

Utilizing Modality Theory to Achieve Academic Success

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Education accompanied by social mobility is the cornerstone of the American dream. Yet, each year scores of children, especially those from the underprivileged class, fail to meet even the most modest academic expectations and subsequently never reach their academic potential. This research rejects earlier explanations of academic failure and suggests that Modality theory, the idea that students differ in their ability to learn new and difficult material depending on the manner in which it is presented, may offer a viable strategy for facilitating academic success. Some research suggests that one specific form of modality- tactual/ kinesthetic presentations, demonstrates promise for improving academic achievement especially when employed with underachievers. This research explores the use of tactual/ kinesthetic teaching strategies with a group of underachieving 6th grade Bermudian children. It reveals that underachievers do, in fact, learn differently than other students and that the tactual / kinesthetic resources may promote a more positive attitude among the students leading to greater engagement with their education and subsequently improved cognitive achievement.

Introduction

Well over 20 years ago, a blue-ribbon presidential panel warned of a “rising tide of mediocrity” in education that threatened the very future of our nation. The study, [A Nation at Risk](#), revealed that verbal and math scores were on a dramatic decline and that functional illiteracy, the inability to engage in everyday reading and writing was increasing dramatically [National Commission on Excellence in Education, 1983]. Almost two and a half decades later, these same scores remain lower than they were thirty years ago, while; seven out of ten fourth graders in disadvantaged neighborhoods cannot read a

simple children's book The situation remains equally dismal on an international basis when we learn that our nation's 12 graders rank last in science [Ravitch, 2001]. Over the years, a number of interesting explanations have evolved which attempt to explain the apparent failure of the schools to promote excellence and equity in the educational experience.

Explaining School Failure

The anthropologist Oscar Lewis was one of the first to explain this discouraging failure by means of a "culture of poverty". His approach focuses on the sub-cultural values attributed to the poor and the manner in which they are socialized by their parents. It suggests that lower-class homes are both materially and culturally deprived and that children growing up in these homes lack the intellectual stimulation required for the development of intelligence and creativity [Lewis, 1966]. More recently, this cultural deprivation argument has been advanced to explain the "rising tide of mediocrity" in the schools by asserting that more economically disadvantaged children are remaining in school longer and that their presence has diluted overall assessment test scores [Sowell, 1993]. Others suggest that scores continue to decline because of limited school resources, especially in disadvantaged areas, as well as an accompanying "dummying down" of the curriculum that continues to pervade the education [Kozol, 1991]. Proponents of this perspective insist that an overall lack of resources, and the lowering of standards are essentially responsible for much of the negative outcomes in schools.

Still others suggest that educational structures operating within the schools are at least partially responsible for this negative outcome. Tracking, the practice of separating students according to ability and curriculum, has often been identified as one such structure which provides differential learning experiences for underachieving students most of whom are in lower tracks [Ansalone, 2000; Hoffer, 1992; Gamoran & Mare, 1989]. Research has uncovered that tracking denies lower track students the benefit of high quality instruction [Oakes, 1985;

Page, 1991], a limited curriculum and less positive teacher expectations for students in the lower track [Ansalone, 2000; Rist, 1979]. But educational delivery systems alone may not be totally responsible for academic success or failure and some research has also identified the importance of student attitude and engagement in learning, in addition to delivery systems, as prime factors in academic success [Carbonaro, 2005; Marks, 2000; Yair, 2000]. It may be likely that underachieving students learn differently than others and that delivery systems that engage them more actively in the learning process ultimately produce more positive outcomes. Current research has also uncovered that Tactual and Kinesthetic approaches to learning, which actively engages students in the learning experience, may produce more positive academic gains when employed with underachieving students [Brand, 1999; Glaser, 1994].

This study rejects earlier explanations of student failure based on cultural derivation and inadequate school resources. It suggests that educational structures, especially those, which engage students in their own learning experience, will also create a more positive attitude in students towards learning and ultimately provide students with an education that is both equal and excellent. In so doing, it asserts that the issue of academic failure lies less with the socio-cultural make-up of the student than with the educational delivery system, student attitude and intensity of student engagement in their own learning.

The Study

The idea that students differ in their ability to learn new and difficult material depending on modality, the means by which it is conveyed to them- by hearing, seeing, touching, etc. is an interesting one that has been debated over time. The current research investigates the impact of a tactual and kinesthetic delivery system on the social studies achievement of underachieving middle-school Bermudian students. The study also compares the students' attitudes towards learning by traditional methods versus the tactual/ kinesthetic approach. The

study is conducted on a population of 6th grade underachieving students attending a middle school in Bermuda.

The five middle schools of Bermuda have a total enrollment of approximately 1000 students and are divided into three levels including M1 (Grade 6), M2 (Grade 7) and M3 (Grade 8). In turn, each of these levels is divided into four classes. The participants for this investigation were students who attended one of these middle schools. All of the students reside locally and the population is essentially Black, of various religions, and of basically the same socioeconomic status. All 93 sixth-grade students who participated in this study were randomly assigned to four homeroom classes by the school's assistant principal. All four classes received both traditional and learning-style responsive instructional teaching in social studies during this investigation. Of the original total population (93) students, four were Caucasian, two were Asian, and 87 were Black. There were 46 males and 47 females.

Of the 93 students, 74 received consistency scores of 70 or more on the LSI and were therefore included in the comparative analysis of learning styles between low, average and high achievers. A total of twenty-one were listed as below average, thirty-six were average learners while, seventeen were high achievers. Terra Nova scores of the original population of 93 students were used to categorize the students as below-average, average, or high achievers. Thirty-two students were classified as underachievers for the achievement portion of the study. A Learning Style Inventory (Dunn & Dunn, 1993) was administered to each of the 93 students in order to determine if, indeed, underachieving students did learn differently from average and high achievers. Achievement based on student preference for modality was tested by a repeated measures design (A B A B) to ensure that each student received both instructional delivery systems [learning social science via traditional methods versus a tactual/ kinesthetic approach]. Two lessons were presented with tactual /kinesthetic methods while two were taught traditionally. The traditional materials consisted of stories, reading comprehension and fact sheets, as well as

student worksheets. The tactual and kinesthetic resources used for the learning-style responsive teaching consisted of Flip-Chutes, Task Cards, Electro boards, Peg Boards, Flip-Flops, large floor puzzles and floor games.

Students' attitude to learning with each of these delivery systems was measured by means of the Semantic Differential scale (SDS), (Pizzo, Dunn, & Dunn, 1990). Differences in learning style were compared by means of the Learning Style Inventory (LSI).

Procedures

This research was conducted during the spring of 2003 after permission had been received from the Chief Education Officer of the Ministry of Education, the principal of the school and the parents of the students. Prior to each unit, pretests were administered on the specific content of each section. Group means and standard deviations from the pretests were used to determine that all four classes were not significantly different from each other, and, too, that the three achievement levels in each class were not significantly different.

The Social Science unit was taught in four parts. Traditional resources were used for Parts One and Three, while tactual and kinesthetic resources were used for Parts Two and Four. The content for all four sections (A, B, C, D) was taken from the teacher's resource box that contained worksheets, stories, resource books and reading materials reflecting the unit content. Unit A and C were taught using traditional teaching methods. The students attended five, 45minute lessons using lecture, discussions, reading comprehension, essay writing and worksheets each for unit A and C. Traditional homework included a comprehension worksheets. At the end of each fifth lesson, the students were given a posttest. Units B and C consisted of tactual and kinesthetic materials. The students were taught five, 45-minute lessons, using these materials each for units B and D. Homework assignments include creating their own task cards and flip-flops in response to the lesson. A

posttest was administered after the fifth lesson. At the completion of the unit the SDS was administered to all students. Eight instruments were developed for this study, – a pretest and a posttest for each of four sections of each unit to assess students' knowledge of the sixth-grade social studies topic. The pretests determined the equivalence of the four classes and the posttest assessed their achievement gains. Questions for the tests were selected from the content of the unit that had been taught in four parts. The pretest and posttest for each part had the identical number of questions and social-studies content. The subject material included in both instructional methods was identical.

The social studies content materials and assessments were determined by a jury of experts who determined that they were equally difficulty. The jury consisted of the school principal that had background knowledge in social studies, a school team leader who taught social studies, the subject coordinator, the team leader and the subject coordinator for social studies. Each of these teachers had a minimum of 15 years experience and all, except one had earned a Masters degree minimally.

Student Learning Style

The students learning style was determined by use of the Learning Style Inventory (LSI) which assesses one's learning in relation to 21 elements of the instructional environment. The 21 elements of the model are grouped into five strands or categories—environmental, emotional, sociological, psychological, and physiological. At the environmental level, the students' preferences for sound, light, temperature, design of furniture, and type of seating are examined. At the emotional level, the emphasis is on students' motivation, persistence, responsibility, and the amount of structure required for that student to learn new and difficult material. The sociological strand considers students' preferences for learning alone, in pairs, in groups, and with or without an authority figure present. The physiological strand considers learners' perceptual strengths (visual, auditory, tactual, or kinesthetic), time-of-day energy

levels, and the need for intake or mobility. Finally, the psychological strand includes learners' information processing style—global or analytic, hemisphericity, and impulsive or reflective reactions.

Student attitude to learning was measured by means of the Semantic Differential Scale. This scale compared the attitudes of the students toward learning with a traditional teaching method to learning with learning-style responsive teaching methods that included tactual and kinesthetic materials. The SDS included 12 bi-polar descriptive pairs that assessed participants' attitudes toward the instructional approach they received. The SDS has been established as a reliable instrument and used in many investigations involving adolescents (Ingham, 1999; Roberts 1999).

Statistical Analyses

The dependant variables for this study were the standard scores on the LSI, mean-gain achievement-test scores, and scores on the SDS measure of attitude. The independent variables were the instructional approaches--traditional or learning-style, and the academic achievement levels of the students. For measures of central tendency, the means and the standard deviations were used. For inferential statistics, these data were analyzed by the use of the analysis of variance (ANOVA), GLM Repeated Measures ANOVA, and a one-sample t-test was used to analyze the attitude scores.

Results

Learning Style Characteristics of Underachievers in the Study

The results of the LSI profiles revealed significant difference among the five learning style elements at $p < .05$. The underachievers were less Motivated than the high achievers students; less Persistent than the average and high achieving students; less Responsible (Conforming) than the average and high achievers; wanted less Structure than the high achievers students; and wanted closer supervision by Authority Figures

than did average students. Clearly, results reveal that underachievers learn differently than do average and high achievers.

Social Studies Achievement

The under-achieving students achieved a mean gain score of 32.5 for Part A, Traditional instruction, 55.03 for Part B, learning-style instruction, 20.16 for Part C, Traditional instruction, and 64.91 for Part D, Learning-Style instruction. These analyses revealed significant main effect interactions for instructional methods among all four treatments. The within-subject effects were significant $F=67.007$, $p<.05$ with an $\eta^2 = .684$, indicating that the results for each part were significantly different from each other. Pair wise comparisons indicated that the LSS students performed significantly better with both tactual/ kinesthetic instructional treatments than they did with Traditional treatments.

Attitudes

To assess LSS students' attitudes, each student's composite score from the Semantic Differential Scale (SDS) were analyzed. The mean and standard deviation were analyzed using a One-Sample t test. The One-Sample t test indicated that the LSS showed a significance difference of positive attitudes towards the tactual/ kinesthetic instructional treatments with a mean score for the group 52.4138, $t=15.151$, $p<.05$.

Conclusions / Policy Initiatives

This study explores the idea that Modality of instruction combined with human agency- student attitude and the degree to which students are involved in their own learning, may be important factors in achieving positive academic achievement especially among under-achievers. It reveals that both achievement and attitude to learning are enhanced when tactual/ kinesthetic strategies are employed. In so doing, it suggests that delivery systems, especially those that engage students actively in the learning process, may facilitate the development of

positive academic and attitudinal outcomes.

Clearly, students do differ in their ability to learn and modality may be a key factor in creating academic success or failure. In light of this study, teachers should be encouraged to experiment with various modalities especially when teaching underachieving students.

Since the utilization of a tactual/ kinesthetic approach necessitates the development of a number of resource aids, many of which require considerable time and effort to develop, instructors should be provided with extra preparation time or additional salary stipends to adequately compensate them for their efforts in this area.

Clearly, this approach liberates us from earlier deterministic theories, which place blame on the victims themselves, and enables us to focus directly on the educational delivery systems, which may help to create academic success or failure in schools.

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