to the significant, overall F. (p. 365)

Chapter IV

FINDINGS

The purpose of this study was to determine if the practice of mixing secondary and adult students in the same Business and Computer Technology classroom contributes to the effectiveness of learning among students.

Sampling Results

The data for the study were obtained by administering pretests and posttests to 264 adult and secondary Business and Computer Technology students enrolled in eight Oklahoma area vocational-technical schools, located at nine different campuses, and four comprehensive high schools. However, due to student absences, student completers, and student dropouts, the usable responses totaled 180 reflecting a retesting rate of 68.18 percent. Table I on page 41 reveals the distribution and percentage of subjects taking the pretest and posttest by group.

Presentation of Data

To prepare the data for analysis, subjects were sorted into the following groups: (A) pure adult, (B) mixed secondary and adult, and (C) pure secondary. The mixed group

TABLE I

DISTRIBUTION AND PERCENT OF BUSINESS AND COMPUTER TECHNOLOGY STUDENTS TAKING PRETEST AND POSTTEST BY GROUP

Groups	Total Number Pretested	Percent Of Total Pretested	Total Number Posttested	Percent Of Total Posttested	Retest Rate By Group
Adult Only	77	29.17%	51	28.33%	79.22%
Mixed Secondary and Adult	62	23.48%	54	30.00%	87.10%
Secondary Only	125	47.35%	75	41.67%	60.00%
Total	264	100.00%	180	100.00%	68.18%

(Group B) was further subgrouped by adult students in the mixed group and secondary students in the mixed group to facilitate data analysis.

Each group comparison was examined by means of an analysis of covariance using posttest scores as the dependent variable, groups as the independent variable, and pretests scores as the covariate. To further evaluate the data, an analysis of covariance was performed on certain teacher characteristics using posttest scores as the dependent variable, teacher characteristics as the independent variable, and pretest scores as the covariate. If the calculated probability was equal to or less than .05 alpha level, the difference was determined to be statistically significant. If a significant difference was found to exist, a post hoc Tukey test was performed to determine where the differences occurred and to see if the difference between the groups were honest significant differences. Data analysis was performed on an IBM microcomputer utilizing the computer software package SYSTAT version 5.03. Table II on page 43 depicts the distribution of teacher characteristics gathered from the faculty demographic survey and MBTI.

Analysis of Data

Research Question One

Pretest and posttest group mean scores were used to answer research question one, "Is there a significant

TABLE II

DISTRIBUTION OF BUSINESS AND COMPUTER TECHNOLOGY
TEACHER CHARACTERISTICS

Teacher Number	Student Population	Degree Type	*Teaching Style	Teacher Age Range	Years of Experience Teaching Voc-Ed	Years of Experience Teaching Adults	Completed Formal Training in Teaching Adults
1	Adult	Bachelors	SJ	35-44	Less than 5	Less than 5	No
2	Adult	Masters	SJ	45-54	5-10	5-10	Yes
3	Adult	Masters	SJ	35-44	5-10	11-15	No
4	Adult	Bachelors	SJ	35-44	5-10	5-10	No
5	Adult	Masters	SJ	55+	5-10	5-10	No
6	Adult	Bachelors	SJ	25-34	Less than 5	Less than 5	Yes
7	Mixed	Masters	SP	35-44	11-15	11-15	Yes
8	Mixed	Masters	SJ	55+	11-15	11-15	Yes
9	Mixed	Bachelors	NJ	25-34	5-10	5-10	No
10	Mixed	Master	SJ	45-54	20+	5-10	Yes
11	Mixed	Masters	NP	45-54	5-10	5-10	Yes
12	Mixed	Masters	SJ	25-34	5-10	5-10	Yes
13	Secondary	Masters	NP	45-54	11-15	Less than 5	No
14	Secondary	Masters	SJ	35-44	16-20	5-10	No
15	Secondary	Masters	NJ	25-34	Less than 5	Less than 5	No
16	Secondary	Bachelors	SJ	35-44	5-10	0	No

*Teaching Style:
SJ = Sensing-Judging
SP = Sensing-Perceiving
NJ = Intuitive-Judging
NP = Intuitive-Perceiving

difference between cognitive mean scores of adult and secondary students when their classes were totally adult or totally secondary compared to a group of adult student and secondary students in mixed classes?"

An analysis of covariance was performed to test for differences among the groups. Posttest scores were used as the dependent variable, groups as the independent variable, and pretest scores as the covariate. An alpha level of .05 was used to determine statistical significance. The probability level in Table III on page 45 yielded significant results ($p = .020$). As can be seen in Table IV on page 45, the secondary mixed group had the highest adjusted group mean score of 79.48. The adult mixed group showed the next to the highest with an adjusted mean score of 78.90 followed by the secondary group of 71.62. The adult group showed the least adjusted group mean score of 71.37. A post hoc Tukey test was performed to examine where the differences occurred and if the differences were statistically significant. Results of the Tukey test in Table V on page 46 shows the pure secondary group scored .25 mean points higher than the pure adult group. The adults in the mixed group scored 7.54 mean points higher than the pure adult group. The secondary students in the mixed group scored 7.87 mean points higher than the pure secondary group. However, the probability levels indicate the Tukey test conflicted with the ANCOVA in that no significant difference was found between any of the groups.

TABLE III

ANALYSIS OF COVARIANCE
PRETEST/POST SCORES BY
GROUPS

Source	Sum of Squares	DF	Mean Square	F Ratio	P
Groups	2113.70	3	704.57	3.36	.020*
Pretest	10046.03	1	10046.03	47.88	
Error	36717.70	175	209.82		

Alpha = .05
* = Statistical Significance Exists

TABLE IV

COGNITIVE ADJUSTED LEAST SQUARES MEAN
POSTTEST SCORES, EXPRESSED
AS A PERCENTAGE, BY GROUP

Groups	Mean	N
Adult	71.37	51
Adult Mixed	78.90	36
Secondary	71.62	75
Secondary Mixed	79.48	18

TABLE V

TUKEY TEST
BY GROUPS

Comparison	Difference	P-Value
Adult/Secondary	.25	1.000
Adult/Adult Mixed	7.54	.079
Secondary/Secondary Mixed	7.87	.173

Alpha =.05

Research Question 2:

Pretest and posttest scores of subjects and the data collected from the faculty demographic survey and the MBTI survey were used to answer question two, "Do certain teacher characteristics make a difference in cognitive mean scores among students enrolled in Business and Computer Technology programs (e.g.,teacher age, years of experience teaching vocational education, teaching styles, years of experience teaching adults, education level, and formal training in adult education)?"

Teacher characteristics were categorized according to specific criteria and an analysis of covariance was performed on the data using posttest scores as the dependent variable, teacher characteristics as the independent variable, and pretest scores as the covariate. An alpha level of .05 was used to determine statistical significance. If a calculated probability level was equal to or less than alpha .05, the difference was determined to be statistically significant. If the calculated probability level was greater than alpha .05, the difference was determined to not be statistically significant. If a statistical significance was found to exist, a post hoc Tukey test was performed to determine where the differences occurred and if the differences were statistically significant.

The teacher characteristic, teacher age, was grouped as follows: (a) under 25, (b) 25-34, (c) 35-44, (d) 45-54, and (e) 55+. Teacher age groups were then analyzed using an

analysis of covariance to determine if the age of the teacher made a difference on student's posttest scores after having been adjusted for prior knowledge of the subject matter. The posttest served as the dependent variable, teacher age as the independent variable, and the pretest as the covariate. The probability level in Table VI on page 49 reveals that differences in posttest scores were statistically significant at the alpha .05 level (p=.000) indicating the age of the teacher makes a difference in the cognitive learning of Business and Computer Technology students. As can be seen from Table VII on page 49, students who were taught by teachers who fell within the 25-34 age group had the highest adjusted mean score (86.87). The 55+ group had the next highest mean score (72.93) followed by the 35-44 group (71.01) with the 45-54 group showing the lowest adjusted group mean score (68.13). Results of the Tukey test in Table VIII on page 50 shows the 25-34 group scored 15.86 mean points higher than the 35-44 group, 18.74 mean points higher than the 45-54 group, and 13.94 mean points higher than the 55+ group. All of which were significant for that one age group.

The teacher characteristic, years of vocational teaching experience, was categorized as follows: (a) less than 5, (b) 5-10, (c) 11-15, (d), 16-20, and (e) 20+. Categories were then analyzed using an analysis of covariance to determine if the number of years of experience teaching vocational education made a difference on student's

TABLE VI

ANALYSIS OF COVARIANCE
PRETEST/POST SCORES
BY TEACHER AGE

Source of Variation	Sum of Squares	DF	Mean Square	F Ratio	P
Teacher Age	8867.48	3	2955.83	17.26	.000*
Pretest	14295.04	1	14295.04	83.49	
Error	29963.92	175	171.22		

Alpha = .05
* = Statistical Significance Exists

TABLE VII

COGNITIVE ADJUSTED LEAST SQUARES MEAN
POSTTEST SCORES, EXPRESSED
AS A PERCENTAGE, BY TEACHER AGE

Groups	Mean	N
25-34 years	86.87	39
35-44 years	71.01	70
45-54 years	68.13	53
55+ years	72.93	18

TABLE VIII

TUKEY TEST
BY TEACHER AGE

Comparison (In Years)	Difference	P-Value
25-34 / 35-44	-15.86	.000*
25-34 / 45-54	-18.74	.000*
25-34 / 55+	-13.94	.002*
35-44 / 45-54	- 2.88	.674
35-44 / 55+	1.93	.945
45-54 / 55+	4.81	.575

Alpha = .05
* = Statistical Significance Exists

posttest scores after having been adjusted for prior knowledge of the subject matter. The probability level in Table IX on page 52 reveals that differences in posttest scores were statistically significant at the alpha .05 level (p=.000). Table X on page 52 reveals that students who were taught by teachers with less than five years vocational education teaching experience had the highest adjusted group mean score of 83.81. The 5-10 year group had the second highest adjusted group mean score of 74.21, followed by the 20+ group of 73.08, and the 11-15 group of 69.10. The 16-20 group had the lowest adjusted group mean score of 64.60. Table XI on page 53 reveals the Tukey test found the differences to lie with the students who were taught by teachers who had 5-10 years vocational teaching experience with the exception of when they were compared to students who were taught by teachers that had 20+ years experience in teaching vocational education. Students in the 5-10 range group scored 9.61 mean points less than the group where teachers had taught less than five years. Students in the 11-15 range group scored 14.71 mean points less than the students in the group where the teacher had less than five years vocational teaching experience. Students in the 16-20 range group scored 19.21 mean points less than the students in the group where the teacher had less than five years vocational teaching experience.

The teacher characteristic, teaching style, was categorized according to the four basic personality types of

TABLE IX

ANALYSIS OF COVARIANCE
PRETEST/POST SCORES BY
YEARS OF VOCATIONAL
TEACHING EXPERIENCE

Source of Variation	Sum of Squares	DF	Mean Square	F Ratio	P
Vocational Teaching Experience	4863.85	4	1215.96	6.23	.000*
Pretest	156070.23	1	156070.23	80.27	
Error	33967.54	174	195.22		

Alpha = .05
* = Statistical Significance Exists

TABLE X

COGNITIVE ADJUSTED LEAST SQUARES MEAN
POSTTEST SCORES, EXPRESSED AS
A PERCENTAGE, BY YEARS OF
VOCATIONAL TEACHING EXPERIENCE

Groups	Mean	N
Less than 5 years	83.81	29
5 to 10 years	74.21	82
11 to 15 years	69.10	46
16 to 20 years	64.60	11
20+ years	73.08	12

TABLE XI

TUKEY TEST BY YEARS OF
VOCATIONAL TEACHING EXPERIENCE

Comparison	DIFFERENCE	P VALUE
Less than 5 years / 5-10 years	- 9.61	.014*
Less than 5 years / 11-15 years	-14.71	.000*
Less than 5 years / 16-20 years	-19.21	.001*
Less than 5 years / 20+ years	-10.73	.168
5-10 years / 11-15 years	- 5.10	.279
5-10 years / 16-20 years	- 9.60	.203
5-10 years / 20+ years	- 1.12	.999
11-15 years / 16-20 years	- 4.50	.874
11-15 years / 20+ years	3.98	.906
16-20 years / 20+ years	8.48	.599

Alpha = .05
* = Statistical Significance Exists

the Myers-Briggs indicators: (a) NJ (intuitive-judging), (b) NP (intuitive-perceiving), (c) SJ (sensing-judging), and (d) SP (sensing-perceiving). Categories were then analyzed using an analysis of covariance to determine if the teaching style of the teacher made a difference in student's posttest scores after having been adjusted for prior knowledge of the subject matter. The probability level in Table XII on page 55 reveals that differences in posttest scores were statistically significant at the alpha .05 level (p=.000) indicating the teaching style of the teacher makes a difference in the cognitive learning of students. As can be seen in Table XIII on page 55, students who were taught by teachers whose teaching style NJ (intuitive-judging) had the highest adjusted group mean score of 89.02. The SP (sensing-perceiving) were second with a adjusted group mean of 79.20, followed by SJ (sensing-judging) of 72.92, and NP (intuitive-perceiving) 63.47. Results of the Tukey test in Table XIV on page 56 found significant differences to lie between the NJ and NP, NJ and SJ, NP and SJ, and the NP and SP teaching styles. The biggest difference occurred between the NJ and NP group with the NP group scoring 25.55 less than the NJ group. Other differences were between the NJ and SJ group with the SJ group scoring 16.10 mean points less than the NJ group. The SJ group scored 9.45 mean points higher than the NP group and the SP group scored 15.73 mean points higher than the NP group.

TABLE XII

ANALYSIS OF COVARIANCE
PRETEST/POST SCORES
BY TEACHING STYLE

Source of Variation	Sum of Squares	DF	Mean Square	F Ratio	P
Teaching Style	9971.76	3	3323.92	20.16	.000*
Pretest	9856.94	1	9856.94	59.77	
Error	28859.63	175	164.91		

Alpha = .05
* = Statistical Significance Exists

TABLE XIII

COGNITIVE ADJUSTED LEAST SQUARES MEAN
POSTTEST SCORES, EXPRESSED AS A
PERCENTAGE, BY TEACHING STYLE

Groups	Mean	N
NJ (Intuitive-Judging)	89.02	25
NP (Intuitive-Perceiving)	63.47	36
SJ (Sensing-Judging)	72.92	104
SP (Sensing-Perceiving)	79.20	15

TABLE XIV

TUKEY TEST
BY TEACHING STYLE

Comparison	Difference	P Value
NJ / NP	-25.55	.000*
NJ / SJ	-16.10	.000*
NJ / SP	- 9.82	.131
NP / SJ	9.45	.001*
NP / SP	15.73	.002*
SJ / SP	6.28	.348

Alpha = .05
* = Statistical Significance Exists

NJ = Intuitive-Judging
NP = Intuitive-Perceiving
SJ = Sensing - Judging
SP = Sensing - Perceiving

The teaching characteristic, years of experience teaching adults, was categorized as follows: (a) less than 5, (b) 5-10, (c) 11-15, (d) 16-20, and (e) 20+. Categories were then analyzed using an analysis of covariance to determine if the number of years experience teaching adults made a difference on student's posttest scores after having been adjusted for prior knowledge of the subject matter. The probability level in Table XV on page 58 reveals that differences in posttest scores were not statistically significant at the alpha .05 level indicating the number of years experience teaching adults does not make a difference in the cognitive learning of students. As can be seen in Table XVI on page 58, students who were taught be teachers who had 11-15 years of experience teaching adults had the highest adjusted group mean score of 74.47, followed by the less than five years group with an adjusted score of 74.29. The 5-10 year range group had the next highest with an adjusted group mean score of 73.38. The 16-20 range group had the lowest adjusted group mean score of 72.61.

The teaching characteristic, education level, was categorized as follows: (a) doctorate, (b) masters, (c) bachelors, (d) associates, and (e) other. Categories were then analyzed using an analysis of covariance to determine if the education level of the teacher made a difference on student's posttest scores after having been adjusted for prior knowledge of the subject matter. The probability level in Table XVII on page 59 reveals that differences in

TABLE XV

ANALYSIS OF COVARIANCE
PRETEST/POST SCORES BY
YEARS OF EXPERIENCE
TEACHING ADULTS

Source of Variation	Sum of Squares	DF	Mean Square	F Ratio	P
Years of Experience Teaching Adults	84.54	3	28.18	.13	.944
Pretest	11860.50	1	11860.50	53.57	
Error	38746.86	175	221.41		

Alpha = .05

TABLE XVI

COGNITIVE ADJUSTED LEAST SQUARES MEAN
POSTTEST SCORES, EXPRESSED
AS A PERCENTAGE, BY YEARS
EXPERIENCE TEACHING ADULTS

Groups	Mean	N
Less than 5 years	74.29	21
5 to 10 years	73.38	57
11 to 15 years	74.47	73
16 to 20 years	72.61	29
20+ years	--	--

TABLE XVII

ANALYSIS OF COVARIANCE
PRETEST/POST SCORES BY
EDUCATION LEVEL

Source of Variation	Sum of Squares	DF	Mean Square	F Ratio	P
Education Level	374.88	1	374.88	1.73	.191
Pretest	15324.07	1	15324.07	70.53	
Error	38456.51	177	217.27		

Alpha = .05
* = Statistical Significance Exists

posttest scores were not statistically significant at the alpha .05 level (p=.191) indicating the education level of the teacher does not make a difference in the cognitive learning of students. As can be seen in Table XVIII on page 61, the highest degree level was a masters. One hundred and twenty-nine of the students were taught by teachers who had a master's degree as compared to fifty-one who had a bachelors. Table XVIII also shows, that while not significant, students who were taught by teachers with a bachelor's degree showed the highest adjusted group mean gain score, 76.07. Students taught by teachers who had a master's degree had an adjusted group mean score of 72.88.

The teacher characteristic, formal training teaching adults, was categorized as: (a) yes, teacher had completed a formal adult education program or (b) no, teacher had not completed a formal adult education training program. The categories were then analyzed using an analysis of covariance to determine if having formal training teaching adults made a difference on student's posttest scores after having been adjusted for prior knowledge of the subject matter. The probability level in Table XIX on page 61 reveals that differences in posttest scores were statistically significant at the alpha .05 level (p=.018) indicating that not having completed a formal adult education program does make a difference in the cognitive learning of students. As can be seen in Table XX on page 62, students who were taught by teachers who had not completed a

TABLE XVIII

COGNITIVE ADJUSTED LEAST SQUARES MEAN POSTTEST SCORES, EXPRESSED AS A PERCENTAGE, BY EDUCATION LEVEL

Groups	Mean	N
Bachelor's Degree	76.07	51
Master's Degree	72.88	129

TABLE XIX

ANALYSIS OF COVARIANCE PRETEST/POST SCORES BY FORMAL TRAINING IN ADULT EDUCATION

Source of Variation	Sum of Squares	DF	Mean Square	F Ratio	P
Formal Training In Adult Education	1211.30	1	1211.30	5.70	.018*
Pretest	14153.39	1	14153.39	66.59	
Error	37620.10	177	212.54		

Alpha = .05
* = Statistical Significance Exists

TABLE XX

COGNITIVE ADJUSTED LEAST SQUARES MEAN POSTTEST SCORES, EXPRESSED AS A PERCENTAGE, BY FORMAL TRAINING IN ADULT EDUCATION

Groups	Mean	N
No (did not complete formal training)	77.63	123
Yes (completed formal training)	72.01	57

formal adult education training program had the highest adjusted group mean score of 77.63. Students who were taught by teachers who had completed a formal adult education training program had a adjusted group mean score of 72.01. While there were no other groups to compare these two categories to, the researcher performed a Tukey to see if the difference of 5.63 was statistically significant. As can be seen in Table XXI on page 64, the Tukey agreed with the ANCOVA in that the difference was statistically significant.

TABLE XXI

TUKEY TEST
BY FORMAL TRAINING
IN ADULT EDUCATION

Comparison	Difference	P Value
No/ Yes	5.63	.017*

Alpha = .05
* = Statistical Significance Exists

CHAPTER V

FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

The purpose of this study was to determine if the practice of mixing secondary and adult students in the same Business and Computer Technology classroom contributes to the effectiveness of learning among students.

There were two specific research questions for the study.

1. Is there a significant difference in cognitive mean scores of adult and secondary students when their classes were totally adult or totally secondary compared to a group of adult students and secondary students in mixed classes?

2. Do certain teacher characteristics make a difference in cognitive mean scores among students enrolled in Business and Computer Technology programs (e.g.,teacher age, years of experience teaching vocational education, teaching styles, years of experience teaching adults, education level, and formal training in adult education)?

The review of literature focused on the diversity among learners. Learning processes and learning outcomes were reviewed. In addition, factors influencing learning processes and learning outcomes were examined.

The population of the study consisted of approximately

10,556 adult and secondary students enrolled in Business and Computer Technology programs during the 1995, fall semester. The initial purposive cluster sample of 264 subjects produced 180 adult and secondary subjects who successfully completed a pretest and posttest. The sample was divided into three groups for data analysis. Group (A) pure adult students, Group (B) a mixture of secondary and adult students, and Group (C) pure students. The mixed group (Group B) was further subdivided by the adult students in the mixed group and the secondary students in the mixed group. The sample represented sixteen programs in eight area vocational-technical schools, located at nine different campuses, and four comprehensive high schools throughout the state of Oklahoma.

Data analysis included an analysis of covariance and, when appropriate, a post hoc Tukey test. The analysis of covariance was utilized to determine if the difference in posttest scores, after having been adjusted for prior knowledge, were significantly, or not significantly, different due to the classroom grouping of the subjects. In addition, certain teacher characteristics were analyzed, using the analysis of covariance, to determine if the difference in posttest scores, after having been adjusted for prior knowledge, were significantly, or not significantly different due to the specific teacher characteristic. When statistical significance existed, a Tukey test was performed to determine where the differences

occurred and if the difference was statistically significant.

Summary of Findings

An analysis of the data revealed the following:

1. An analysis of covariance, which tested for group mean differences among students grouped according to pure adult (Group A), a mixture of secondary and adult students (Group B), and pure secondary (Group C) to determine if the difference in group mean posttests scores, after having been adjusted for prior knowledge of the subject matter, yielded significant results. The pure secondary and secondary students in the mixed group experienced the greatest difference with the secondary students in the mixed group scoring 7.87 mean points greater than the pure secondary group. The secondary students in the mixed group had the highest overall adjusted group mean (79.48). However, a post hoc Tukey test rendered conflicting results in that the differences in the groups were not found to be statistically significant indicating the differences were not honest differences and could have been due to chance.

2. An analysis of covariance, which tested for mean differences among students taught by teachers of varying age levels, yielded significant results. The Tukey test yielded significant results in every grouping where the teacher's age fell into the 25-34 year range. The biggest difference was found between the 25-34 age range with the 45-54 group

scoring 18.74 mean points less than the 25-34 range group.

3. An analysis of covariance, which tested for mean differences among students taught by teachers who had varying years of experience teaching vocational education, yielded significant results. The Tukey test yielded significant results in every grouping where the teacher had less than five years vocational teaching experience except when compared with the group with twenty plus years experience. The biggest difference was between the less than 5 years range group and the 16-20 years range group. Students who were taught by teachers that had 16-20 years experience teaching vocational education scored 19.21 mean points less than students who were taught by teachers who had less than five years vocational teaching experience.

4. An analysis of covariance, which tested for mean differences among students taught by teachers with varying teaching styles, yielded significant results. The Tukey test revealed that greatest difference occurred in the NJ (intuitive -judging) and NP (intuitive-perceiving) teaching style. Students who were taught by teachers who had a NP (intuitive-perceiving) teaching style scored 25.55 mean points less than students who were taught by a teacher that exhibited a NJ (intuitive-judging) teaching style. Additionally, students who were taught by a teacher who exhibited a NJ (intuitive-judging) teaching style had the highest adjusted group mean score (89.02). The majority of students were taught by a teacher who exhibited a SJ

(sensing-judging) teaching style (n=104).

5. An analysis of covariance, which tested for mean differences among students taught by teachers who had varying years of experience teaching adults, yielded nonsignificant results. Students who were taught by teachers that had 11-15 years of experience teaching adults had the highest adjusted group mean score (74.47).

6. An analysis of covariance, which tested for mean differences among students taught by teachers who had varying levels of education degrees, yielded nonsignificant results. While the majority of teachers had a master's degree (n=129), students who were taught be teachers who had a bachelor's degree (n=51) exhibited the highest adjusted group mean score of 76.07.

7. An analysis of covariance, which tested for mean differences among student taught by teachers who had completed formal training in adult education, yielded significant results. Students taught by teachers who had not completed a formal adult education program exhibited the highest adjusted group mean score of 77.63. The majority of teachers had not completed a formal adult education program (n=123).

Conclusions

While the results of this study identified some statistical differences among students based on grouping and certain teacher characteristics, the study also produced

results from which no firm conclusions can safely be made about the lack of significant differences between students based on grouping and certain teacher characteristics. Due to the nature of the sample being purposive, the findings can only be generalized back to the sample and not to the population. Therefore, the conclusions of this study should be interpreted with extreme caution until future true experimental studies in which class grouping of adult and secondary students enrolled in Business and Computer Technology programs can be further investigated. As a result of the findings of the study, the following conclusions are drawn:

1. Based on the observable data in this study that adult and secondary students tend to exhibit greater cognitive gain when placed in a mixed class, it is concluded that attempts should not be made to segregate these two groups until further studies are conducted with other occupational groups to see if similar findings are found.

2. Based on the observable data in this study that cognitive learning outcomes of Business and Computer Technology students are greater when taught by teachers who are between the ages of 25-34, it is concluded that teachers who fall in this age range are the newer teachers and are still excited about teaching. Their generation has been exposed to the technology therefore, they are more likely to have experienced the technology and are less fearful than the more seasoned teachers. It is also concluded they have

not taught long enough to experience burnout. Additionally, it is concluded that teachers in this age range have recently graduated from college or have come from business and industry where they have not become discouraged by the operations of a bureaucratic organization.

3. Based on the finding in this study that cognitive learning outcomes of Business and Computer Technology students are greater when taught by teachers who have less than five years experience teaching vocational education it is concluded that when new programs are developed or openings becoming available, vocational administrators should seriously consider filling these positions with teachers who have less than five years experience.

4. Based on the observable data in this study that teaching style does make a difference in cognitive learning among Business and Computer Technology students, it is concluded that teaching styles and learning should be identified at the beginning of each year and school personnel, in charge of student scheduling, should make a deliberate effort to match teaching styles and learning styles whenever possible. Also, staff development programs should be implemented that address "style-flexing"; the ability to shift away from one's own primary style to accommodate the style of another.

5. Based on the observable data in this study that teachers years of experience teaching adults does not significantly impact cognitive learning, it is concluded

that one of the reasons this characteristic was found to be nonsignificant is that the primary focus of fulltime vocational programs has been, and continues to be, on the secondary learner. Vocational teachers have spent the majority of their professional careers teaching secondary students, not adults.

6. Based on the observable data in this study that the education level of the teacher does not contribute to the effectiveness of learning among Business and Computer Technology students, it is concluded that vocational education is practical-based rather than theoretical-based and that a teacher's knowledge base in the particular skill area for which they teach is just as valuable, if not more, than a degree. It is also concluded that this is one of the reasons why vocational education practices hiring teachers from business and industry.

7. Based on the observable data in this study that cognitive learning outcomes of Business and Computer Technology students are greater when the teacher has not completed a formal adult basic education program, it is concluded that teachers do not believe they need to return to the classroom to receive formal training teaching adults.

Recommendations

The study has provided information concerning cognitive learning outcomes among adult and secondary students enrolled in Business and Computer Technology programs that

was previously unavailable. However, the information provided in this study is preliminary. It would be premature to suggest that any statewide policies or practices be implemented based on the results of the study. The information provided answers to the questions raised by the researcher and provided a number of implications for further research studies.

The following recommendations are offered:

1. Conduct a study to evaluate learning outcomes of vocational students matching teaching styles and learning styles.

2. Conduct a qualitative study to determine to what extent peer group interaction contributes to the effectiveness of learning among vocational students.

3. Conduct a study to evaluate learning outcomes of vocational students taught by instructors who come from business and industry or hold alternative certification.

4. Conduct a study to evaluate the extent to which institutional structures contributes to the effectiveness of learning among vocational students.

5. Conduct a study to evaluate the extent to which teachers involving students in the teaching/learning process contributes to the effectiveness of learning among vocational students.

6. Conduct a study to evaluate the extent to which promoting self-directed learning contributes to the effectiveness of learning among vocational students.

7. Conduct a study to evaluate learning outcomes of students in the affective and psychomotor domains of learning.

8. Conduct a study to see if vocational teachers are products of vocational education.

While the current study does not provide sufficient findings to recommend restructuring programs at the present time, it is the opinion of the researcher that findings from the above proposed studies would provide additional information that could prove to be a rich resource for vocational educators and administrators as new programs are developed and existing programs are restructured.

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APPENDIXES

APPENDIX A

SAMPLE INSTRUMENT

LOTUS 1-2-3
SPREADSHEET APPLICATION

The purpose of this instrument is to test your knowledge of the LOTUS 1-2-3 spreadsheet application. The instrument contains true/false, multiple choice, and matching questions.

PART A: TRUE OR FALSE

Directions: Using a pencil or pen, circle the "T" if you think the statement is true or the "F" if you think the statement is false.

1. T F When saving a file in a spreadsheet program, the maximum number of characters the file name can have is seven (7).

2. T F In a spreadsheet, a specific unit of cells that form a rectangle indicates the cell range.

3. T F The space created by the intersection of a row and a column is known as a cell.

4. T F The letter of the column and the number of the row is known as the cell address.

5. T F A cell entry that consists of words or letters of the alphabet is called a label.

6. T F The default cell width setting in LOTUS 1-2-3 is nine characters.

7. T F Numeric data entered into a spreadsheet is stored left-justified in a cell.

8. T F When text data is entered into a spreadsheet that contains more characters than the width of the column, an error message is displayed.

9. T F The MOVE command is used to move the cursor from one cell address to another.

10. T F Rows run vertically down the screen while columns run horizontally across the screen.

(please continue on next page)

PART B: MULTIPLE CHOICE

Directions: Each of the items in this section is followed by four possible responses. Using a pencil or pen, circle the letter that you think best answers the question or completes the statement.

1. T F The command /FR is used to:
   a. load a new worksheet
   b. restore a previously stored worksheet
   c. retrieve a worksheet
   d. return to the operating system

2. T F A cell is identified by a cell _____.
   a. pointer
   b. address
   c. entry
   d. location

3. T F The function key used to move the cell pointer to a designated cell:
   a. F5 GOTO
   b. F2 GOTO
   c. F1 GOTO
   d. F7 GOTO

4. T F With LOTUS 1-2-3, each column is identified by a:
   a. number
   b. letter
   c. symbol
   d. none of the above

5. T F If a cell entry begins with a circumflex (^), the data in the cell will be:
   a. left justified
   b. right justified
   c. centered
   d. bolded

6. T F To evoke a spreadsheet command press the _____ key.
   a. shift
   b. control
   c. alt
   d. slash

(please continue on next page)

7. T F The address where the cursor is positioned is known as the:
   a. absolute cell address
   b. active cell address
   c. current cell address
   d. revolving cell address

8. T F A rectangular block of cells is known as a:
   a.range
   b.block
   c.scope
   d.series

9. T F The area on the screen that displays cell information, commands, descriptions of commands, and the mode of operation is known as the:
   a. menu
   b. cell pointer
   c. control panel
   d. status line

10. T F _____ are any combination of mathematical operations used to perform any type of calculation, from simple arithmetic to advanced financial and statistical analysis:
   a. arguments
   b. formulas
   c. exponents
   d. expressions

PART C: MATCHING

Directions: The terms below can be matched with one of the numbered descriptions. Using a pencil or pen, write the correct letter in the space provided before each description.

a.	home key	g.	labels
b.	/FR	h.	apostrophe
c.	cursor movement keys	i.	quote
d.	mode indicator	j.	ESC
e.	GOTO	k.	/FG
f.	EDIT	l.	values

___ 1. Pressing this key will move the cell pointer to cell address A1.

(continue on the next page)

___ 2. The command that allows the user to quickly move from one cell to another.

___ 3. A message on the spreadsheet screen indicating the function being performed by the user.

___ 4. Cells containing numbers such as 23 or 145.89 or the result of formulas.

___ 5. Cells containing text descriptors such as Sales, Inventory, or Costs.

___ 6. The keystrokes used to retrieve an existing spreadsheet file.

___ 7. A label prefix that is used to indicate right justification of the data in a cell.

___ 8. A label prefix that is used to indicate left justification of the data in a cell.

___ 9. A function which allows the user to modify or correct information in a spreadsheet.

___ 10. The key that is pressed one or more times to return you the READY mode.

PART D: STUDENT DEMOGRAPHIC SURVEY

Directions: Please complete the information below by filling in the blank and/or by placing a check mark on the line to the left of the appropriate response.

1. Last four digits of social security number: _____

2. Current Student Status:
   ___ Secondary Student
   ___ Adult Student

3. Age:
   ___ 18 and under
   ___ 19+

APPENDIX B

FACULTY DEMOGRAPHIC SURVEY

FACULTY DEMOGRAPHIC SURVEY

Directions: Please complete the information below by filling in the blank and/or by placing a check mark on the line to the left of the appropriate response.

1. *Last four digits of social security number:* _ _ _ _

2. *Current student population:*
   ___ *Secondary Only*
   ___ *Adult Only*
   ___ *Mixture of Secondary and Adult*

3. *Age:*
   ___ *Under 25*
   ___ *25-34*
   ___ *35-44*
   ___ *45-54*
   ___ *55+*

4. *Highest Level of Education*
   ___ *Doctorate*
   ___ *Masters*
   ___ *Baccalaureate*
   ___ *Associates*
   ___ *Other (please specify)*

5. *Years of vocational teaching experience:*
   ___ *Less than 5*
   ___ *5-10*
   ___ *11-15*
   ___ *16-20*
   ___ *20+*

6. *Years of experience teaching adults:*

___ *0*

___ *5-10*

___ *11-15*

___ *16-20*

___ *20+*

7. *Completed formal training in teaching adults:*

___ *Yes*

___ *No*

APPENDIX C

LETTER SENT TO INSTRUCTORS THAT
ACCOMPANIED PACKET OF INFORMATION
PRIOR TO PRETEST ADMINISTRATION

October 2, 1995

Ella Chumley
Business and Computer Technology Instructor
Pocola High School
P.O. Box 640
Pocola, OK 74092-0640

Dear Ella:

Once again, I want to tell you how much I appreciate your help with my research project. The enclosed administrative procedures checklist explains what you need to do to successfully administer the pretest.

I will be mailing you the posttest packet sometime early December. If you have any questions, please do not hesitate to call me. I have enclosed a business card for your convenience.

Sincerely,

Elaine Stith

Elaine Stith

ADMINISTRATIVE PROCEDURES

The packet of materials contains the following:

1. Faculty Demographic Survey
2. Myers Briggs Type Indicator Survey (MBTI)
3. Secondary Student Consent Form
4. Testing Instrument
5. Self-Addressed Stamped Envelope

Please follow the instructions given.

Faculty Demographic Survey: (Instructor Only) Instructions: Using a pen or pencil, please complete both the front and back of the survey.

Myers Briggs Type Indicator: (Instructor Only). Instructions: Using a pencil, please follow the instructions on the form.

Secondary Student Consent Form: (Secondary Students Only). Instructions: The Oklahoma State University Institutional Review Board requires a consent form to be completed by all secondary students. Please have all secondary students and their parent and/or guardian read, sign, and date the consent form and return to you.

Testing Instrument: (Students Only) Instructions: During the week of October 15, 1995, administer the pretest to students. Follow the instruction on the instrument.

Self-Addressed Stamped Envelope: Instructions: The faculty demographic survey, Myers Briggs Type Indicator survey, student consent forms, and the tests are to be placed in the self-addressed stamped envelope and mailed to the researcher no later than October 27, 1995. Please return all unused tests as well.

VITA

Elaine Sue Stith

Candidate for the Degree of

Doctor of Education

Thesis: A COMPARISON OF LEARNING OUTCOMES OF SECONDARY AND ADULT STUDENTS ENROLLED IN BUSINESS AND COMPUTER TECHNOLOGY PROGRAMS IN OKLAHOMA AREA VOCATIONAL TECHNICAL SCHOOLS AND COMPREHENSIVE HIGH SCHOOLS

Major Field: Occupational and Adult Education

Biographical:

Personal Data: Born in El Reno, Oklahoma, July 23, 1951, the daughter of Raymond and Margie Jackson. Married to Kenneth Stith, March 21, 1969.

Education: Graduated from Southeast High School, Oklahoma City, Oklahoma, in May 1969; received the Associate of Applied Science degree in Business Technology from Seminole Junior College, Seminole, Oklahoma in May 1981; received the Bachelor of Science degree in Business, Computer Science, Education from Central State University, Edmond, Oklahoma, in May 1985; received the Master of Education degree from Central State University, Edmond, Oklahoma, in May 1988; received Secondary Administrative Certification, Oklahoma State University, in July 1994; and completed the requirements for the Doctor of Education degree at Oklahoma State University, Stillwater, Oklahoma, in July 1996.

Professional Experience: Instructor of Information Data Processing, Gordon Cooper Area Vocational-Technical School, Shawnee, Oklahoma, 1985-1991; Director of Business and Finance, Gordon Cooper Area Vocational-Technical School, 1991-1994; Director of Computer and Office Center, Metro Tech Area Vocational-Technical Center, Oklahoma City, Oklahoma, 1995-present.

OKLAHOMA STATE UNIVERSITY
INSTITUTIONAL REVIEW BOARD
HUMAN SUBJECTS REVIEW

Date: 07-31-95 **IRB#:** ED-96-008

Proposal Title: A COMPARISON OF LEARNING OUTCOMES OF SECONDARY AND ADULT STUDENTS INTEGRATED IN BUSINESS AND OFFICE TECHNOLOGY PROGRAMS IN OKLAHOMA AREA VOCATIONAL TECHNICAL SCHOOLS, VOCATIONAL SKILL CENTERS, AND COMPREHENSIVE HIGH SCHOOLS

Principal Investigator(s): Juanita Bice, Garry Bice, Elaine Stith

Reviewed and Processed as: Exempt

Approval Status Recommended by Reviewer(s): Approved

ALL APPROVALS MAY BE SUBJECT TO REVIEW BY FULL INSTITUTIONAL REVIEW BOARD AT NEXT MEETING.
APPROVAL STATUS PERIOD VALID FOR ONE CALENDAR YEAR AFTER WHICH A CONTINUATION OR RENEWAL REQUEST IS REQUIRED TO BE SUBMITTED FOR BOARD APPROVAL.
ANY MODIFICATIONS TO APPROVED PROJECT MUST ALSO BE SUBMITTED FOR APPROVAL.

Comments, Modifications/Conditions for Approval or Reasons for Deferral or Disapproval are as follows:

Signature: _____ Date: August 2, 1995

Chair of Institutional Review Board