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ABSTRACT

The study investigates differences in learning styles as measured by the Learning Style Inventory (LSI), an instrument designed to identify sociological, emotional, environmental, and physiological factors that form an individual's learning style. The subjects for the study were a sample of fourth-, fifth-, and sixth-graders in a midwestern elementary school. The students were divided into three groups according to their achievement scores on the Iowa Test of Basic Skills. A series of one-way analyses of variance was conducted with scores on the LSI as the dependent variables and achievement category as the independent variables. Post hoc comparisons were completed as needed using the protected t-test. The findings support the previous findings that students do manifest significant variations in how they prefer to learn in a classroom setting. The average achievers did not display a significant preference for a particular learning style, while the high and low achievers did. The high achievers were more independent and motivated than other students, and they indicated significantly fewer physical needs than the others. No significant differences were indicated for global factors of sociological needs, emotionality and immediate environment. Based on the results of this study, teaching strategies could be developed to potentially enhance learning of the different achievement groups. (JAZ)

Learning Style and Academic Achievement in Fourth, Fifth and Sixth Grade Students

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The concept of teaching students through their individual learning styles has gained importance in educational circles for the past two decades. This issue was the impetus for a monograph devoted to this subject (National Association of Secondary Principals, 1979) in which learning style was defined as "...the characteristic affective, and physiological behaviors that serve as relatively stable indicators of how learners perceive, interact with, and respond to the learning environment" (p. 4).

Several instruments designed to assess differences in individual learning styles have been developed. Among the instruments developed for this purpose is the Learning Style Inventory (LSI; Dunn, Dunn and Price, 1978). The LSI is designed to identify sociological, emotional, environmental and physiological factors that the authors believe combine to form an individual's learning style.

The LSI is appropriate for use in grades three through 12. A majority of the research utilizing the LSI has involved exceptional students. Wild (1979) attempted to locate differences in the learning styles of learning disabled students, while the learning styles of gifted students were investigated by Griggs, Price and Dunn (1978). Few studies have been reported which investigated the relationship between learning style and academic achievement. Dunn, Dunn and Price (1978) identified several learning style factors which correlated with high and low

achievement in math and reading. Marcus (1979) attempted to identify learning style patterns of high, low and average academic achievers in junior high social studies classes.

White and Duker (1973) have stated that school systems have continued to increase their concern with providing the most comprehensive means to assist in student development during the 12+ years a student is involved in public education. In addition, there has been an increasing emphasis upon teaching students through their preferred modes of learning. Bloom (1976) and Hunt (1971) have advocated this approach to teaching and have developed educational procedures emphasizing the recognition and development of individual differences among learners.

It appears that early identification of student learning styles would be useful in planning programs to facilitate the learning process and to capitalize on individual strengths. However, very little is known regarding the learning styles or characteristics of high, low and average achievers in the elementary school. Therefore, the present study was designed to investigate differences in learning styles, as measured by the LSI, in fourth, fifth and sixth grade students achieving at high, low and average levels.

METHOD

Subjects

Subjects for the study consisted of all fourth, fifth and sixth grade students who participated full time in regular education programs in a midwestern elementary school serving a suburban/rural community. The sample consisted of 72 fourth graders, 66 fifth graders and 69 sixth graders forming a total sample of 207 (112 males and 95 females).

Procedure

Each student was administered the LSI in Fall 1984. The LSI was developed by Dunn, Dunn and Price (1975) for the purpose of assessing conditions under which the student learns most efficiently. The LSI was later revised in 1978. The LSI assesses individual performances in four general areas related to learning: (1) immediate environment (sound, temperature, light and design); (2) emotionality (motivation, responsibility, persistence and the need for either structure or flexibility); (3) sociological needs (self orientation, adult orientation, peer orientation and/or combined ways); and (4) physical needs (perceptual preferences, time of day, intake and mobility). These four general areas are further divided into 24 subscale factors.

Students were classified into three achievement groups (high, average and low) based on their composite achievement scores on the Iowa Test of Basic Skills, which was administered to the students as a part of the district's regular testing program. Students scoring in the upper 25% of the respective grade level were placed in the high

achieving group, students in the middle 50% range were placed in the average group and students in the lower 25% were placed in the low achieving group, using local norms. This resulted in 53 students in the high category, 108 in the average category and 46 in the low category.

A series of one-way analyses of variance were conducted with scores on the LSI as the dependent variables and achievement category as the independent variables. Post hoc comparisons were completed as needed using the protected t-test.

RESULTS

Significant differences were noted for the global factor of physical needs with $F(2,204) = 3.69$, $p < .05$. High achievers indicated a need for significantly fewer physical needs (mobility, perceptual preferences, etc.) than the other groups. Nonsignficant differences were indicated for the global factors of sociological needs, emotionality and immediate environment. Mean scores are presented in Table 1.

Insert Table 1 about here

Significant differences were noted on the following subscales of the LSI: perceived level of responsibility with $F(2,204) = 6.08$, $p < .01$; need for structure within the classroom setting with $F(2,204) = 3.64$, $p < .05$;

preference to have adults present in the learning environment with $F(2, 204) = 10.05$, $p < .001$; preference to learn through several sociological ways (individual, peer, group, etc.) with $F(2,204) = 4.35$, $p < .05$; and preference to have new information presented in a visual mode with $F(2,204) = 3.83$, $p < .05$. The low achievers perceived themselves as less responsible, needing more structure, being more adult oriented, having a preference for learning through several approaches and desiring more visual material during instruction as compared to the high achieving and average groups. The high achievers perceived themselves as being more responsible, needing less structure, being less adult oriented, and regarded learning through several different approaches as being less desirable than the average and low achieving groups. Mean scores for subscales of the LSI are presented in Table 2.

Insert Table 2 about here

DISCUSSION

The achievement groups differed significantly on a total of six factors measured by the LSI: sociological needs, responsibility, structure, learning with adults, learning through several ways and use of visual stimuli in instruction. These results lend credibility to White and Duker's (1973) assumptions that not all regular education

students necessarily learn in the same manner. This also supports previous research using the LSI that has identified significant differences among the learning styles of a variety of regular and special education students (Marcus, 1979; Griggs & Price, 1981; Dunn, Dunn & Price, 1978).

Of the 28 factors of the LSI, the average achievers displayed only one significant difference from the high and low groups. This was a perceived dislike for the use of visual stimuli during instruction. Outside of this factor, the average achievers did not indicate any perceived preference or dislike for the remaining 27 LSI factors.

This finding supports that average students may be more flexible in terms of their ability to understand and obtain information during instruction. Such a learning style could be conceptualized as using "whatever style works best at the time." These results are supported by the LSI research of Marcus (1979) where no significant preference for any learning style factors were found for average achievers as compared to their high and low achieving counterparts.

Several of the significant differences identified in the study support the ideal that the high achieving student is more independent and motivated than other students. High achievers perceived themselves as more responsible for their academic work, needing less structure in their school routines, and preferring not to be involved in adult oriented learning activities as compared to low and average

achievers. Similar results among high achievers were found by Marcus (1979) and Price, Dunn and Dunn (1978).

Such characteristics may have the ability to help to further support the high achievers in an academic environment. They may be more responsible and likely to complete work assignment. They have the ability and desire to work independently of the teacher/adult. And lastly, high achievers may not need to have rules and other structuring devices imposed on them in order for them to function effectively in the classroom. The above characteristics have a potential to lead teachers to perceive high achieving students in a more positive fashion than their counterparts. They may not require the teacher guidance, direction, time and effort to be successful in a classroom as low and average achievers may need. If teachers do take a positive view of such characteristics in their students, high achievers may be more prone to receive reinforcement from their teachers and find academic work intrinsically rewarding.

However, it is most difficult to determine if (a) teacher interactions emphasizing reinforcement for academic achievement actually increase school performance or (b) students who achieve at a higher than average rate elicit reinforcement tendencies from their teachers. Both factors may interact to influence teacher-student interactions.

Another important difference among the three achievement groups was the perceived desire for physical

needs in the learning environment. Such needs include food intake, the ability to move about the classroom and time of day that instruction takes place. Low achievers perceived themselves as having more physical needs than high and average achievers. On the other hand, high achievers had significantly fewer needs than the low and average groups. This may have some bearing on the ability of the achievement groups to function in the classroom. The traditional classroom is often a place where order is desired, physical movement is restricted and emphasis is placed upon developing intellectual abilities versus satisfying physical needs. If this is the case, it appears that the high achievers may fit into the classroom setting more easily than low achievers as their physical needs are fewer. The management of an elementary classroom may not incorportate enough physical stimuli, i.e. music, food intake, peer and group activities to meet the low achievers' optimally perceived learning environment. If this is so, operating a classroom which does not meet the students' physical needs may hinder a low achiever's chances for academic success.

Low achievers in this study indicated a perceived preference to learn through several sociological ways including learning by self, with a peer, with a group of students and with adults present. High achievers scored significantly lower on this factor, suggesting the absence of a need to vary the sociological learning format. However, there was no indication as to the specific

sociological mode high achievers perceived as most conducive to learning.

This may suggest that high achievers have found a specific learning style which they are comfortable with and use effectively in a learning situation. On the other hand, low achievers may not have developed any one preferred learning style.

These results suggest that low achievers may learn new information when it is provided through a variety of instructional modalities. This could include individual instruction, group activities, such as a reading group or participating in a play, independent work and direct instruction to the class by the teacher. Such procedures may enable a low achieving student to obtain new information more readily as the learning can be reinforced by these different instructional techniques.

A major limitation of the present study concerns the number of statements in the LSI measuring specific subfactors. These ranged from two to eight. Those subfactors and the number of statements in () that were found to discriminate between the three achievement groups in this study included: adult motivation (3), responsiblity (6), structure (4), learning through several ways (3), and preference for visual modality (3). The limited number of statements used to measure these subfactors should cause the accuracy of their measurement to be questioned. Therefore,

these results, although statistically significant, should be interpreted with caution.

The differences between the achievement groups and their perceived preference for physical needs can be viewed with greater confidence. The physical needs factor is one of the global measures of the LSI and included a total of 38 statements.

CONCLUSIONS

The current research lends support to previous findings that students do manifest significant variations in how they prefer to learn in a classroom setting. This includes students participating in regular education curricula as well as those students receiving special education services. The majority of past efforts to identify student learning styles has focused upon special education and older students at the junior high school level and beyond. The results of the present study suggest that younger students are also capable of identifying factors within their classroom environment that may facilitate the learning process.

If students, particularly elementary students, are indeed able to accurately assess their individual learning styles, educators have a potential tool to design learning environments that best suit individual students or groups of students with similar learning style preferences.

There have been a number of studies that have substantiated that different learning styles exist among

different education groups. However, there has been little effort directed toward teaching these students through their identified learning styles to see if it would actually result in improved educational performance (Martin, 1977). This type of research could assist in answering several important questions. Can students accurately identify their learning styles? Will teaching students through their learning style preference result in higher educational performance?

Based on the results of this study, teaching strategies could be developed to potentially enhance learning of the different achievement groups. Overall, high achievers appear to be independent and responsible students. They may benefit from self directed tasks such as developing their own projects to work on in relation to the subject matter being taught.

Low achievers may benefit from having their school day follow a structured schedule where times for specific activities are clearly stated. Within this schedule, they could be exposed to a variety of instructional experiences. During arithmetic, instructional activities might include direct lecture by the teacher, independent work on self correcting worksheets, and playing math games with fellow students. This would provide the low achieving student with exposure to the concept being taught through a variety of instructional modes which would reinforce the learning of that concept.

Within the classroom, teachers may need to give more attention to the physical needs of low achievers. This may include providing more chances to move about the classroom or allowing the student to eat snacks during the school day.

The results of the present study suggest that all regular education students do not necessarily learn in the same manner. The results are also consistent with previous research with the LSI that has identified significant differences among the learning styles of a variety of regular and special education students (Marcus, 1979; Griggs & Price, 1981; Dunn, Dunn & Price, 1978). As with the Marcus study (1979), the average achievers in the present study did not display a significant preference for a particular learning style, while the high achievers and low achievers did. The high achieving student appears to be more independent and motivated than other students. Such characteristics may have the potential to lead teachers to perceive high achieving students in more positive ways than their counterparts. At the same time, the low achieving student appears to need greater structure, variety and organization within the learning environment.

References

Bloom, B. S. (1976). Human characteristics and school learning. New York: McGraw-Hill.

Dunn, R., Dunn, K., & Price, G. (1975). Learning Style Inventory Manual. Lawrence, KS: Price Systems.

Dunn, R., Dunn, K., & Price, G. (1978). Learning Style Inventory Manual. Lawrence, KS: Price Systems.

Griggs, S., Price, G., Dunn, R. & Dunn, K. (1981). Studies in student learning styles. Roeper Review, 4, 38-40.

Hunt, D. E. (1971). Matching models in education. Toronto: Ontario Institute for Studies in Education.

Marcus, L. (1979). Learning style and ability grouping among seventh grade students. Clearing House, 52, 377-380.

National Association of Secondary School Principals. (1979). Student learning styles, diagnosing and prescribing programs. Reston, VA: Reston Publishing.

White, M. & Duker, J. (1973). Suggested standards for childrens samples. American Psychologist, 28, 700-703.

Wild, J. (1979). A study of the learning styles of learning disabled students and nonlearning disabled

students at the junior high school level. Unpublished masters thesis, University of Kansas, Lawrence, Kansas.

Table 1

Mean Scores on LSI Global Factors by Achievement Level

LSI FACTOR	ACHIEVEMENT LEVEL LOW	AVERAGE	HIGH	p
Physical	22.70a (5.09)	21.36b (3.98)	20.36c (4.08)	< .05
Sociological	10.04 (2.21)	9.76 (1.68)	9.15 (2.32)	NS
Own Emotionality	14.26 (3.17)	13.70 (2.21)	13.23 (1.86)	NS
Immediate Environment	13.19 (2.04)	12.97 (2.39)	12.60 (2.31)	NS

Standard deviation expressed in ().

Means with common subscripts do not differ significantly from each other.

Table 2

Mean Scores on LSI Subscales by Achievement Level

SUBSCALE	ACHIEVEMENT LEVEL LOW	AVERAGE	HIGH	p
Responsibility	3.57a (1.29)	3.29b (1.36)	2.70c (1.14)	< .05
Structure	2.98a (0.83)	2.69b (0.80)	2.51c (1.01)	< .05
Adult Oriented	2.02a (0.57)	1.73b (0.70)	1.39c (0.77)	< .05
Learn Through Several Ways	2.13a (0.80)	1.90b (0.73)	1.68c (0.77)	< .05
Visual Oriented	1.63a (0.71)	1.26b (0.80)	1.34c (0.73)	< .05
Sound	3.89 (1.02)	3.96 (1.23)	3.70 (1.12)	NS
Light	2.52 (0.83)	2.61 (0.86)	2.60 (0.93)	NS
Temperature	2.78 (0.73)	2.78 (0.75)	2.75 (0.90)	NS
Design	3.85 (1.25)	3.58 (1.53)	3.42 (1.51)	NS
Self Motivated	3.04 (0.79)	2.92 (0.71)	3.02 (0.75)	NS
Adult Motivated	1.72 (0.75)	1.94 (0.74)	2.06 (0.72)	NS
Teacher Motivated	2.46 (0.86)	2.55 (0.75)	2.70 (0.57)	NS
Unmotivated	0.54 (0.81)	0.52 (0.57)	0.47 (0.64)	NS
Persistence	3.46 (1.33)	3.19 (1.13)	3.11 (1.03)	NS
Learn Alone	3.89	4.09	3.94	NS

	(1.21)	(0.97)	(0.97)	
Peer Oriented	1.09 (0.84)	1.22 (0.85)	1.38 (1.06)	NS
Auditory	2.61 (0.95)	2.33 (1.02)	2.38 (1.11)	NS
Tactile	2.60 (1.20)	2.64 (1.01)	2.66 (1.04)	NS
Food Intake	3.43 (1.76)	3.26 (1.86)	2.98 (1.87)	NS
Learn in Morning	1.35 (0.92)	1.34 (0.93)	1.40 (0.93)	NS
Learn Late in Morning	1.48 (0.55)	1.56 (0.69)	1.47 (0.64)	NS
Learn in Afternoon	1.83 (0.93)	1.86 (0.69)	1.90 (0.84)	NS
Learn in Evening	0.98 (0.71)	0.92 (0.73)	0.68 (0.58)	NS
Mobility	4.52 (1.43)	4.79 (1.47)	4.34 (1.39)	NS

Standard deviation expressed in ().

Means with common subscripts do not differ significantly from each other.