LWATI: A Journal of Contemporary Research, 8(1), 35-47, 2011
ISSN: 1813-2227

Effect of Cognitive Style and Gender on JSS Students' Academic Achievement in Social Studies

Regina O. Arisi
Social Science Education, Delta State University Abraka, Nigeria
Email: regina_arisi@yahoo.com

ABSTRACT

This study investigated the effects of cognitive style and gender on student's academic achievement in social studies. It was designed to obtain empirical evidence of effects of cognitive style and gender as well as the interaction effects of cognitive style on student's academic achievement in social studies.

The subjects of the study consist of 192 junior secondary school students of 87 boys and 105 girls. They were selected from four secondary schools to make up the sample for the study. The study adopted a 2x2 pre-test post-test non randomized intact group. It is a quasi experimental design. The data were analysis using the simple percentage and the hypothesis was determined with the use of ANCOVA statistics at 0.05 level of significance the following were the results findings:

- There is a significant main effect of cognitive style in student's academic achievement in social studies. Field Independent students performed significantly better than field Dependent social studies student. Cognitive style accounted for 15.2% of the total variation in the post-test scores.
- There was no significant main effect of gender on students academic achievement in social studies
- There was no significant interaction effect of cognitive style and gender on student's academic achievement in social studies.

The educational implication of this study revealed that students varied in the way they perceived and process information therefore the teacher has to take into consideration student's cognitive styles so as to present learning materials that will enhance student performance. The lack of gender differential in student's academic achievement in social studies implies that the teacher should present social studies learning materials in a way that will blemish the feelings that the subject is for a particular gender.

INTRODUCTION

Cognition has been defined involves the process of perception, thinking, understanding, problem solving, reasoning and remembering. Its study will

help in the understanding of how and to what extent individual differences account for apparent variation in learning outcome among learners who are faced with the same learning tasks.

Social studies have been variously described as value laden and controversial Osho (1985) and Osakwe et al (1995). This is because most of the curriculum content is derived from different cultures which change from time to time with places. Mansaray (1985) has observed that most social studies concepts are drawn from the field of social sciences. These problems become compounded when it is realized that these concepts are only taught at the junior secondary school (JSS) levels and re-emerges at the tertiary level.

Cognitive style as a concept arose from studies by several psychologists, which focused on individual differences and perception. Scholars have defined the term severally Kegan, Moss and Siegel (1963) considered cognitive style as stable individual preference in modes of perceptual organization and conceptual categorization of the external environment. Walman (1975) saw it as the model in which a person organizes and classifies his perception of the environment in order to impose order upon a confusing series of events. From all these definitions cognitive style can be view as a way an individual select, organizes and processes their learning experiences in their environment. In other word, cognitive style depict an understanding of how individual differ in the way they perceived and react to phenomenon which varied quantitatively from one individual to another

Learners are complex individuals with diverse interests, needs personal characteristics, home-background, Cognitive attainment, age range, learner's characteristics, maturity level, gender difference etc which influence directly or indirectly what they learn. Some differ greatly and no two individuals are identical. Because of these differences, any single learning opportunities offered by the teacher may mean something different to the different categories of learners who are placed in the same learning environment or classroom. These variation in the learners learning condition tend to run along continuum from a situation where the teacher presents structure and order/ material to a situation in which the student determine how he/she will go about learning without much help from the teacher. In other words, all learners do not go about learning in the same way. With this Klausmier (1974) was able to identify some psychological traits of the learner that came into play to determine the learners' performance. Of these psychological traits, the cognitive style of the learners in very crucial in concept learning Noval (1989). This variation as observed by Hunt (1970B) tends to affect students cognitive learning and he classified them into two categories cognitive-complexity-simplicity. These are cognitive complex individual which he described as relatively independent in their behavior because they are self creative and innovative in problem solving, self centered and discovered facts and information, as distinct from the background in which they are embedded. They are known as field independent, analytical or holistic. These groups of learners need little or no supervision from the teacher to function adequately in their environment. The other group cognitively-simple individual tend to

function best when closely supervised and given direction by the teacher, their behavior is relatively conventional and predictable in solving problems. They are unable to analyses and differentiate the components of stimulus situation. Instead they respond to the stimulus as a whole, they are variously know as global, serialist, relational or field dependent. Hunt (1970) and Harvey (1966) did a lot of researches to match students based on their levels of cognitive-complexity – simplicity with learning situation so as to promote learning achievement. Their findings has been that cognitively simple students are more likely to achieve better under highly structured learning situation, whereas the cognitively complex individual tend to achieve better under less structured learning environment. It is against this background Skinner (1968) suggested that

> ''The development of an adequate theory of instruction must relate to the area of learning and teaching by generating principles that have functional values to the teacher to teach well and under which all student learn as efficiently as their talent permits''

The knowledge of the student and their teachers' relationship suggests that when the teachers and students behave in certain ways, some students learning outcomes are more likely to be better than if they have behaved in the other ways. The success of a classroom interaction depends in the skills and capability of the teacher and his/her psychological knowledge of the learner potential which he/she need to tap, developed and utilized in the learner for maximum learning outcome with little or no difficulties. Base on this the study is directed into finding out the effects of cognitive styles and gender as covariant on student's academic achievement in social studies. The following research questions where utilized for the study

1. What is the effect of cognitive style on students' academic achievement in social studies?
2. What is the effect of gender on student academic achievement in social studies?
3. Will there be interaction effects of cognitive style and gender on students' academic achievement in social studies?

The following three hypotheses were formulated to guide the study:

1. There is no significant effect of cognitive style (field dependent and field independent on student's academic achievement in social studies.
2. There is no significant effect of gender on students academic achievement in social studies.
3. There is no significant interaction effect of gender and cognitive style on student academic achievement in social studies

METHODOLOGY

The study adopted a quasi-experimental pre-test and post-test control group design of 2x2 factorial designs consisting of cognitive style (field dependent and field independent) group into male and female students. It is quasi-experimental design because non randomized subject in intact classes was used for the study. It is a 2x2 factional design consisting of cognitive style (field dependent and field independent) group into and female subject. A population of 200 students' was drawn from four randomly selected schools (all mixed school) in Ukwani local government area. Out of these populations a sample of 192 students' participated in the study. The students' were made up of 106 field independent and 86 field dependent divided into 2 groups of male 87 and female 105. Two instruments was used for the study, the cognitive style test (CST) and which was used to assigned students into field dependent and field independent. This instrument was a version of Siegel cognitive style test that was modify, validated and used by Onyejiak (1980), and was adopted by the researcher. In estimating the reliability of the test, pearson product moment correlation coefficient techniques was employed. The second instrument used was the social studies achievement test (SSAT) that consists of 50 multiple choice questions based on topics covered during the treatment period. These test items were designed by the researchers, and taught during the treatment period. A table of specification was used to test items whether they meet the demand of Bloom's taxomy of cognitive domain of setting and testing pupils. The tests were spread in this manner as shown below.

Table 1: Pre Test Post Test Social Studies Achievement Test.

content	No. of Items	Percentages
Origin of man	5	10%
Scientific Evolution of man	6	12%
Early man	3	6%
Uniqueness of man	4	8%
Man's capability	3	6%
Man's physical and cultural variation	2	4%
Races of the world	6	12%
Racism	3	6%
Community	7	14%
Rural and Urban Community	7	14%
Social satisfaction	4	8%
Total	50	100%

These test items were later given to experts in social studies educations with cognate research experience and specialist in measurement and evaluation, as well as experienced social studies teachers in two secondary schools whose scheme of work was used for designing the test items. From their comments

and recommendation some of the items were modified and reworded. In developing the draft instrument, all levels of the cognitive domain were grouped under remembering, understanding and thinking. This was in line with Educational testing service (ETS) pattern of classification. Here application, analysis synthesis and evaluation and sub categories of Blooms taxonomy were categorized under thinking level. Which was in line with other educators such as Ohuche and Akeju (1977) and Jegede and Inyang (1991). This was use for grouping for higher level of cognitive skills. This study also subscribed to this idea based on the level of subjects used for the studies. The test was then administered to 100 JSS III student (50 boys) and (50 girls) their responses were scored and was used to determine the reliability Co-efficient of the test as well as Kuder Richardson formula 20 since items were not of equal difficulty that is P is not constant for all the items and also items were scored dichotomously as recommended by Mehrens and Lehmann (1975). Using this formula a reliability estimate of RXX = 0.75 was established for the test which was viewed as adequate enough to continue the use for the test. Analysis of covariance (ANCOVA) and multiple classifications Analysis (MCA) were used for data analysis, the post test seem as were collated and analyses. Hypothesis were tested at 0.05 alpha level of significant and the result were presented in tables

Table 2: ANCOVA summery table for the two independent variables and students achievement in social studies

Source of variation	Sum of squares	DF	Mean squares	F	P
Covariant	2138.172	1	2138.172	46.749	.000
Pre test	2138.172	1	2138.172	46.749	.000
Main Effects	5235.967	5	1047.193	22894	.000
Cognitive Style (CS)	2282.903	1	2282.903	49.908	.000
Gender (G)	0.564	1	.564	0.012	.912
2-way-iteraction	267.764	7	38.25	.836	.559
CS X G	48.816	1	48.816	1.067	.303
Explained	7733.849	16	483.366	10567	.000
Residual	8004.817	175	45.742		
Total	15738.657	191	82.401		

TABLE 3: Multiple classification analysis of the post test academic achievement scores of students in social studies according to instructional methods, cognitive learning style and gender.
Grand Mean = 56.167

Variable + category	n	Unadjusted dev'n eta		Adjusted for independent dev'n eta	Adjusted for independent m + covariant dev'n beta	
Cognitive style						
1. Field	86	-4.77			-3.94	
Dependent	106	3.87	47		3.19	38
2. Field						
Independent					15.2%	
Gender						
1. Male	87	.68			-06	
2. Female	105	-.57			.05	
			.07		01	
					0.01%	
Multiple R squared					.469	
multiplier					.685	

RESULTS

Research Question I: what is the significant effect of cognitive style on students' academic achievement in social studies?

Table 4: Post test scares of subjects according to cognitive learning style.

Cognitive Style	N	Grand mean	Mean	Gain
Field dependent	86	56.17	51.40	4.77
Field independent	106		60.04	3.87
Total	192		56.17	

From the above table IV, Field independent student generally performed better than field dependent social studies student as revealed in their mean scores 60.04 and 51.04 respectively. Also established in the study, the field independent student not only performed better than their field dependent students they scored more that the overall mean (Grand Mean) of 56.17.It can be concluded that there was significant man effect of cognitive style on student academic achievement in social studies. Also in the ANCOVA summary table showed that there s a significant effect of cognitive style on

student's academic achievement in social studies (F1, 191= 49.908 > 0.05). The null hypothesis was rejected. It was therefore concluded that cognitive style significantly influenced student's academic achievement in social studies a critical examination of the multiple classification analysis (MCA) in table IV showed that the mean for field independent (FI) and field dependent (FD) subject was 60.04 and 51.40 respectively. The implication of this is that the field Independent (FI) students performed better that their field dependent (FD) counterpart. The mean scores gain for field independent students (3.87) are greater than the grand mean score of 56.17. Also revealed from the classification table was that cognitive style alone accounted for 15.2% of the variation in the post-test scores In other words, this study established that there is a significant mean effect of cognitive style on student academic performance in social studies, field independent student significantly performed better than their field dependent counterparts. This finding of field independent students was not surprising; field independent students generally tend to posses higher of intelligences Witkin (1977). A look at the field independent and field dependent dimension of cognitive style reveal that field independent students are subjects that analysis and differentiate component of complex stimulus. They posses' analytic skills and perceived object as separate from their environment. In other word they solve problems that are presented and context, while the field dependent subjects lack these skills, they respond to stimulus as a whole without considering its component parts. Social studies is an integrated and value laden subject whose curriculum content are derived from different cultural background and different content area. By this nature, it demands a variety of tasks from the students and field independent are known for learning in a wide variety of learning task Hence their learning of the subjected social studies who by its nature is integrative has place them higher than their field dependent counterpart. This high performance of field dependent that was revealed in this study has also been reported in other studies such as Babalola (1979) Yore (1986) Akiakwo (1988) Okwo (1990) Ughamadu (1997), Okobia (1999) and Arisi (2002) Agbogoroma (2004). However it most be started that there were some researchers who did not establish significance difference in the performance of field dependant and field dependant such as Doglas and Khale (1978) and Onweughbu (1998).

What is the effect of gender on student's academic achievement in social studies?

Table 5: Post-test scores of subjects according to gender.

Gender	N	Grand Mean $\bar{X}$	F Mean $\bar{X}$	Gained mean
Male	87	56.17	56.85	.68
Female	105		55.60	-.57

From the Table V above, It is clear that the male students performed better than their female counterpart. The male students had a mean score of 5.85 while their female counterparts had a mean score of 55.60. It can be concluded that male social studies students performed slightly better than their female counterparts. A look at the post-test mean scores revealed that the male students scored slightly higher (0.68) above the grand mean of (56.17) while the female students scored slightly lower (-0.57) below the gained mean. When the differences in the mean gained scores were calculated (.68-57), .11 figure was recorded which was less significant as indicated in the multiple classification analysis table that gender alone accounted for 0.01% of the total variation. Base on this, it can be concluded that gender has no significant effect on student's academic performance in social studies.

Also revealed from the ANCOVA summary table shows that there was no significant effect of gender on student's academic achievement in social studies. (F1, 191= 0.012 P > O.5). The null hypothesis was accepted. It was then concluded that there was no significant effect of gender on student's academic achievement in social studies. The mean scores for male and female students were 56.85 and 55.60 respectively. Also the MCA table revealed that gender alone accounted for 0.01% of the total variation in the post-test scores hence it was not significant and was regarded as the least of the factors. The adjusted post-test mean scores were 56.11 and 56.22 for male and female student respectively. Gender differential in academic achievement has contained to generate argument among scholars. There are views that gender is a crucial factor in determining students learning outcomes Nwagu (1981). Some researchers believe that differences in academic achievement are due to genetic factors Fennema and Sherma (1977) Sherma (1978) Gray (1981). Other attributed these differences to environmental influences Alkinson et al (1983) Hecker (1987). There are those who have established that gender does not have significant effect on learners' achievement Inomisessa (1987) Ajewole (1987) Ande (1990) Oguniyemi (1994) and Ajiboye (1996). These findings of no significant mean effect of gender on student's achievement in social studies have shown that the debate on effect of gender on learning is an inconclusive issue. Female generally were believed to perform significantly better than their male counterparts especially in subjects that are dominated with verbal concepts as pointed at by Rebelsky and Tebachnick (1971) Mcteer (1975) Weber (1976). With this, one expected female students to have significantly performed better than their male counterparts since social studies is a subject that is dominated by verbal concepts Plausible reasons that could be advanced for this no significant mean effect of gender on social studies achievement in this study is that-:

- Social studies is a core subject at the junior secondary school level. Students therefore had no option other than to put in their best so as to pas the subject irrespective of gender factor.

- Social studies is concerned with the study of man and his environment, concepts and issues that were taught within the treatment period have been familiar and therefore favoured both sexes that gender did not significantly influence their learning
- It is also believed that students right from JSS one have been exposed to social studies concepts and have developed similar altitudes towards the study of the subject hence gender could not in any way determine how they learned.
- The finding of no significant mean effect of gender on students academic achievement in social studies established in this study tallies with studies carried out by researchers such as Ezewu(1981) Wasson and Howman (1994) Ughamdu (1977) , Okobia (1999) and Arisi (2002). They used French, English Language and social studies respectively in their researches. Although gender differences have been reported in other studies such as Voelker and Harnrris (1971) Balik (1976) Iwuyi (1980) Osakwe (1991) and O'brien (1994). The implication of these conflicting results show that the debate on the effect of gender on learning outcomes in inconclusive and more researches are needed in school discipline.

Are there Interaction effects of gender and cognitive style on student academic achievement in social studies post-test scores of cognitive style according to gender?

Table 6: Performance According to sex.

Cognitive style	Male $\bar{X}$	Female $\bar{X}$	Grand $\bar{X}$
Field Independent	60.38 (400	59.76 (46)	56.17
Field Dependent	52.70 (47)	50.26 (59)	

From Table VI above It can be seen that both male and female field Independent student performed better than their male and female field dependent counterparts in the mean scores of (60.38 and 59.70) and (52.70 and 50.26) respectively. Also revealed from the table was that field independent male and female student scored above the grand mean (56.17) while the field dependent male and female students scored below the grand mean. An indication that field independent student (male and female) performed better than the field dependent male and female counterpart. A look at the ANCOVA table revealed lack of significant interaction effect of gender and cognitive style. This lack of significant interaction effect established from the ANCOVA table in the study could be inferred that the content of social studies favored the field Independent student's irrespective

of their gender differentials. The field independent students as observed from the study show a more articulated study skill hence they are different in the ways they attend to issues or tasks. This is because the status of the students, and the materials they learned influence their learning processes, hence the field independent students performed better than their field dependent counterparts irrespective of gender differences used in this study. Also revealed from the hypothesis testing the table indicates no significant interaction effect of cognitive style and gender in student academic achievement in social studies (F1, 191 – 1.067 P> .05). The null hypothesis is therefore retained. It was concluded that there was no significant interaction effect of cognitive style and gender no significant interaction effect of cognitive style and gender on student's academic achievement in social student. This was depicted graphically and it shows an ordinal interaction.

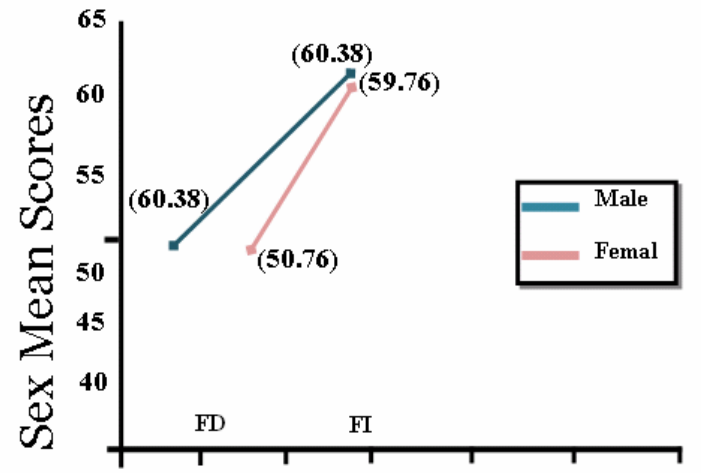

Figure 1: Graphical representation of the level of interaction effect of cognitive style and gender on student's academic achievement in social studies (cell means are shown in brackets).

FI: Field Independent Cognitive Style
FD: Field Dependent Cognitive Style

The finding of no significant interaction effect of cognitive style and gender established in this study confirms other researchers such as Ughamadu (1990) Umeodaugu (1995), Okobia (1999) and Arisi (2002). All reveal no significant interaction effect of gender and cognitive style on student academic achievement in Chemistry, integrated science and social studies respectively. Another researcher who agreed with these researches is Adeyemi (1978) who in different subject area (biology) reported hat gender

did not significantly integrate with cognitive style to determine student's academic achievement. This was in contrast to the finding of Onyejiaku (1980) who established a significant interaction effect of gender and cognitive style on students' mastery of mathematical concepts. These conflicting findings tend to reveal that different discipline vary in their degree of tasks as perceived by students. Chemistry and integrated science share similar relationship as apposed to social studies hence there is variation in cognitive demand of students. Reason that could be advance is that cognitive differential (Field Independent Boys and Girls) and (Field Dependent boys and girls) have their different ways of attending to tasks in social studies. In line with some contemporary views, the status of the students and the materials to be learned at study time influence their learning processes. A critical examination of the characteristics of field dependent and field independent learners tends to suggest that field independent student are likely to develop a more articulated study WALL than their field dependent counterpart hence they performed better irrespective of gender difference as established in the study. Finally, another reason that could be established for lack of significant interaction effect of gender and cognitive style on student's academic achievement in social studies could be that the content of social studies favour both sex irrespective of then differences in cognitive style.

CONCLUSION AND RECOMMENDATION

Education generally is meant for the development of the individual to live and interact effectively in the environment he/she finds his/herself. Student , the receiver of educational knowledge are varying learning characteristics influenced by several variables as revealed by the study of significant main effect of cognitive style on student academic achievement in social studies. Cognitive style alone accounted for 15.2% of the total variation in the posttest scores. Field independent student performed significantly better than field dependent social studies. This has same empirical implication/information for improving steady and learning processes in social studies in secondary school, the fact that field independent students performed better that the field dependent student's shows that students varied in the cognitive abilities. That is, the way they perceived and process information. This equally influences their performance in the classroom situation and this has some important implication for classroom teaching. The presentation of learning experience at junior secondary school levels needs to take into consideration students learning styles. This suggests that the classroom teacher not only need to know the subject matter of his/her subject along with the pedagogical records, they should also be very conversant with enhance students learning which is the cognitive style. In other words, classroom teachers should be knowledgeable in both the content of social

studies and the cognitive style of the student they teach so as to enhance their performance. Also, the finding of significant man effect of cognitive style in student's achievement in social studies has implication for schools especially with emphases on continuous assessment. The counselor should be conversant with the necessary psychological tests; this will enable them to understand the learner's psychological constructs. Such knowledge of the learner cognitive style by the counselors and classroom teachers will make them work together in monitoring the academic performance of their learners as well as enhancing their mental health status. This also has implication on curriculum planner in planning and development of social studies curriculum, the experts of cognitive style on student's performance hence they have to be well informed as regards the nature of the learner's cognitive style and their on the learning processes effects. This would enable them incorporate the necessary learning methods that would be of benefit to students with different cognitive style in social studies curriculum.

The study has reported lack of significant gender differentiate in students cognitive achievement in social studies. The implication of this finding is that the classroom teacher while providing learning experiences in social studies lesson should set aside the already conceived idea that girls perform significantly better in verbal subjects like Arts and social studies than their male counterparts while the boys are superior in biological and physical sciences than their female counterpart. This will help the students to optically learn the content of social studies irrespectively of gender factor.

REFERENCES

Akpochafo, W. P. (2001). Effects of Expository Discovery and Discussion Strategy on Academic Achievement in JSS Social Studies in Delta State. (Unpublished Ph. D. Thesis, Delta State University, Abraka.

Arisi, R. O. (2002) "Effects of Teaching Strategy, Cognitive Style and Gender on Students Academic Achievement in Social Studies in Delta State. (Unpublished Ph.D. Thesis, Delta State University, Abraka.

Babalola B.A (1979). the relationship between Field Dependent/Field Independent Cognitive Style and Academic achievement in mathematics and science subjects among Nigerian secondary school students; Journal of science Teachers Association of Nigeria STAN. PP 18(1) 40-48.

Hunt D.E(1970b). A conceptual level matching model for Co-ordinator learning characteristics with educational approaches Interchange Vol. 1 page 67-82.

Klaumier H.J. (1974). Concepts learning; A Bibliography Tech. Rep No. 82 madison.

Osakwe, E. O. (1991). '' the effects of Instructional modes on spatial conceptualization in social studies''.

Osho (1985), ''the effects of problem solving and conventional teaching strategies on students achievement in social studies'' An Unpublished PHD Thesis University of Ibadan Ibadan.

Mansary A. (1985). ''Effects of two modes of concept Presentation and cognitive style on attainment of social studies concepts by secondary school student's'' (Unpublished PHD Thesis University of Ibadan).

Noval C.S 91989). Science concept achievement and cognitive function Journal of Research in science teaching 2 PP 7-16.

Onyejiaku F.O (1980). Validation of a modified siegels Cognitive test among Nigerian Secondary school Pupils'' Africa Journal of educational research 2(1 &2) PP 142-143.

Onyejiaku F.O (1980b Effects of Cognitive Style and Instructional Strategies on Academic Performance). (Unpublished PHD Thesis, University of Ibadan Ibadan.

Okobiah, O. S. (1984). Towards a more effective evaluation in social studies in the eighties'' in Okobiah, O. S and Udoh, E. N. E. (eds), Social studies in national development and integration; A publication of SOSAN and the Institution of Education, University of Nigeria, Nsukka, pp. 33-38.

Okwo F. A (1990): Interaction of Field Dependent and Field Independent with pictorial Adjusts in secondary school student learning of Physics from audio system. Unpublished M.E.D project University of Ibadan, Ibadan.

Skinner (1968). The technology of teaching; New York: Apple Century Crofls.

Mechrens W. and Lehmann I.. J. (1978). Measurement and Evaluation in Education and Psychology New York; Holt Rinehart and Winston..

Nwagwu H. A (1981) Sex Differential in the Manifestation of Behavioral problems in Nigeria school children. Africa Journal of Education research I (1) page 45-53.

Wetkin H.A (1977). Role of Field Dependent and Field Independent Cognitive Style in Academic Evaluation; A longitudinal study; Journal of Education Psychology 69 (3) Page; 197-211

Yore L.J (1986). The Effect of Lesson structure and Cognitive Style on the science Achievement of Elementary School Children. Science Education 70 (9) PP 461-471.