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The Effect of Cognitive Learning Style on Organizational Skills of Students with Learning Disabilities in a Ninth Grade Inclusion Science Classroom

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May 8, 1996

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Running Head: ORGANIZATIONAL SKILLS

ABSTRACT

The effect of cognitive learning style on improving the organizational skills of students with learning disabilities was investigated using subjects of a ninth grade inclusion science class in a rural school division. The intervention consisted of identifying the learning styles of two subjects, and adapting instruction to reflect the modalities of the subjects. The results of a multiple baseline across subjects design showed an improvement in the subjects' organizational skills which was measurable in the subjects' academic achievement. Future research implications were discussed and recommended.

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The Effect of Cognitive Learning Style on Organizational Skills of Students with Learning Disabilities in a Ninth Grade Inclusion Science Classroom

Every person has a learning style, as individual as a signature. Knowing students' learning styles, we can organize classrooms to respond to their individual needs for quiet or sound, bright or soft illumination, warm or cool room temperatures, seating arrangements, mobility, or grouping preferences (Dunn, Beaudry, & Klavas, 1989).

Long seen as a powerful tool for teachers, knowledge of learning styles is equally valuable to students (Hand, 1990). Helping students understand learning styles lets them see new perspectives and increases their tolerance for each other's differences (Jaouen, 1990). Several developmental differences exist in how students use organization, elaboration, and knowledge to process information in working memory. Around age six, most children discover the value of using organizational strategies and by nine or ten they use these strategies spontaneously (Woolfolk, 1995).

Counseling professionals are increasingly serving the learning and developmental needs of all students rather than the therapeutic or remedial needs of a select few (Frenza,

1985). Study skills are primarily information-processing procedures that facilitate the learning, and retention, and application of knowledge and skill (Fitzpatrick, 1982). Study skills are learned abilities for acquiring and applying knowledge and skill; study skills involve learning how to learn. The major objective of a study skills program is to make students truly independent learners (Griggs, 1990). Boyer (1987) asserted that more attention needs to be focused on how students learn.

Cognitive Learning Style

Cognitive learning styles have been defined as different ways of perceiving and organizing information (Woolfolk, 1995, p. 126). The Dunn model describes learning styles in terms of how the individual's ability to learn new or difficult material is affected by the following variables: (a) the immediate environment (e.g., noise level, temperature, amount of light, and furniture design); (b) emotionality (e.g., degree of motivation, persistence, responsibility, and need for structure); (c) sociological needs (e.g., learning alone or with peers, learning with adults present, learning in groups); (d) physical characteristics (e.g., auditory, visual, tactile, and kinesthetic strengths, best time of day for learning, need for food while learning, and mobility requirements); and (e) psychological inclinations (e.g., global and analytic strengths) (Carbo & Hedges, 1988). Ever since Plato's

dialogue with Meno, educators in general, and subsequently, special educators in particular, have attempted to match instruction to student needs. In no area is this more evident than learning disabilities (LD), where the practice of assessing abilities and devising instruction according to assessed patterns of modality strength and weakness has been widespread and remains intuitively appealing (Kavale & Forness, 1987).

Kavale and Forness (1987) used the technique of meta-analysis to arrive at a quantitative synthesis of findings from 39 studies searching for aptitude treatment interactions. The primary findings indicated that neither modality assessment nor modality instruction were efficacious. Kavale and Forness suggested that the presumption of matching instructional strategies to individual modality preferences to enhance learning efficiency has great intuitive appeal; however, little empirical support for this proposition was found from the quantitative synthesis of the extant research. Kavale and Forness (1987) insisted that it is substance not style that has the most effect on learning.

Curry (1990) stated that the operationalization of learning style theory encompasses three pervasive general problems: (1) confusion in definitions, (2) weakness in reliability and validity of measurements, and (3) identification of relevant characteristics in learners and

instructional settings. Dunn (1990) agreed that one of the major flaws of previous examinations of the effectiveness of modality-matched instruction was the imprecise interpretations of the terms auditory, visual, tactual, and kinesthetic. These terms can be defined differently by various researchers. Tactual and kinesthetic can sometimes be used interchangeably despite their clear cut differences, and are often excluded totally from the research design. Researchers making the assumption that children have either auditory or visual preferences omit examining children for tactual and kinesthetic preferences; therefore, children who are essentially tactual or kinesthetic never experience modality-matched instruction. However, Dunn, Beaudry, and Klavas (1989) stated a number of studies conducted during the last decade have found that student's achievement increases when teaching methods match their learning styles, biological and developmental characteristics that affect how they learn.

To investigate connections between individual preferences and other influences on learning, researchers have conducted correlational studies to establish the relationships between learning style and birth order, cognitive development, maturation, hemisphericity, field dependence/independence, global/analytic processing, temperament, and self-concept (Dunn, et al. 1989). Hand (1990) stated that by examining their own and their

classmates' learning styles, students can learn new strategies for accomplishing tasks. Helping students understand learning styles lets them see new perspectives and increases their tolerance for each other's differences (Jaouen, 1990).

Dunn (1990) stated that students are not failing because of the curriculum. Students can learn almost any subject matter when they are taught with methods and approaches responsive to their learning style strengths. Students have to be taught in sociological patterns in which they feel comfortable. Allowing students to have choices in how they learn makes them more involved in the whole process. According to Grigg (1990) students benefit from a knowledge of their learning style strengths and the implications for applying these strengths in the areas of studying and learning. The reward for all of us is the satisfaction that our students are learning more successfully than ever before (Orsak, 1990). Brunner and Majewski (1990) stated that at Frontier Central High School in Hamburg, New York, students identified as mildly handicapped are enjoying high rates of success. The secret of their success is a well researched, faculty developed curriculum that takes into account the needs and strengths of individual learners.

When permitted to learn difficult academic information or skills through their identified preferences, children

tend to achieve statistically higher test and attitude scores than when instruction is dissonant with their preferences. No learning style is either better or worse than another. Since each style has similar intelligence ranges, a student cannot be labeled or stigmatized by having any type of style. Most children can master the same content; how they master it is determined by their individual styles (Dunn, Beaudry, & Klavas, 1990).

Kendall and Cummings (1988) stated that cognitive behavioral techniques have begun to be utilized in attempts to improve students' approaches to academic tasks of all kinds. Although this line of research is relatively underdeveloped at this point, the overall goal seems to be the teaching of metacognitive or task-specific thinking skills that will help the student to approach an academic task in a more organized, efficient manner. The outcome of counseling students toward effective study skills based on their learning style strengths is empowering students to direct and monitor their own learning (Griggs, 1990).

Organizational Skills

At the outset of their schooling, young children are learning what the methodology of being a good learner is, just like teachers learn the methodology of being effective teachers. Therefore, it is important for teachers to help young children include planning and organizational skills in their emerging definition of their role as learners. These

key school behaviors are rarely explicitly taught; however, adults assume that children will learn them on their own. As a result, children who plan naturally and are systematic in planning do well in school, with good planning ability related to higher achievement scores in both elementary and high school students (Naglieri & Das, 1987). Poor planners often flounder, not necessarily because they lack the potential, but because they do not know how to structure and organize their ideas and behaviors (Casey & Lippman, 1991). Being organized is important for success in the regular classroom.

Through years of teaching experience, researchers have found that many slow learners are poorly organized. Harding (1987), for example, required each student in his study to keep an assignment notebook, which was checked periodically. The materials needed for each class were clearly defined. Students were expected to bring the needed materials to class each day. Compliance with these expectations resulted in daily positive reinforcement.

Students with mild disabilities have organizational problems. Particular areas in which organization assistance might be needed include: (a) keeping track of materials and assignments, (b) following directions, (c) completing class assignments, and (d) completing homework assignments (Henley, Ramsey, & Algozzine, 1993). Foley and Epstein (1992) stated that overall student achievement test

performance was significantly correlated with organizational skills and an internal locus of control orientation. IQ and organizational skills were identified as significant predictors of writing, arithmetic, reading, general facts, and overall academic achievement. Two variables, organizational skills and age, were significant predictors of overall grade point average.

Allen and Freitag (1988) suggested evening workshops for parents that covered the categories of goal setting, homework completion, organizational skills, time management, study environment, note taking techniques, following directions to complete a task, test-taking and preparation skills. Callhoun and Beattie (1987) conducted a study on school competence needs of adolescents with mild disabilities. The researchers concluded that students need organizational skills to contribute to school success. Because most students are never taught how to learn, many students with and without mild disabilities struggle with the learning process. They need direct instruction in how to organize for learning (Meese, 1994). The competence of students with learning disabilities to understand, manipulate, make decisions about, and complete assigned tasks successfully is not related solely to their academic skill. Students' competency depends on their proficiency to organize content, material, and time in a meaningful way (Shields & Heron, 1989).

The literature review gives credence to the fact that students with learning disabilities experience more success academically if the teacher and student are aware of the student's learning style and if the student is taught organizational skills. The problem arises when teachers assume that students have acquired organizational skills without any instructions and do not consider the students' learning styles when presenting the curriculum. As students with learning disabilities pass from elementary to secondary schools, the discrepancy between the academic achievement of students with learning disabilities and their peers may increase if students with learning disabilities do not have good organizational skills.

Statement of Purpose

An unawareness of cognitive learning styles can negatively affect a student's ability to develop organizational skills. The lack of competence in this area may result in the experiencing of academic difficulties. These students may come to class unprepared, forgetting to do assignments, to complete assignments, or to bring necessary materials to class. Lack of organizational skills plays an essential part in the academic success of students with learning disabilities. The purpose of this research, therefore, is to determine if organizational skills taught in a manner to reflect learning styles will affect the daily

performance of student's with learning disabilities in a ninth grade science inclusion classroom.

METHODOLOGY

Subjects and Setting

The study was conducted in a secondary school setting in a rural area of Virginia. The subjects consisted of two students one male and one female, identified according to Public Law PL 94-142 (Individuals with Disabilities Act 1990) as having a learning disability. The students were in a ninth grade inclusion science class, meeting the specific criteria of the federal, state, and district locality.

Instrument

The subjects were administered the Learning Style Inventory (LSI) (Dunn, Dunn, & Price (1989). Research in 1988 indicated that 95 percent (i.e. 21 out of 22) of the reliabilities are equal to or greater than .60 for the Likert scale English translation in grades 5 through 12. The areas with the highest reliabilities include: noise level, light, temperature, design, motivation, persistence, responsibility, structure, learning alone/peer oriented learner, authority figures present, learn in several ways, auditory, visual, tactile, kinesthetic preferences, requires intake, evening/morning, afternoon, needs mobility, parent figure motivated, and teacher motivated. The area with a reliability of only .55 is late morning preferences. This reliability analysis was based on 890 randomly selected subjects in grades 5-12 who took the 1987 revised instrument (Dunn et. al, 1989).

Each individual's learning style is based on a complex set of reactions to varied stimuli, feelings, and previously established patterns that tend to be repeated when the person concentrates. The inventory does not assess the finer aspects of an individual's skills, such as ability to outline procedures, organize, classify, or analyze new material. It evidences how students prefer to learn, not the skills they actually use (Dunn et, al.,1989).

Once the assessments were analyzed, the subjects were given a check list (See Appendix A) that assisted them in strengthening their organizational skills. The check list was explained and demonstrated to students. In addition, a letter was sent to the student's parent (See Appendix B) that gave an explanation of the procedure.

Procedure

Permission was obtained from the superintendent of the school division and the principal of the secondary school (See Appendix C) in which the study was conducted. Parental permission was obtained from the parents of the subjects (See Appendix D). The participation of the subjects in this study was strictly voluntary. The anonymity and confidentiality of the subjects was guaranteed. The consent forms used were the suggested forms of Longwood College's Human Subjects Research Review Committee.

Upon obtaining permission, baseline data were collected

on the subjects' daily class work and homework assignments. Intervention was then implemented with the first subject.

Data Collection and Intervention

Students were administered the Learning Style Inventory (Dunn, Dunn, & Price, 1989). The assessment was evaluated and data were collected on the subjects' class work assignments and homework assignments on a daily basis by the researcher. Once a pattern was established in the subjects' daily performance of completed classwork and turned in homework assignments, the subjects were given the assignment checklist (See Appendix A). The subjects recorded each assignment and checked off the assignments as they were completed. The parents of the subjects checked the subjects' homework and signed off if the assignments were completed and made comments if necessary. The number of assignments assigned and number of assignments completed and turned in were recorded by the researcher (See Appendix E). Percentage correct on assignments was graphed as the dependent variable. (See Figure 1).

Intervention also consisted of adjustments in presentation of the curriculum to address the various learning styles of the subjects. On a daily basis, presentation of the subject matter was made using visual aids, projects that required hands on activities were assigned, and tests were administered orally.

Research Design

A multiple baseline across subjects design was used to conduct this study. Data were taken for each subject simultaneously. While intervention was implemented with one subject, the other subject remained in baseline. Once a pattern was established with the first subject, the intervention was implemented with the second subject.

RESULTS

The evaluation of the Learning Style Inventory (LSI) administered to the subjects revealed the following learning style preferences. Subject #1's learning preference was auditory and visual. He preferred morning to afternoon and evening, was parent and teacher motivated, and learned better when it was quiet and warm, and when the room was well lit. He also preferred to work with peers rather than alone and needed visual aids and lectures. Subject #2's learning preference was visual and tactile. She preferred morning to afternoon and evening, was not parent motivated, but was teacher motivated. She learned better with sound, and preferred warm temperatures and well lit rooms. She also preferred to work alone rather than with peers, needed mobility, and required hands on materials to promote the learning environment.

Data were collected over a period of 16 days. The baseline data showed the following results for Subject #1. He turned in only 50% of the assignments, did not pass tests that were administered, and did not take an active part in class. He had four failing grades. His grades ranged from 0 to 100 with a median of 62 and a mean of 50. (See Figure 1). Alberto and Troutman (1990) stated that a baseline is often considered stable if no data point of the baseline varies more than 50% from the mean or average. The fluctuation for this subject's performance showed a lack of

stability; however, when intervention began the subject showed an increasing trend resulting in an improvement in his academic achievement. The subject turned in all assignments, and became more actively involved in class. His performance demonstrated an increasing trend with grades ranging from 70-100 with the median being 80 and the mean being 80. The subject showed a remarkable improvement in test grades going from failing to passing. (See Figure 1).

Baseline data on Subject #2 revealed that she turned in assignments that were not complete. The baseline data path showed great variability with grades ranging from 0-100. The median for Subject #2's grades was 90, with the mean being 65. She experienced three failing grades before intervention. With intervention Subject #2 showed an increase in level with grades ranging from 78-100. The median grade for Subject #2 during intervention was 93 and the mean was 91. She also began to turn in completed assignments and to take a more active part in class. All grades were passing (See Figure 1).

DISCUSSION

Making the subjects of this study aware of their learning styles and introducing ways to strengthen their organizational skills using their learning style preference, confirmed that these factors would improve the subjects' academic achievement. Griggs (1990) stated that all students should be provided with knowledge concerning their learning style strengths and helped to developed study skills that are congruent with their individual preferences for learning.

The results of this study did appear to be in conjunction with the literature cited that cognitive learning styles have some effect on the organizational skills of students with learning disabilities. Intervention of adjusting classroom instruction to subjects' learning styles, in conjunction with strengthening organizational skills, showed a remarkable improvement in both subject's academic achievement. Both subjects experienced an improvement in test scores as well as an improvement in completed classwork and homework assignments. Both subjects also became more interested in participating daily in the class and put more of an effort into class projects than before intervention. According to Dunn, Beaudry, and Klavas (1990) when permitted to learn difficult academic information or skills through the identified preferences,

children tend to achieve statistically higher test and attitude scores than when instruction is dissonant with their preferences.

Limitations

One limitation of this study was the short amount of time for data collection. During intervention class periods were shortened because of testing, so subjects were not in class the usual 80 minutes. The size of the sample was an additional limitation. The sample consisted of only two subjects, because of time limitations.

Another limitation was the controlling of the environment. The lighting of the classroom could not be adjusted. The noise level was controlled, but a problem would have existed if the subjects needed complete quiet. Another environmental effect was mobility in the classroom. Mobility could be adjusted, but would have caused distractions for other students.

Recommendations

Children need to be introduced to organizational skills at the onset of instruction. Students must also be made aware of their individual learning style and the learning style of their peers at the onset of instruction. Teachers must adapt their teaching techniques to incorporate the different learning styles of their students. The implementation of these techniques should result in higher academic achievement of students. Dunn (1990) stated that

students are not failing because of the curriculum. Students can learn almost any subject matter when they are taught with methods and approaches responsive to their learning style strengths. Students benefit from a knowledge of their learning style strengths in the areas of studying and learning (Grigg, 1990).

Future Research

More research is needed in the area of learning styles and organizational skills. Controversy exists concerning learning styles and academic ability. Kavale and Forness (1987) suggest that the presumption of matching instructional strategies to individual modality preferences to enhance learning efficiency has great intuitive appeal. However, little empirical support for this proposition was found from their synthesis of the research. Kavale and Forness insist that it is substance not style that has the most effect on learning.

There is also a need for future research on the effects of various learning styles and organizational skills as these relate to the academic achievement of students. Students need to be provided with the necessary tools and skills by schools and colleges for success in the educational arena. Boyer (1987) asserted that more attention needs to be focused on the manner in which students learn.

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APPENDIX A

Checklist for Subjects

STUDENT'S NAME:

Note to Parent: Please check your child's assignment sheet, and place a check mark next to the assignment if student completed. Please make a comment if student had a problem with the assignment.

ORGANIZATION OF HOMEWORK ASSIGNMENTS

Monday	Tuesday	Wednesday	Thursday	Friday
Date	Date	Date	Date	Date
Assignment	Assignment	Assignment	Assignment	Assignment
Due Date	Due Date	Due Date	Due Date	Due Date
Assignment	Assignment	Assignment	Assignment	Assignment
Comments	Comments	Comments	Comments	Comments

APPENDIX B

Letter to Parent Explaining Study and Requesting Permission
for Student Participation

March , 1996

Dear Parent:

I am a student a Longwood College, completing my master's in the area of Mild Disabilities. In order to complete my studies, I must select a problem and research it. The problem I have chosen to research is "The Effect of Cognitive Learning Style on Organizational Skills of Students with Learning Disabilities in a Ninth Grade Inclusion Science Classroom". Your child is a student in the class that I have chosen to work with.

The study I am conducting will be working with students to improve their organizational skills. The student will keep a checklist of all their classroom assignments and their homework assignments. I am asking parents to check to see if the student completes the homework assignments and make comments if the student had difficulty or if the student does not complete the assignments.

Being a part of this research is on a voluntary basis only. I am writing you to get your permission to do this research and have your child be a part of this study. The name of the students will not be used and all information that is collected will be kept in confidence.

If you choose to have your child be a part of this study, please complete the attached form and return to me at the above address. If you choose not to have your child participate in this study, please return the form to me.

Thank you very much for your cooperation in this matter.

Respectfully,

Louise Mont-Tucker

APPENDIX C

Letters Requesting Permission from the School Division and
the School Principal to Conduct Research

March , 1996

Superintendent of Schools

Dear Superintendent,

I am currently a student at Longwood College seeking my masters' in Mild Disabilities. In order to complete my studies, I must research a problem and write a thesis. I have selected the following area to research "The Effect of Cognitive Learning Style on Organizational Skills of Students with Learning Disabilities in a Ninth Grade Inclusion Science Classroom".

This letter is being sent to ask your permission to conduct this study in my ninth grade inclusion class. The anonymity and confidentiality of the students and the school will be kept. The participation of the students will be on a voluntary basis only. Whether the students participate or not, will not in any affect their instructional program.

Thank you for your cooperation in this matter.

Respectfully,

Louise Mont-Tucker

March ,1996

Principal

Dear Principal,

I am currently a student at Longwood College studying Mild Disabilities. In order to complete my studies, I must select and research a problem. I have selected the following area to research "The Effect of Cognitive Learning Style on Organizational Skills of Students with Learning Disabilities in a Ninth Grade Inclusion Science Classroom".

This letter is being sent to ask your permission to conduct this study at your school. The anonymity and confidentiality of the students and the school will be kept. The participation of the students will be on a voluntary basis only. Whether the students participate or will not in any affect their instructional program.

Thank you for your cooperation in this matter.

Respectfully,

Louise Mont-Tucker

APPENDIX D

Consent Form for Students to Participate in the Study

Consent for Participation in
Social and Behavioral Research

I, _____, consent to participate (or allow my child or legal subject to participate in the research project entitled: The Effect of Cognitive Learning Style on Organizational Skills of Students with Learning Disabilities in a Ninth Grade Inclusion Science Classroom.

I acknowledge that the purpose of this study, the procedures to be followed, and the expected duration of my participation have been explained to me. Possible benefits of this project have been described to me, as have alternative procedures, if such procedures are applicable and available.

I acknowledge that I have had the opportunity to obtain additional information regarding this research project, and that any questions I have raised have been answered to my full satisfaction. Further, I understand that my (or my child's legal subject's) participation in this research is voluntary, and I am free to withdraw my consent at any time and to discontinue participation in this project without prejudice. I understand that no information will be presented which will identify me (or my child or legal subject) as the subject of this study unless I give my permission in writing.

I understand that if I have concerns or complaints about my (or my child's or legal subject's) treatment in this study, I am encouraged to contact the office of Academic Affairs at Longwood College at (804) 395-2010.

Finally, I acknowledge that I have read and fully understand this consent form. I sign it freely and voluntarily. A copy has been given to me.

Date: _____ Signed: _____
(Parent)

Date: _____ Signed: _____
(Participant)

APPENDIX E

Teacher Data Sheet

Data Sheet

Name _____

Record of Assignments

DATE	ASSIGNMENT	COMPLETED	INCOMPLETE

Figure 1. Grades Subjects Received on Assignments Turned in
During Data Collection.

Grades on Assignments

Figure 1:

