

THE EFFECTS OF INCORPORATING LEARNING STYLES AND MULTIPLE  
INTELLIGENCES IN A LANGUAGE ARTS/MATHEMATICS CLASSROOM FOR  
RETURNING DROPOUTS

By

Ann B. Smoak

Master of Education  
in  
Divergent Learning  
Columbia College  
2007

---

Submitted in Partial Fulfillment of the Requirements  
for the Degree of Master of Education in Divergent Learning

---

Dr. Polly LaRosa  
Primary Research Advisor

---

Dr. Chris Burkett  
Secondary Research Advisor

## ABSTRACT

The purpose of the study was to determine if students' awareness of their learning styles and multiple intelligences would increase student achievement, engagement in the learning process, and retention in the classroom. The subjects of this study were a small group of pre-GED students in an adult education environment. Data was collected using a modified Dunn & Dunn Learning Style Inventory, a multiple intelligence survey excerpted from the works of Thomas Armstrong, and Bickey's Basic Assessment of Cognitive Organization. The teacher provided students with a summary of the findings from these instruments. At the end of the instruction period, students reported that the findings on their individual learning styles and multiple intelligences had no effect on their achievement. The researcher, however, found the information gathered useful for instructional purposes.

## DEDICATION

Having lived for some years past the half century mark, I do not feel compelled to write a dedication thanking anyone “without whose love and support this thesis would not have been possible.” My parents are deceased, my children are grown and gone, and my husband, has remained, if not by my side, in the close vicinity for over thirty years. I am, therefore, thankful that no one got in the way.

However, since a dedication is somewhat required, I bestow this honor on my old friends, ladies who not only know me from conversations and anecdotes but who have, in fact, witnessed the greater portion of my life. Friends, after all, choose your company. They can opt out at any time. It is, perhaps, the highest compliment. Cheers.

## ACKNOWLEDGEMENTS

I would like to thank Faye Houston, Director of Adult and Community Education for Richland School District One for allowing me the time and resources to complete this research project. I would also like to thank staff members Will Gilyard and Dion Helper for assisting me in gathering data from the Advantage Pro Database.

## TABLE OF CONTENTS

ABSTRACT .....	ii
DEDICATION .....	iii
ACKNOWLEDGEMENTS .....	iv
TABLE OF CONTENTS.....	v
LIST OF FIGURES AND TABLES .....	viii
INTRODUCTION.....	1
Purpose Statement.....	2
Importance of the Study .....	2
Definition of Terms.....	3
REVIEW OF THE LITERATURE.....	4
Introduction.....	4
Characteristics of Dropouts.....	4
Addressing the Needs of the Returning Student.....	7
Conclusion.....	16
METHODOLOGY .....	18
Participants .....	18
Materials .....	20
Procedures .....	21
Analysis .....	22
FINDINGS .....	23
DISCUSSION .....	31
Overview of the Study .....	31

Summary of Findings.....	31
Limitations of the Study.....	31
Conclusions .....	320
Reccomendations .....	31
REFERENCES.....	33
APPENDIXES .....	39
APPENDIX A: Exit Survey .....	40
APPENDIX B: Individual Learning Style Report (Sample).....	42
APPENDIX C: Dunn and Dunn Learning Style Inventory (Modified).....	44
APPENDIX D: Multiple Intelligence Test (Adapted).....	50

LIST OF FIGURES AND TABLES

1. Table One - Participant's Pre and Post Test Reading and Math Scores.....24

## INTRODUCTION

“Gee, I’ve never been able to balance my checkbook. I’ve never been able to dance (or draw) well.” Such comments would most likely elicit smiles and empathetic nods at any social gathering in our country. But imagine someone saying, “I’ve never learned how to read or write” (Armstrong 2003, pp. 5 & 6). Dead silence with an uncomfortable awkwardness would ensue. Literacy in American society is accepted as the norm, and the illiterate person is considered to be almost less than human by much of society. Small wonder then that a story about a successful person who finally publicly admits his or her illiteracy makes the newspaper, with the person subsequently embarking on speaking engagements across the country. In fact, illiterate people are rarely financially successful, and admitting to illiteracy has become a point of shame.

According to the latest statistics available from the South Carolina Department of Education’s Report on Student Dropout and Completions Rates 2001-2002 (2003), 3.3% of the total student enrollment dropped out during the 2002 school year. This same report indicates that when comparing the number of 8<sup>th</sup> grade enrollees with the number of high school diplomas issued four years later, the percentage of completions drops to 66.8% or a 33.2% drop out rate. Offering these students another chance to be successful is the major concern of this research project.

Adult education programs across the country, no matter what the delivery system, exist to help those members of society who have previously been unsuccessful in school. Often one measure of success is the obtaining of a high school credential. The GED program exists nationally to offer an alternative avenue for high school completion.

## Purpose Statement

This action research project was concerned with the pre-GED student, one whose reading score is determined to fall between the 4.0 – 7.0 grade levels in reading and/or whose math score is determined to fall between 4.0 – 7.0 grade levels. Two research questions were addressed in this research project. First, would incorporating the current research on learning styles and multiple intelligences into the methodology and curriculum make any positive difference in these students' advancement? Secondly, would teaching the students to consciously use their individual learning styles and multiple intelligences cause them to become more engaged in their learning process? Given that they have been unsuccessful in the traditional classroom setting, it was posited that many of these students will be classified as divergent learners.

## Importance of the Study

Being literate is obviously important to functioning well in modern society. The National Adult Literacy Survey (South Carolina Adult Education, 2006) ranked literacy levels into five categories from being able to fill out simple forms and do basic addition (Level One) to making high level inferences in detailed documents (Level Five). The survey notes that nearly half of adults functioning at Level One live in poverty. Conversely, only four to eight percent of adults functioning at the highest two levels of literacy live in poverty.

It would be unrealistic to think that many students reading or computing on the 4<sup>th</sup> to 7<sup>th</sup> grade level would be ready to take the GED test after only a semester or less of instruction. However, it is not unrealistic to expect some gains in achievement during this period of time. Perhaps more important, however, is giving these students the hope

and self-confidence so that, by using their individual strengths and styles, they too can be successful in the classroom. If by teaching greater self-awareness of learning styles and unique intelligences and by offering strategies which utilize students' learning styles and individual strengths, this classroom can motivate these students to remain committed to their goals, this research project will be a success.

#### Definition of Terms

1. Learning Styles – The manner in which environment, emotionality, sociological needs, physical characteristics, and psychological inclination affect an individual's learning process.
2. Multiple intelligences – The separate intelligences that enable a person to solve problems or to fashion products that are valued in society.

## REVIEW OF THE LITERATURE

### Introduction

In preparation for this research project, it was incumbent on the researcher to explore topics that might directly illuminate both the sociological and academic backgrounds of the targeted returning dropouts as well as the findings and applicability of teaching theories to successfully reach these students. Particular attention was given to the increase of student efficacy and achievement by the incorporation of learning styles and multiple intelligence theory into classroom practice.

### Characteristics of Dropouts

It is sobering to consider the life of the uneducated person in today's society. Gone are most of the factory jobs that paid a decent wage for unskilled labor. With the cuts in government social services such as welfare and Medicaid, the safety nets that kept many poor people afloat are now wearing thin. Women who a few years ago depended on their husbands to provide for them now find that they must enter the work force. The cost of living steadily increases while minimum wage has not changed for nearly ten years. In terms of real buying power, the minimum wage has less now than it has had during most of the last fifty years (Economic Policy Institute, 2006, Economic Snapshots section, para. 3). Why then, do so many of our young people drop out of school? What has happened in their educational experience that has totally disengaged them from gaining the knowledge to compete successfully in today's marketplace?

The reasons that students drop out of school are many and varied. Lan and Lanthier (2003) found that even though "environmental factors" (p. 311) of family and neighborhood do, in fact, influence a person's choice to dropout, it is personal attributes

that contribute the most to the decision to separate from school. These attributes include poor motivation, low self-esteem, and substandard academic performance, as well as problems dealing with the school environment. However, Lan and Lanthier's study revealed that these negative factors did not spontaneously appear but, instead, progressively deteriorated over time. Therefore, the decision to drop out of school was made by degrees. As school personnel have little or no control over outside factors, one implication of this gradually-made decision to drop out is that it can possibly be reversed in the right school environment.

Another study (Nowicki, Duke, Susney, Stricker, & Tyler, 2004) echoed Lan and Lanthier's findings that both environmental factors and personal attributes contribute to a student's probability of quitting school. They noted, however, that dropout rates are not evenly distributed across demographics in the United States and are strongly correlated with lower socioeconomic conditions and unstable family relationships. Awareness of negative environmental factors, when combined with poor student performance, makes targeting potential dropouts fairly predictable, and also allows educators to specifically target students most at risk of dropping out of school.

Several studies reconfirmed the correlation between poor academic performance and dropping out of school. The continual struggle to meet academic expectations often leads to frustration and low self-esteem. As a self-protective measure, these students may identify less and less with their educational experiences in order to maintain their sense of self-worth. By feeling that they have consciously chosen not to participate in the learning process, they have, in effect, allowed themselves to feel better about themselves. This

phenomenon may account for the relative high scores on self-esteem surveys completed by unsuccessful students (Griffin, 2002).

Miller, Fitch, and Marshall (2003) examined students' sense of control over their educational processes. This locus of control issue found that students in an alternative school setting felt that they had little control over their learning. Conversely, the students who remained in a traditional school setting displayed a greater sense of intrinsic control, feeling as if they were in charge of their learning. As these students had already been unsuccessful in a traditional school setting, the researchers concluded that a faulty locus of control may have been a contributing factor.

Another reason for dropping out of school for many students is economical necessity. According to a study by Entwisle, Alexander, and Olson (2004), many economically disadvantaged high school students are working because they must. Rather than merely working to obtain spending money, some students may be, in fact, contributing to the family income. These students, therefore, are not necessarily disengaged from their schooling and may, if circumstances allow, return to school to obtain a GED. Furthermore, the characteristics that enable them to successfully retain employment are desirable skills in a learning environment. The researchers further suggested that a student's work experience could, in some instances, be a driving force in returning to school as he or she knows firsthand the value of obtaining a high school credential for better employment.

Other factors that must be considered are the unique characteristics of the adult education learner. Malcolm Knowles, in his definitive study, *The Modern Practice of Adult Education* (1980), noted that adult learners display an "immediacy of application"

(p. 53) perspective toward course curriculum. In other words, while younger students may let the teacher direct the curriculum, adult learners are specific goal oriented and have little patience with curriculum that they feel does not address their immediate needs.

#### Addressing the Needs of the Returning Student

When a former dropout with low achievement decides to return to school, it is crucial that he or she be afforded an educational environment different from the one in which he or she was unsuccessful. Incorporating the student's learning style and multiple intelligences into classroom practice offers one avenue for differentiating this school experience from the previous school experience.

Working with new discoveries in the way that students learn and wishing to incorporate this information into usable classroom practice, Rita and Kenneth Dunn published *Teaching Students through Their Individual Learning Styles: a Practical Approach* in 1978. In this book, the authors related the manner in which (1) environment (2) emotionality (3) sociological needs and (4) physical needs influence student achievement. Following diagnosis of students' learning styles using the Learning Style Inventory (LSI), Dunn and Dunn prescribe specific classroom settings and practices to maximize student learning.

Early on in the work with learning styles, researchers turned their attention to incorporating these learning styles into reading instruction. Along with Dunn and Dunn, Carbo (1991) explored using learning styles to improve performance of poor readers. She noted that many poor readers were "highly tactile/kinesthetic, only moderately visual, and were low auditory" (p. 31) and suggested alternative methods for teaching these students. Carbo (1996) continued to espouse the belief that accommodating reading

styles increased achievement. She cited various studies using her methods that yielded significant gains in reading abilities, including an elementary school in urban San Antonio that changed dramatically. Prior to incorporating her teaching strategies, this school ranked 61<sup>st</sup> out of 65 elementary schools in its district, but after using Carbo's Reading Styles model for two years, this school rose to 9<sup>th</sup> place in its district.

Another study (Stahl, 1999) questioned the efficacy of using learning style theories in the classroom, particularly in the teaching of reading. Stahl stated, "The reason researchers roll their eyes at learning styles is the utter failure to find that assessing children's learning styles and matching them to instructional methods has any effect on their learning" (p. 1). Stahl evaluated the studies quoted by Carbo and found that out of 17 studies cited, none were published in a peer reviewed journal and that the large majority were doctoral dissertations from one university. Furthermore, Stahl questioned the whole validity of the learning style concept and cautioned that categorizing students with resulting changes in teaching methodology could actually harm student achievement. He noted that learning is a fluid process that changes over time as new skills are developed and recommended that teachers accommodate those differences as they become evident.

Nevertheless, students, by the time they reach secondary school, have often internalized the definition of intelligence as purported by traditional schools and society in general (Matthews, 1996). Using the Kolb Learning Style Inventory and a student questionnaire that asked students to rate their academic achievement, Matthews collected data from nearly 6,000 high school students throughout South Carolina. Her results showed that students' learning styles had a "significant . . . effect on perceived academic

achievement” (Results section, para. 4). Those students whose styles favored interpersonal relationships over deductive reasoning often rated themselves as “poor” academically. Conversely, the students who showed an analytical preference in learning style rated themselves as being academically strong.

Two British researchers, Riding and Caine, questioned this assumption that analytic learners automatically perform better at academic tasks than their more holistic counterparts. In their research, Riding and Caine (1993) correlated the learning styles of a group of 182 British secondary-level students to their achievement on the General Certificate of Secondary Education (GCSE). Believing that learning style characteristics could be simplified into two forms, Global/Analytic and Visual/Imagery, Riding and Caine developed a learning style inventory to measure these dimensions and subsequently graphed these students’ performance on the GCSE. Riding and Caine’s research revealed that students who were in the intermediate range on both learning style continuums performed best on the GCSE, and the researchers theorized that these students have the ability to “avoid the limitations of an extreme of style and can utilize the most appropriate facilities of both dimensions as the task requires” (p. 63). Conversely, students who classify as “Analytic-Verbalisers will have no means available to them of obtaining an overall view, but will be limited to an analytic structure” (p. 62).

Taking into consideration the learning styles of returning dropouts may be particularly important in improving reading scores of low achievers from disadvantaged socio-economic backgrounds. Drawing on previous studies that showed a “mismatch” between many high school dropouts’ learning styles and traditional instruction, Caldwell

and Ginthier (1996) found a high correlation between a “combination of learning style variables (motivation, persistence, responsible, kinesthetic and teacher motivated . . .” (p. 3) and low reading achievement in this socioeconomic strata. Caldwell and Ginthier noted that with the exception of kinesthetic, the other characteristics are internal factors. The researchers suggested that teachers adopt strategies which allow students greater control over their learning processes, thus increasing motivation and student achievement.

Using the Dunn and Dunn Learning Styles Inventory, researchers Jackson-Allen and Christenberry (1994) investigated the learning style differences between 25 low achieving African Americans males and 25 high achieving African-Americans males in the tenth grade. The researchers were particularly concerned with the learning modalities and motivational factors of the two groups. This study indicated that more learning similarities than differences exist. No statistical differences in auditory, visual, or tactile modality were expressed. However, low achieving African-American students did display a significantly higher requirement for mobility. In the area of motivation, the high achieving African-American students were more parent-motivated than their lower achieving peers. Although not quite statistically significant, results indicated that low achieving African-Americans tend more toward visual modality than auditory modality, and the researchers suggested further study in this area.

This exploration of cognitive style attributes of the at-risk population was also the consideration of another study (Hunt, 1995). While acknowledging that the education system has consciously begun to pay attention to cultural diversity, he questioned the basic premise of some high school courses that he felt were totally organized around

logical analysis and in which African-American students performed poorly. He concludes that a “learning environment which fails to recognize the unique characteristics of its students’ learning preferences may also fail to provide a solid foundation for education success” (p. 2).

Another study (Philbin, Meier, Hurffman, & Boverie, 1995), although limited in number of participants, researched the innate learning style differences between males and females. This study tentatively concluded that traditional teaching methods favor males’ preferred learning styles of analytical and abstract thinking while ignoring the preferred female learning styles of global, concrete. Furthermore, this study reported a stronger sense of “concern for others” among females and a stronger sense of “concern for self” among males (p. 486). Referring to other studies which have noted the achievement gap in mathematical achievement between males and females, the authors postulated that the learning style differences between the two genders may contribute to the achievement discrepancy.

One study (Murray, 2002), although extremely limited in number of participants, examined the learning styles of adult learners in an adult education GED program. These learners were reading below a 6<sup>th</sup> grade level according to the TABE test of basic ability. The Kolb Learning Style inventory was administered to the participants and indicated that these adult learners preferred a reflective observation learning style orientation. The least preferred learning style was abstract conceptualization. Thus, these adult learners were able to view situations from different perspectives and apply their experience to evaluating information. Furthermore, the study revealed that adults often have trouble acquiring new information if the new information is not presented in a visual form.

Recognizing that the aim of these participants was to pass the GED, the researchers suggested that while presenting new information in visual form may satisfy the immediate preferences of the learners, the need to address reading deficiencies can not be ignored.

While a great deal of attention has been given to the differing learning styles of students, some researchers and theorists have turned their attention to the learning styles of teachers and how they affect classroom practice. If “teaching behaviors reflect the beliefs and values that teachers hold about the learner’s role in the exchange” (Heimlich & Norland, 2002), then teachers’ classroom attitudes and methods will reflect their own prior experience in the learning process. As many teachers have themselves been taught in a field dependent environment, their predilection is to continue this practice even though intellectually they recognize that this is not the preferred learning style of many of their students. Noting this discrepancy between teacher knowledge of learning styles and teacher application of this knowledge, Heimlich & Norland proposed that teachers consciously adapt the role of “lifelong learners” and continue to study their own teaching methods to examine if they are effectively adapting information about student learning styles into their classrooms practice. Drawing on the conclusions of Delahoussaye and Pithers, Brown (2003) concluded that teachers are able to change their teaching styles through effective training, thus better meeting the changing demands of student-centered learning.

One researcher, Warren (2001), sought to quantify the effects of matching student learning style with teacher learning style. Her study involved 57 ninth-grade students and 16 ninth-grade teachers in an urban Southeastern high school. After determining the

global or analytical preferences of both teachers and students, Warren tracked student achievement in English, mathematics, science, and social studies classes. Warren found that nearly seventy-five percent of students performed better academically when paired with teachers possessing the same global or analytical style.

The above research supports Claxton & Murrell's (1988) statements that most students learn best when matched with teachers whose styles mimic their own. Claxton & Murrell believe that matching student and teacher styles are most important when working with the underachieving student. Some intentional mismatching may, however, be beneficial if handled sensitively, but care must be taken to ensure that the underachieving student does not experience "discontinuity" (p. 2) and thus feel threatened in the learning environment.

In addition to the issue of learning styles, the theory of multiple intelligences, first promulgated by Howard Gardner, has captured the imagination of countless educational theorists and practitioners. Gardner (1993) maintained that Binet's IQ test, previously widely used to measure intelligence, was faulty in that it only quantified a person's verbal and mathematical abilities. In contrast, Gardner defined intelligence as "the ability to solve problems, or to fashion products, that are valued in one or more cultural or community settings" (p. 7). At that time, he identified seven distinct intelligences: linguistic, logical-mathematical, spatial, musical, bodily-kinesthetic, interpersonal and intrapersonal, noting that it was probable that additional intelligences would later come to light.

Many educators embraced Gardner's theory of multiple intelligences as a means to improve student performance. For example, Lazear (1999) used this approach to improve classroom instructional methods. Lazear stated that just identifying students' predominant intelligences is not enough. Instead, teachers should actively develop these intelligences. Therefore, Lazear formulated various exercises and methods to "enhance and amplify" (p. 1) each intelligence. Furthermore, Lazear developed specific transfer strategies whereby one intelligence becomes the basis of learning in many content areas.

Various other authors have also attempted to use multiple intelligence theory to improve the literacy of students. For example, Silver, Strong, and Perini (2000) use their strategy of "translation" wherein a student uses a strong intelligence to "support learning in a weaker intelligence" (p. 17). A few examples given include teaching vocabulary by defining words with drawings or pictures (visual intelligence) and teaching grammar through creating songs (musical intelligence).

The GED has a writing component wherein the examinee must compose an essay on a selected topic in a given amount of time. Therefore, just as learning styles and multiple intelligences should be considered in the reading process, so should they also be considered in the writing process. Tucker (1995), an English teacher, observed the differing approaches to writing in his 11<sup>th</sup> grade expository writing class. Tucker found that the linguistic learner followed the usually taught pattern of writing: draft, revise, edit, and publish. However, the visual-spatial learners in his classroom could not follow this process. Instead, in what appeared at first glance to be procrastination, the visual-spatial learners spent a great amount of time in a lengthy process of visualizing the entire paper

before actually beginning to write. Furthermore, these learners could not, except with extreme difficulty and reluctance, make editing notations on their papers. Instead, they would completely rewrite the entire paper for each mistake.

Another teacher, Rubado (2002) used the theory of multiple intelligences to help her students gain control over their learning environment, thus increasing confidence in their scholastic ability. Although not eligible for special education services, the middle school students in her classroom were at risk of dropping out as soon as they were old enough because of academic failure and disengagement with education. Starting from the assumption that each individual possesses all eight intelligences to varying degrees, Rubado focused a portion of her curriculum on teaching the theories to her students, having them design learning activities involving the different intelligences. While not a research study with resulting empirical evidence, Rubado observed that her students began making more informed choices both about their school assignments and in their choices of working partners in cooperative learning.

Since a large majority in the prospective research group will probably be African American, it is necessary to consider any innate learning style differences in the African American population. This is, obviously, a topic that must be considered with care as accusations of stereotyping may result from the question. However, in looking at research done by African Americans researchers on African American students, one finds the possibility of differing learning styles being addressed. Cureton (2005), when studying beginning reading classrooms of inner-city African Americans, found that although these children may lack what is considered to be innate motivational behavior, they do evince strong teacher motivation. Cureton also noted that successful teachers in

this setting used lessons with physical and oral involvement with learning. Shade (2005) suggested that African American survival history has mandated learning strategies that are intuitive and person oriented rather than analytic and object oriented as is customary in traditional school settings.

Silver, Strong, and Perini (1997) feel that learning style theory and multiple intelligence theory are complementary in that each “responds to the weaknesses of the other” (p.59). “Without multiple intelligence theory, style is rather abstract . . . Without learning styles, multiple intelligence theory proves unable to describe different processes of thought and feeling” (p. 59). By incorporating both theories into classroom practice, the classroom experience can become a place that “respects and celebrates diversity and provides . . . the tools to meet high standards” of achievement (p. 61). This sentiment is echoed by Wilson (1998) who, in reviewing the literature on learning styles, concluded that “Awareness of learning styles and skill in utilization of instructional methods . . . will give teachers a wide array of techniques to use in promoting student learning” (p. 14).

### Conclusion

Hippocrates famously said, “First, do no harm.” One can argue that traditional classroom methods have harmed many students by ignoring their individuality and attempting to fit everyone into the standard academic mold. This has too often caused students to feel disengaged from the school setting and resulted in poor performance. If by incorporating learning style and multiple intelligence theories into classroom practice, this research project can once again engage students in learning, then the battle is, at least, begun. Once students are motivated, care about their academic

advancement, and feel that school is a valuable resource for their lives, they may realize that their goals are attainable and decide to give education a second chance.

## METHODOLOGY

### Participants

This action research project targeted the 17 – 20 year old, pre-GED student, whose reading or math scores fell between the 4.0 – 7.0 grade levels. During the 05-06 school year, 135 students entered the Richland One Adult Education program at this level. Of that number 52 tested out of that level at the end of the course (Advantage Pro Custom South Carolina Database, 2006). This report also showed that 79 students separated before completion of the course with the remaining 4 students continuing in the program. It was this representative 79 students (58% of the total enrollment in this substrata) that were the subject of this research project. Of the total number of students last year, nearly 90% were African-American and slightly more than 60% were female.

During the allotted research period, 16 students entered this pre-GED classroom. However, 10 of these students stopped attending before the end of the semester, leaving only 6 students who completed post testing and post surveys. These 6 students, all males, formed the participants for the conclusions of this research project. Since the number of participants was limited and since adult education always attempts to address and remediate individual student deficiencies, a detailed summary of each individual's history and findings is relevant. All names of students used herein are fictitious.

Student Number one, Robert, was a 17 year old black male who had attended high school for three years and accumulated 13.5 of the 24 credits required for a South Carolina high school diploma. His TABE Level D pretest showed him reading at the 7.8 grade level and his TABE Level M pretest revealed a 5.8 math level.

Student Two, Corey, was a 17 year old black male who had attended high school three years but had only accumulated three credits. His pretest TABE scores, both at the D Level, showed his reading level at 6.2 and his math level at 2.7. Corey elected only to attend the two days out of the week when math instruction was scheduled.

Student Three, Thomas, was a 17 year old black male who had attended high school for only one year, having been retained several years at the middle school level. His reading score on TABE Level D was 6.2 and his math score on Level D was 9.5.

Student Four, Ricardo, was a 17 year old black male who had attended high school for two years and had earned 8.5 credits. His entry level reading score on TABE Level M was 5.2 and his entry math score on Level M was 6.1.

Student Five, Sam, was a 20 year old white male who reported that he had left school in the ninth grade. No transcript was obtained from his previous school. His entry level scores on TABE Level M were 4.8 in reading and 3.9 in math.

Student Six, Brandon, was an 18 year old black male who had attended high school for four years but who had only earned 10 credits. His entry level scores on TABE Level M were 3.5 and 5.3 for reading and math respectively.

Students met for GED math and language arts instruction for one and one-half hours each afternoon, four days a week, at the adult education facility. Adult Education in Richland County practices an open enrollment/open exit policy. Therefore, some of these students attended class for nearly the entire semester while others began class toward the end of the research period. Also, in adult education, teachers often teach more than one area of study at any given time, and at times other students engaged in other course studies were in the classroom.

As the pre-GED program ran on a semester schedule, students were not allowed to participate in this action research project unless they entered class with a minimum of four weeks of instruction time left.

### Materials

Before being scheduled into GED classes at Richland One Adult Education, students must take standardized tests to determine their approximate achievement levels in reading and math. Prior to these actual tests, a TABE Locator is administered to determine the appropriate testing materials. TABE tests are designed at four academic levels: E is designed for those students whose locator results show them working at the 2– 3.9 grade level; M is for those students whose locator results show them working at the 4.0 – 5.9 grade level, D is for those students whose locator results show them working at the 6.0 – 8.9 grade level, and A is for those students whose locator results show them working at 9.0 – 12.9 grade level (CTB/McGraw-Hill, 2006, Survey 9 & 10 Section). Students were pre-tested using Form 7 at the appropriate level of the Test of Adult Basic Education (TABE) and post tested using Form 8 of the appropriate level. These assessment instruments also provided data analysis on areas of weaknesses.

To gather data for this research project, a modified version of the Dunn and Dunn Learning Style Inventory (Appendix C) and a multiple intelligence survey excerpted from the works of Thomas Armstrong (1994) (Appendix D) were administered to give both the students and the teacher insights into optimum learning environments. Additionally, students' global/analytic preferences were determined by administration of the Basic Assessment of Cognitive Organization (Bickley, 1985). A post survey (Appendix A) asked students if there had been any impact on their learning due to an awareness of their

individual learning styles and multiple intelligences. This post survey also asked students to gauge whether or not they considered this classroom experience beneficial and to identify which instructional techniques had, in their opinion, been most useful.

It was stressed to the students that the Learning Styles Inventory, the multiple-intelligence inventory and the Basic Assessment of Cognitive Organization were all informational surveys only. Students were also informed that the results would be given to them and that both they and the teacher could use this information to optimize their learning. The teacher discussed the results of these surveys with the individual students and provided them with a list of possible study methods that the survey results indicated would be most beneficial to them individually. Additionally, the teacher provided each student a summary of his/her individual learning style (Appendix B).

Students had at their disposal a computerized pre-GED instructional program and various high interest books on tape, as well as an assortment of language arts and mathematics materials written at the appropriate grade level but designed with the adult learner in mind.

#### Procedures

The semester study was qualitative in nature and was based on surveys, teacher observations, and student input. Quantitative data was referenced, but no statistical analysis on the data was performed.

In addition to collecting the items mentioned above, the teacher kept observational notes on individual students, noting their responses to varying classroom activities and instructional methods. Particular attention and guidance were given to students' use of their identified learning styles. Reflections on their reading processes

were also informally incorporated into teacher-student discussions. The underlying message was student engagement in the learning process.

### Analysis

All information from tests, surveys, teacher observations, and exit interviews were inductively analyzed to seek out specific patterns of change in student attitudes and achievement.

## FINDINGS

South Carolina, as well as other states, has experienced a growing number of dropouts from its traditional educational system, and adult education services have expanded to meet this need. At present, Richland One Adult Education offers a variety of GED classes designed to match both student ages and ability levels. Therefore, separate classes exist for the younger (17-21) students and for the more mature adult (>21 year of age). Although all students aged 17 or above are classified as adult learners according to the federal government, past experience has shown that mixing older adults with younger adults proved counterproductive to both groups in that the older adults were often exasperated by the behavior of the younger students while the younger students often felt out of place with the older students. Additionally, it has been found that, particularly among the younger population, grouping by achievement level is more effective because instruction can be better targeted. Thus, Richland One offers various levels of GED instruction. If a mature adult with a reading level below fourth grade enters adult education, he or she is placed in a literacy class with other mature adults. To avoid wide disparities in age grouping and the stigma often associated with "literacy," a younger student is placed in a class referred to as Skills Enhancement. Many of the students in this classroom also receive special education services. If a student's reading level falls between 4.0 and 7.0 grade level, he or she is placed in an age appropriate class designated as pre-GED. For those students scoring between 7.0 and 9.0 grade level in reading, separate, age appropriate GED classes exist. Finally, for those students either entering with or obtaining a reading level of 9.0 and above, a separate FastTrack GED class has been designed. This class, running in three-week sessions, has been designed to

give intensive test preparation for the actual GED test, and it is entry into this class that students strive to obtain. This scaffolded approach has been in effect in Richland One for the last three years and, as the reputation of the FastTrack program has grown, so has the number of students entering the GED program. During the 2005-2006 school year, 1,942 students entered the Richland One Adult Education GED program with 262 of these students successfully obtaining their GED credentials (Advantage Pro Custom South Carolina Database, 2006). Although this percentage of success is less than 15% and may, at first glance, appear paltry, Richland One Adult Education had the highest number of GED graduates in the state (South Carolina Department of Education, 2006). Regardless of the relative success experienced in the Richland One GED program, the fact remains that approximately 85% of the students who entered the program with the expressed desire to obtain their GED credentials did not meet this goal. Most of these students entered at academic achievement levels below those needed for successful GED attainment (Advantage Pro Custom South Carolina Database, 2006).

One of the most disheartening occurrences in adult education is the poor retention of students. In fact, students who seem to be actively engaged in their learning and are attending regularly will suddenly quit attending. In the past, various follow-up attempts have been made to ascertain reasons for these sudden departures and to encourage students to return. However, little success has been realized from these follow-up contacts. Therefore, improving both effective instruction and student retention in the GED program remains a high priority.

One of the hopes of this research project was to keep students more actively engaged in their learning process by introducing learning styles and multiple intelligence

theory. Unfortunately, this hope was not realized. In fact, nearly two-thirds of the students who enrolled stopped attending before the end of the semester. Although all students who did remain for the course work experienced academic gains (Table One), it remains, at best, unclear if incorporating this information had any noticeable effect on student attitude or achievement. No student reported in the exit survey that this knowledge had affected their behavior or academic success. Except for expressions of mild interest when their individual learning styles were presented to them after administration of the various inventories, students seemed to quickly dismiss the information or comment that there was nothing new or pertinent to their current situation.

Table One -Pre and Post Test Scores of Participants

Student	Reading Pre-Test Form/Level	Reading Post-Test Form/ Level	Math Pre-Test Form/level	Math Post-Test Form/Level	Comments
Sam	M/4.8	D/7.8	M/3.9	M/6.4	Extra time given on reading
Thomas	D/6.2	D/8.5	D/9.5	n/a	Extra time given on reading
Corey	D/6.2	n/a	M/2.7	M/4.4	
Brandon	M/3.5	M/6.2	M/5.3	M/6.9	Extra time given on reading
Ricardo	M/5.2	M/6.6	M/6.2	D/8.7	
Robert	D/7.8	D/12.9	M/5.8	D/6.8	

All classrooms in adult education work on the premise that the student-teacher relationship is one of mutual respect. Classrooms are informal by design, and students are treated as adult learners. Since behavior problems are rare, teachers can concentrate on motivating students and supplying content. Therefore, when the Dunn and Dunn Learning Style Inventory indicated that students needed mobility or informal design or

that students required food or drink intake while studying, the normal classroom setting accommodated these preferences. For the purposes of this study, no classroom modifications were made except that half of the classroom lights were not turned on so that students could elect to sit in the area of the classroom that was most agreeable. All students commented favorably on the classroom atmosphere in their exit surveys.

As mentioned in the research by Knowles (1980), adult students usually have defined objectives in returning to school and little patience with any activities perceived to be unconnected to these objectives. This attitude was evident throughout this instruction period. Students were totally resistant to any deviation away from standard teaching materials on the grounds that “this wouldn’t be on the test.” For the most part, students were resistant to any teaching materials that were not designated by title as being GED preparation materials. When the instructor/researcher requested them to complete the surveys on their learning styles and multiple intelligences, many students displayed reluctance and felt that the surveys were too time consuming. Furthermore, some students were openly suspicious of the global/analytic survey, assuming that it contained “trick” questions that had right or wrong answers, regardless of the instructor/researcher’s assurances to the contrary.

As one of the defining characteristics of drop-outs is a faulty locus of control (Entwisle, Alexander, & Olson, 2004), one facet consciously addressed in the classroom methodology was allowing students a great deal of freedom in choosing specific items of study. This, of course, required individualized instruction which was accomplished by computer-assisted instruction and assignments based on the item analysis from the TABE

pretest. All students responded favorably to this individualized instruction method on the exit surveys.

As noted by Lan and Lanthier (2003), students who have dropped out of school have poor motivation, low self-esteem and substandard academic performance. Although only one of these students had not been attending school during the previous year, all were significantly behind in grade level. However, the observable self-esteem attributes of these students varied widely. Samuel, who was the oldest student and had been disconnected from the school system for several years, evinced the most notable esteem issues in his math work. In fact, the instructor/researcher could easily observe Samuel's poor self-esteem during math class as he became noticeably agitated and nervous whenever the teacher approached his desk while he was doing math work. Only after Samuel had been attending for several weeks did he relax enough to be receptive to individual instruction. Thomas, also, suffered from poor self-esteem. He exhibited classic "he doth protest too much" comments concerning his reading work, often making sure the instructor understood that his failure to correctly answer a question was not because of any reading deficiency but because the "question was unclear," or "he was just skimming and not paying attention." Corey, on the other hand, although one of the academically lowest in the class, felt ready to take the GED test at the end of the semester and after only 11 hours of instruction. He felt that his 6.2 reading level was adequate and that since he had progressed in math from a 2.7 grade level to a 4.4 grade level, he was sufficiently prepared.

Contrary to expectations, one instructional technique that was designed to promote readers' self-esteem and increase reading comprehension was rejected as being a

waste of time by all students. This involved allowing students to self-select high-interest novels on their own reading levels and listen to the books on tape if they desired to do so. Although the instructor/researcher implemented this early in the semester, it was soon abandoned as it became increasingly evident that the students found this to be a chore with no purpose. Once again, their comments centered around it “not being on the test.”

As each of these students expressed visual and auditory learning style preferences, much instruction was direct with the instructor/researcher outlining the steps in organization of written texts through graphic organizers. This apparently appealed to the logical/mathematical learners in the classroom as each rated this instructional technique as being “very valuable.”

Although the students themselves seemed to find little value in knowing their own learning styles and multiple intelligences, this information did prove valuable to the instructor/researcher both in developing teaching strategies and in exploring students’ learning deficiencies. Three students, Ricardo, Corey, and Robert, were quite adept at following math concept explanations and in performing mental math. Ricardo, in fact, was able to perform quite advanced algebraic word problems mentally if given enough time. Each of these students had shown strong logical/mathematic ability on the multiple intelligence survey, and the instructor/researcher was, at first, perplexed at their failure to reflect this ability in their achievement. This disparity was soon discovered to be due to each individual having gaps in basic knowledge and mastery of mathematical processes. In fact, Ricardo, who had long depended on his innate mathematical ability, continued to rely on this innate ability for quite some time, only realizing late in the semester that he really needed to master the math processes to assure better testing scores. In this

instance, paradoxically, a strong logical/mathematical intelligence had been relied on too heavily with resulting achievement deficiencies.

When the global/analytic inventory was administered to these students, it was found that three of the students were predominantly analytic, two were global and one was basically in the middle of the spectrum. Although prior research (Matthews, 1996 & Philbin, et al., 1995) indicated that those students with strong analytical tendencies are most successful in traditional schooling, the experience of this project suggests that a lack of global understanding may, in certain instances, hinder academic achievement, thus, to some degree validating Riding's (1993) research that an extreme analytical learning style can often be detrimental. Both Thomas and Samuel exhibited extremely strong analytical tendencies but each, in his specific way, had academic deficiencies which could possibly be attributed to this processing style. Samuel, as noted previously, was unable to follow any classroom discussions on mathematical concepts. He was also completely unable to do any mental math beyond the most elemental, not seeing relationships and logical progressions as the rest of the class was easily able to do. Thomas, on the other hand, was quite good at math and in finding details in reading assignments but was often unable to grasp the author's purpose and main idea in written text.

As noted in the research by Cureton (2005), African American students in the early elementary grades evince strong teacher motivation. This precept held true in this study as four of the five African American students rated themselves as highly teacher-motivated with the fifth rating himself somewhat teacher motivated.

Interestingly, on the Dunn and Dunn Learning Inventory, four of the six students rated themselves persistent in their study habits and three considered themselves to be

independent learners. However, when examining preliminary data on the students who had started the class and dropped out, it was found that the majority of these students also considered themselves to be persistent and independent learners, leading one to believe that students may not accurately assess their motivation. Concerning the students who did complete the semester, teacher observation confirmed the students' self-assessments on this attribute, including Corey's self-assessment that he was not persistent. Corey, as it turned out, was the only student who had to be reminded to "stay on task."

One student, Robert, did test out of the class, obtaining a reading level score of 12.9 on the TABE. Robert attempted to attend the FastTrack session but due to scheduling conflicts was unable to do so. He elected to take the GED test in November and passed four of the five sections. He will retake the writing section of the GED test in February, 2007. Ricardo also elected to take the GED test in December although his reading scores did not indicate that he was ready to do so. To date, his scores have not been returned.

In summary, the students in this research project all experienced academic gains in their areas of study although little evidence exists that indicates exposure to and knowledge of their individual learning styles was influential in these gains. However, the teacher, for instructional purposes, was able to use information from these instruments to better understand the students and to, therefore, target instructional methods more effectively.

## DISCUSSION

### Overview of the Study

This research project sought to increase academic progress and retention in a pre-GED classroom by incorporating student awareness of learning styles and multiple intelligences.

### Summary of Findings

No direct evidence supported the hypothesis of this research project. Students reported that knowledge of learning styles and multiple intelligences had no effect on their academic performance. However, the instructor was able to use information about learning styles and multiple intelligences to assist students.

### Limitations of the Study

Obviously, the number of students who completed all parts of this research project was extremely limited. Therefore, any conclusions are not validated by large amounts of data.

Also, the Dunn and Dunn Learning Inventory used in this project was an abbreviated one and was hand scored by the researcher. As such, it may not be as accurate as the complete survey. When student responses to the survey indicated opposite answers to what was, in effect, the same question, the researcher had no basis for determining which response was a true representation of the student's preference.

### Conclusions

Perhaps the most obvious conclusion to this research project is that it demonstrates the futility of making broad generalizations about the adult education student. Even when considering the very small number of participants, for every

individual that filled a pigeon hole, another emptied it. Some suffered from poor self esteem, others didn't. Some, although inherently mathematically talented, had failed to grasp basic mathematical procedures. The one student who didn't acknowledge strong teacher motivation showed the strongest gains of any student in the class. The majority of the students who, at the beginning of the semester rated themselves as being persistent, dropped out, some after attending only one or two class sessions. Two of the students with the most observable low self-esteem, persisted.

The incorporation of learning styles and multiple intelligence theory into the classroom had little discernable effect on either student attitudes or achievement. The teacher/instructor did, however, find this information valuable as it helped to individualize instruction and increase understanding of student thought processes.

#### Recommendations

As long as students enter GED classes with the sole aim of passing a specific test, they may be reluctant to explore topics that are not test-related. However, any information about the students' learning processes can be instructionally valuable, particularly in pinpointing individual quirks in learning.

One point that should be addressed early on in the classroom is having students set realistic goals. Students must realize that spending a few weeks in a classroom, no matter how hard they work or how individualized the instruction, will not overnight remediate years of deficiencies in learning. Perhaps this is where the true value of teaching learning styles and multiple intelligences can have the most effect. If students set realistic goals, maybe they would allow themselves time to explore their learning styles and multiple intelligences.

## REFERENCES

- Advantage Pro Custom South Carolina Data Base. (2006). Table 5. Retrieved July 1, 2006 from Advantage Pro Custom South Carolina Database.
- Armstrong, T. (2003). *The multiple intelligences of reading and writing: Making the words come alive*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Armstrong, T. (1994). *Multiple intelligences in the classroom*. (Excerpted from). Alexandria, VA: Association for Supervision and Curriculum Development. Retrieved on November 7, 2006 from [http://www.spannj.org/BasicRights/appendix\\_b.htm](http://www.spannj.org/BasicRights/appendix_b.htm)
- Bickley, A.C. (1985). *Basic assessment of cognitive organization*. 2006 Handout in EDU 732, Master's in Divergent Learning Program, Columbia College, Columbia, SC.
- Brown B. L. (2003) Teaching style vs. learning style. Myths and realities. Office of Educational Research and Improvement, Report no. 26. (ERIC Document Reproduction Service No. ED482329)
- CTB/McGraw-Hill. (2006). Tests of Adult Basic Education (TABE): Forms 9 & 10. Retrieved January 1, 2007 from [http://www.ctb.com/products/product\\_detail.jsp?FOLDER%3C%3Efolder\\_id=1408474395247195](http://www.ctb.com/products/product_detail.jsp?FOLDER%3C%3Efolder_id=1408474395247195)
- Caldwell, G. P., & Ginthier, D. W. (1996). Differences in learning styles of low socioeconomic status for low and high achievers. *Education 117* (1), 141-147. Retrieved July 9, 2006 from Expanded Academic ASAP database.

- Carbo, M. (1996). Reading styles: High gains for the bottom third. *Educational Leadership*, 53 (5), 8-13. Retrieved July 14, 2006 from Expanded Academic ASAP database.
- Carbo, M., Dunn, R., & Dunn, K. (1991). *Teaching students to read through their individual learning styles*. Needom Heights, MA: Allyn & Bacon.
- Claxton, C. S., & Murrell, P. H. (1988). Learning styles. *Eric Digest*. (ERIC Document Reproduction Service No. ED301143)
- Cureton, G. O. (2005). Afro-American cognitive style: A variable in school success? In Hammond, B., Hoover, M., & McPhail, I. (Eds.). *Teaching African American learners to read: Perspectives and practices* (pp. 59-65). Newark, DE: International Reading Association.
- Dunn, R., & Dunn, K. (1978). *Teaching students through their individual learning styles: A practical approach*. Reston, VA: Reston Publishing.
- Dunn, R., & Dunn, K. (n.d.). Learning style inventory (modified). 2006 Handout in EDU 745, Master's in Divergent Learning Program, Columbia College, Columbia, SC.
- Economic Policy Institute. (2006). *Economic Snapshots*. Retrieved July 14, 2006 from [http://www.epi.org/content.efm/webfeatures\\_snapshots\\_20060705](http://www.epi.org/content.efm/webfeatures_snapshots_20060705)
- Entwisle, D. R., Alexander, K. L., & Olson, L. S. (2004). Temporary as compared to permanent high school dropout. *Social Forces*, 82, 1181-2006. Retrieved July 2, 2006 from Expanded Academic ASAP database.
- Gardner, H. (1993). *Multiple intelligences: The theory in practice*. New York: Basic Books.

- Griffin, B. W. (2002). Academic disidentification, race, and high school dropouts. *High School Journal*, 85 (4), 71-81. Retrieved July 7, 2006 from Expanded Academic ASAP database.
- Heimlich, J. E., & Norland, E. (2002). Teaching style: Where are we now? *New Directions for Adult & Continuing Education*. Spring 2002, 17-25. Retrieved October 1, 2006 from Academic Search Premier.
- Hunt, S. K. (1995, November). Learning the hard way: Learning styles and at-risk populations. Paper presented at the annual meeting of the Speech Communication Association. (Eric Document Reproduction Service No.ED391196)
- Jackson-Allen, J., & Christenberry, N. J. (1994, November). Learning style preferences of low- and high-achieving young African-American males. Paper presented at the annual meeting of the Mid-South Educational Research Association, Nashville, TN. (ERIC Document Reproduction Service No. ED387758)
- Knowles, M. S. (1980). *The Modern Practice of Adult Education*. Chicago, IL: Follet Publishing Company.
- Lan, W., & Lanthier, R. C. (2003). Changes in student academic performance and perception of school and self before dropping out of school. *Journal of Education for Students Placed at Risk*, 8 (3), 309-332. Retrieved July 1, 2006 from [http://www.leaonline.com/doi/abs/10.1207/S15327671ESPR0803\\_2?journalCode=espr](http://www.leaonline.com/doi/abs/10.1207/S15327671ESPR0803_2?journalCode=espr)
- Lazear, E. (1999). *Eight ways of knowing: Teaching for multiple intelligences* (3<sup>rd</sup> ed.). Arlington Heights, IL: Skylight Training and Publishing, Inc.

- Matthews, D. B. (1996). An investigation of learning styles and perceived academic achievement for high school students (Special issue: Young adolescents at risk). *The Clearing House*, 69 (4), 249-254. Retrieved July 9, 2006 from Expanded Academic ASAP database.
- Miller, C.A., Fitch, T., & Marshall, J. L. (2003). Locus of control and at-risk youth: A comparison of regular education high school students and students in alternative schools. *Education*, 123 (3), 548-552. Retrieved June 15, 2006 from Expanded Academic ASAP database.
- Murray, M. D. (2002). Learning style modalities and attributes of an effective classroom environment: An analysis of adult learners in an adult basic education classroom. Unpublished master's thesis, Brooklyn College, New York, New York. (ERIC Document Reproduction Service No. ED478646)
- Nowicki, W., Jr., Duke, M. P., Susney, S., Stricker, B., & Tyler, A. M. (2004). Reducing the drop-out rates of at-risk students: The effective learning program (ELP). *Genetic, Social, and General Psychology Monographs*, 130 (3), 225-239. Retrieved July 7, 2006 from Expanded Academic ASAP database.
- Philbin, M., Meier, E., Huffman, S., & Boverie, P. (1995). A survey of gender and learning styles. *Sex Roles: A Journal of Research*, 32(7), 485-494. Retrieved October 1, 2006 from Academic ASAP database.

- Riding, R., & Caine, T. (1993). Cognitive style and GCSE performance in mathematics, English language and French. *Educational Psychology: An International Journal of Experimental Educational Psychology*, 13(1), 59-67. (ERIC Document Reproduction Service No. EJ480295)
- Rubado, K. (2002). Empowering students through multiple intelligences. *Reclaiming Children and Youth*, 10 (4), 233-235. Retrieved July 10, 2006 from Expanded Academic ASAP database.
- Shade, B. J. (2005). Afro-American cognitive style: A variable in school success? In Hammond, B., Hoover, M., & McPhail, I. (Eds.). *Teaching African American learners to read: Perspectives and practices* (pp. 200-232). Newark, DE: International Reading Association.
- Silver, H. F., Strong, R. W., & Perini, M. J. (1997). Integrating learning styles and multiple intelligences. *Educational Leadership*, (55)1, 22-27. Retrieved October 1, 2006 from Academic Search Premier.
- Silver, H. F., Strong, R. W., & Perini, M. J. (2000). *So each may learn: Integrating learning styles and multiple intelligences*. Alexandria, VA: Association for Supervision and Curriculum Development.
- South Carolina Adult Education. (2006). *Adult Ed Statistics; Adult Literacy Census 1990 and 2000 Table*. Retrieved July 14, 2006 from <http://www.sclrc.org/census.htm>
- South Carolina Adult Education. (2006). *The state of literacy in America*. Retrieved July 14, 2006 from <http://www.sclrc.org/NalsNarrative.htm>

- South Carolina Department of Education. South Carolina Department of Education (2006). *Fourth annual "Celebrating our success" luncheon* [Brochure]. Columbia, SC: Office of Adult and Community Education (2006). *Fourth annual "celebrating our success" luncheon* [Brochure]. Columbia, SC: Office of Adult and Community Education.
- South Carolina Department of Education. (2003). Report on Student Dropout and Completion Rates 2000-2001. Retrieved July 14, 2006 from [http://ed.sc.gov/agency/offices/ssys/alternative\\_education/dropout/Statedropoutreport.pdf](http://ed.sc.gov/agency/offices/ssys/alternative_education/dropout/Statedropoutreport.pdf)
- Stahl, S. S. (1999). A critique of learning styles. *American Educator*, 23 (3), 27-31. Retrieved July 10, 2006 from [http://www.aft.org/pubs-reports/american\\_educator/fall99/DiffStrokes.pdf](http://www.aft.org/pubs-reports/american_educator/fall99/DiffStrokes.pdf)
- Tucker, B. (1995). Minds of their own: Visualizers compose. *English Journal*, 84 (8), 27-31. Brown, B. L. (2003) Teaching style vs. learning style. myths and realities. Office of Educational Research and Improvement, Report No. 26. (ERIC Document Reproduction Service No. ED482329)
- Warren, P. E. (2001). The effect of matched learning styles and instructional methods on student achievement. Unpublished master's thesis, Columbia College, Columbia, SC.
- Wilson, V. C. (1998). Learning how they learn. (ERIC Document Reproduction Service No. ED 427017). Retrieved October 1, 2006 from ERIC database.

## APPENDIXES

APPENDIX A

Exit Survey

## Exit Survey

Name: \_\_\_\_\_

1. What have you learned about your learning styles and multiple intelligences?
2. Has knowing about your learning style and multiple intelligences helped you understand your learning process better? Explain:
3. Do you consciously think about your learning style when you are studying or trying to learn new information? How do you use the insights into your learning styles to help you be more successful in your school work?
4. Several methods used in this class were designed to help you tap into your learning style. Please rate the following methods.

	Helped a lot	Helped a little	Didn't help
Oral reading of materials	_____	_____	_____
Books on tape	_____	_____	_____
Computer lessons	_____	_____	_____
Direct instruction	_____	_____	_____
Working individually	_____	_____	_____
Working with other students	_____	_____	_____
Graphic organizers	_____	_____	_____
Studying graphs/charts	_____	_____	_____
Atmosphere of classroom	_____	_____	_____

5. Overall, how would you rate your education advancement in this class?

Learned quite a lot \_\_\_\_\_  
Learned a little bit \_\_\_\_\_  
Didn't learn much at all \_\_\_\_\_

6. Has this class influenced your desire to continue your education in any way? Why or why not?

## APPENDIX B

### Individual Learning Style Report (Sample)

INDIVIDUAL LEARNING STYLE RESULT FOR (name withheld)

(Name withheld), in many ways you are a student who has functioned well in the traditional classroom setting. You learn best when things are relatively quiet and lights are on. You learn mainly visually but could also benefit from using your kinesthetic abilities to help you learn new material. You are strongly analytical and probably prefer to have new information presented to you in a logical, step-by-step order. From reviewing your reading and math scores, I am inclined to believe that you got tired during the initial testing we did with you when you entered adult education. Learn to stay focused for longer and longer periods of time.

## APPENDIX C

### Dunn & Dunn Learning Style Inventory (modified)

## LEARNING STYLE INVENTORY

Pretend that you have a difficult school assignment to study as you consider the following. Mark answers true or false. There are no “right” or “wrong” answers.

1. I study best when it is quiet.
2. I like studying with lots of light.
3. I like to be told exactly what to do.
4. I study best at a table or desk.
5. When I study I like to sit on a soft chair or couch.
6. I like to study with one or two friends.
7. I am able to study best in the morning.
8. I often have trouble finishing everything I ought to do.
9. I have to be reminded often to do something.
10. I like making my teacher proud of me.
11. I study best when the lights are dim.
12. When I really have a lot of studying to do I like to work alone.
13. I do not eat or drink or chew while I study.
14. I like to sit on a hard chair when I study.
15. The things I remember best are the things I read.
16. I think better when I eat while I study.
17. I often nibble something as I study.
18. It's hard for me to sit in one place for a long time.
19. I remember things best when I study them early in the morning.
20. I really like people to talk to me.
21. I hardly ever finish all my work.
22. I usually start my homework in the afternoon.
23. I like to feel inside what I learn.
24. Sound usually keeps me from concentrating.
25. If I have to learn something new, I like to learn about it by having it told to me.
26. At home I usually study under a shaded lamp while the rest of the room is dim.
27. I really like to do experiments.
28. I like to sit on carpeting or rugs when I study.
29. I think my teacher feels good when I do well in school.
30. I have to be reminded often to do something.
31. I really like to watch television.
32. I can block out sound when I work.
33. I like to learn most by building, baking or doing things.
34. I usually finish my homework.
35. If I could go to school anytime during the day, I would choose to go in the early morning.
36. It is hard for me to get things done just before lunch.
37. It is easy for me to remember what I learn when I feel it inside of me.
38. I like my teacher to check my school work.
39. I enjoy learning by going places.

40. When I really have a lot of studying to do I like to work alone.
41. I really like to draw, color, or trace things.
42. The things I remember best are the things I hear.
43. I remember things best when I study them in the afternoon.
44. I really like to shape things with my hands.
45. When I study I put on many lights.
46. I like to eat or drink, or chew while I study.
47. When I really have a lot of studying to do I like to work with a group of friends.
48. I remember things best when I study them early in the morning.
49. I can sit in one place for a long time.
50. I often forget to do or finish my homework.
51. I like to make things as I learn.
52. I can think best in the evening.
53. I think best just before lunch.
54. The things I like doing best in school I do with friends.
55. Late morning is the best time for me to study.
56. I like to learn most by building, baking or doing things.
57. I often get tired of doing things and want to start something new.
58. I like to be able to move and experience the motion and the feel of what I study.
59. When I really have a lot of studying to do I like to work with two friends.
60. I like to learn through real experiences.
61. If I could go to school anytime during the day, I would choose to go in the early morning.
62. I can ignore most sound when I study.
63. If I have to learn something new, I like to learn about it by seeing a filmstrip or film.
64. I study best near lunchtime.
65. I really like to listen to people talk.
66. I often eat something while I study.
67. I enjoy being with friends when I study.
68. It's hard for me to sit in one place for a long time.
69. I remember things best when I study them before evening.
70. I think my teacher wants me to get good grades.
71. I really like to build things.
72. I can study best in the afternoon.
73. Sound bothers me when I am studying.
74. When I really have a lot of studying to do I like to work with two friends.
75. When I can, I do my homework in the afternoon.

**1. Sound**

High	Low
1-F	1-T
24-F	24-T
32-T	32-F
62-T	62-F
73-F	73-T

**2. Light**

High	Low
2-T	2-F
11-F	11-T
26-F	26-T
45-T	45-F

**3. Formal Design**

High	Low
4-T	4-F
5-F	5-T
14-T	14-F
28-F	28-T

**4. Persistent**

High	Low
8-F	8-T
9-F	9-T
21-F	21-T
30-F	30-T
34-T	34-F
50-F	50-T
57-F	57-T

**5. Requires Intake**

High	Low
13-F	13-T
16-T	16-F
17-T	17-F
46-T	46-F
66-T	66-F

**6. Needs Mobility**

High	Low
18-T	18-F
49-F	49-T
68-T	68-F

**7. Teacher Motivated**

High	Low
3-T	3-F
10-T	10-F
29-T	29-F
38-T	38-F
70-T	70-F

**8. Independent Learner**

High	Low
12-T	12-F
23-T	23-F
37-T	37-F
40-T	40-F

**9. Peer Oriented**

High	Low
6-T	6-F
47-T	47-F
54-T	54-F
59-T	59-F
67-T	67-F
74-T	74-F

**10. Auditory**

High	Low
20-T	20-F
25-T	25-F
42-T	42-F
65-T	65-F

**11. Visual**

High	Low
15-T	15-F
31-T	31-F
63-T	63-F

**12. Tactile**

High	Low
41-T	41-F
44-T	44-F
51-T	51-F
71-T	71-F

**13. Kinesthetic**

High	Low
27-T	27-F
33-T	33-F
39-T	39-F
56-T	56-F
58-T	58-F
60-T	60-F

**14. Function best in morning**

High	Low
7-T	7-F
19-T	19-F
35-T	35-F
48-T	48-F
61-T	61-F

**15. Functions best in late morning**

High	Low
36-F	36-T
53-T	53-F
55-T	55-F
64-T	64-F

**16. Functions best in afternoon**

High	Low
22-T	22-F
43-T	43-F
72-T	72-F
75-T	75-F

**17. Functions best in evening**

High	Low
52-T	52-F
69-F	69-T

APPENDIX D

Multiple Intelligence Test (excerpted from Armstrong)

## MULTIPLE INTELLIGENCE TEST

Where does your true intelligence lie? This quiz will tell you where you stand and what to do about it. Read each statement. If it expresses some characteristic of yours and sounds true for the most part, jot down a "T." If it doesn't mark an "F." If the statement is sometimes true, sometimes false, leave it blank.

1. \_\_\_\_\_ I'd rather draw a map than give someone verbal directions.
2. \_\_\_\_\_ I can play (or used to play) a musical instrument.
3. \_\_\_\_\_ I can associate music with my moods.
4. \_\_\_\_\_ I can add or multiply in my head.
5. \_\_\_\_\_ I like to work with calculators and computers.
6. \_\_\_\_\_ I pick up new dance steps fast.
7. \_\_\_\_\_ It's easy for me to say what I think in an argument or debate.
8. \_\_\_\_\_ I enjoy a good lecture, speech or sermon.
9. \_\_\_\_\_ I always know north from south no matter where I am.
10. \_\_\_\_\_ Life seems empty without music.
11. \_\_\_\_\_ I always understand the directions that come with new gadgets or appliances.
12. \_\_\_\_\_ I like to work puzzles and play games.
13. \_\_\_\_\_ Learning to ride a bike(or skates) was easy for me.
14. \_\_\_\_\_ I am irritated when I hear an argument or statement that sounds illogical.
15. \_\_\_\_\_ My sense of balance and coordination is good.
16. \_\_\_\_\_ I often see patterns and relationships between numbers faster and easier than others.
17. \_\_\_\_\_ I enjoy building models (or sculpting).
18. \_\_\_\_\_ I'm good at finding the fine points of word meanings.
19. \_\_\_\_\_ I can look at an object one way and see it sideways or backwards just as easily.
20. \_\_\_\_\_ I often connect a piece of music with some event in my life.
21. \_\_\_\_\_ I like to work with numbers and figures.
22. \_\_\_\_\_ Just looking at shapes of buildings and structures is pleasurable to me.
23. \_\_\_\_\_ I like to hum, whistle, and sing in the shower or when I'm alone.
24. \_\_\_\_\_ I'm good at athletics.
25. \_\_\_\_\_ I'd like to study the structure and logic of languages.
26. \_\_\_\_\_ I'm usually aware of the expression on my face.
27. \_\_\_\_\_ I'm sensitive to the expressions on other people's faces.
28. \_\_\_\_\_ I stay "in touch" with my moods. I have no trouble identifying them.
29. \_\_\_\_\_ I am sensitive to the moods of others.
30. \_\_\_\_\_ I have a good sense of what others think of me.

Place a check mark by each item you marked as “true.” Add your totals. A total of four in any of the categories A through E indicates strong ability. In categories G and G a score of one or more means you have abilities as well.

Linguistic	Logical-Mathematical	Musical	Spatial	Bodily-Kinesthetic	Intra-Personal	Inter-Personal
7.	4.	2.	1.	6.	26.	27.
8.	5.	3.	9.	13.	28.	29.
14.	12.	10.	11.	15.		30.
18.	16.	20.	19.	17.		
25.	21.	23.	22.	24.		
Total	Total	Total	Total	Total	Total	Total