

A Comparative Study of the Learning Style, Thinking Style and Brain Hemisphericity of Secondary School Children



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Abstract

An awareness of individual differences in learning has made educators and teacher educators program more sensitive roles in teaching and learning and has permitted them much in teaching and learning-thinking styles so as to develop students. Students and trainees use different style in learning and thinking and an educator should be aware of his students' preferred learning- thinking styles to make learning interesting and effective. This research finds out the learning and thinking styles with preferred dominance of hemisphericity and brain behaviour in the govt. and private school students to provide a new framework to understand the ways students' process information. This study attempts to know the right hemisphericity, left hemisphericity and integrated hemisphericity or whole brained preference of the verbal, content, class, learning, interest etc. learning styles and the preference of logical, divergent, convergent, creative, problem solving, imaginative etc. thinking styles of the students in the govt. and the private schools. These styles are concerned with cognition, perceive and gaining of knowledge differently, with conceptualization of ideas and think differently, with affect to feel and form values differently and with behaviour to act differently. The tool "Style of Learning and Thinking" (SOLAT) (Dr. D. Venkataraman, 1994) is used for the data collection.

Determining the preferred dominance of hemisphericity can provide the impetus towards a framework built on a sound knowledge base and towards an emerging psychology which will help us promote the development of holistic personality of a child. On the other hand, has provided teachers with different view of learning and demonstrated how to apply it to classroom teaching. The application of this knowledge in the schools and teacher education should mark the solid beginning for major new methodologies for designing learning tasks, instructions for the students and trainees provided information about the dual aspects of the human mind and consciousness. This will improve learning and thinking, a basic frame work upon which practice of learning and instruction depends focussing on individual difference of learners and more toward building 'brain-compatible' approaches for learning.

Keywords: Learning Style, Thinking Style, Right, Left, Integrated Hemisphericity, SOLAT

Introduction

Learning and thinking style are the method of educating particulars to an individual that is presumed to allow that individual to learn best. It is commonly believed that most people favour some particular method of interacting with, taking in and processing stimuli of information. Based on this concept the idea of individualized "learning styles" originated in the 1970's and has gained popularity in recent years.

Learning is an interactive process, the product of students and teachers activity within a specific learning environment. These activities, which are the central elements of the learning process, show a wide variation in pattern, style and quality (Keefe, 1987). Learning problems frequently are not related to difficulty of the subject matter but rather to the type and level of cognitive process required to learn the material. Gregore and Ward (1977) claims that if educators are to successfully address the needs of the individual they have to understand what "individual" means. They must be related of teaching styles to learning and thinking style.

Knowledge of stylistic characteristics and their underlying forces can help educators to understand some of the hidden forces behind individual differences. Accepting the diversity of style can help us to create the atmosphere and experiences that encourage each individual to reach his or her full potential. To appreciate diversity in style one should recognize several basic functions that we all perform when interacting with a situation, then we think about it, react to it, and ultimately act upon it. These basis functions guide us to create four categories to style differences.

The dual nature of the human mind and consciousness has been pointed out for thousand of year in literature, art, philosophy and religion. However, practical people in education, business, industry, and the like have continued to be sceptical about the matter and have rarely made deliberate use of this information in recent years., clinical and experimental studies have reduced, this scepticism and there is now active interest in using information about the dual aspects of the human mind and consciousness to improve learning and thinking.

Learning style and thinking styles has been considered a superficial, consisting of surface behaviours, characteristics, outward features, however, is more than mere appearances. Reveal themselves to be surface indicators of two deep levels of the human mind and brain dominance: whole systems of thought, and peculiar qualities of the mind which an individual used to establish links with reality.

Knowledge of stylistic characteristics and their underlying forces can help educators to understand some of the hidden forces behind individual differences. To appreciate diversity in style one should recognize several basic functions Cognition, Conceptualization, Affect and Behaviour.

It is possible by eliminating the barrier to learning by working with the hemispheric preference of the learners as well as providing opportunities for actuating the functioning of non-dominant hemisphere. This might help students to become more integrated learning with better processing skill in both hemispheres. The teaching and learning procedures must be organized in such a way that they tone up and activate the hemisphere function of the brain in students.

Justification of the Problem

Instruction should be planned with an analysis of the ways a particular student process information and this insight provides educator with a more substantive framework for planning than did earlier "single approach" proposals for teaching all students. Recent research findings of learning styles, thinking styles and brain behaviour provide a new framework for understanding the ways students' process information. Recognizing and defining the styles by which a person learns to be important to the learning process as diagnostic tests are to the healing process in the field of medicine. The early application of this knowledge in a school setting should mark the solid beginning for major new methodologies for instructing students.

Knowledge about learning styles, thinking styles and brain hemisphere is fundamental new tool at the service of student and teachers. It provides a profound view of the learner and a basic frame work upon which practice of learning and instruction may be built.

Review of Literature

Psychological Activities Related to Hemispheric Functions

By working with patients who had two hemispheres (right and left: which are intimately related to the consciousness of the person) of their brain surgically separated in an attempt of malepileptic seizures. Roger Sperry (1975) of the California Institute of technology and Joseph Bogen (1969) and their associated of Roll Less medical group (Bogan, fisher and Bogern, 1965; Gazzaniga (1970), Gazzaniga and Sperry' 1967 Sperry 1968 and Ornstein have confirmed with John Hyghrings Jockson asserted in 1878 that our brain consists of two distinctive but anatomically symmetrical units, the right and left hemispheres. These studies on the functioning of the human brain, together with new findings indicate that two hemispheres of the cerebral cortex processes organize and encode information differently. Each cerebral hemisphere is capable of functioning in a manner different from the other. The brain also specializes within each hemisphere as well as across the hemispheres.

Further investigating thinking styles and psychosocial development in the Chinese higher education context, Zhang.L.F.,University of Hong Kong; Research Gate. The primary objective of this research was to further investigate the predictive power of thinking styles for psychosocial development through replicating Zhang and He's (in press) study of Chinese university students in Shanghai, mainland China. The finding are Type I styles (typified by their creativity-generating characteristics) positively contributed to psychosocial development, whereas Type II styles (noted for their norm-favouring features), especially the monarchic and conservative styles, negatively contributed to psychosocial development. Two of the Type III styles (Type III styles may display the characteristics of either Type I or Type II styles, depending on the specific situation) consistently predicted psychosocial development: the external style positively contributed to psychosocial development, whereas the anarchic style did so negatively.

The role of critical thinking skills and learning styles of university students in their academic performance, Ghazivakili.Z,¹ Norouzinia. R,² Panahi.F,³ Karimi.M,⁴ Gholsorkhi.H,⁵ Ahmadi.Z., J Adv Med Educ Prof. 2014 Jul; 2(3): 95–102. The results of this study showed that the students' critical thinking skills of this university aren't acceptable. Also learning styles, critical thinking and academic performance have significant relationship with each other. Due to the important role of critical thinking in enhancing professional competence, it is recommend using teaching methods which are consistent with the learning styles.

The Study of Learning Styles, Thinking Styles, and English Language Academic Self-efficacy among the Students of Islamic Azad University of Behbahan Considering Their Field of Study and Gender, Negahi. M., Nouri. N., Khoram , A., Islamic Azad University, Ahar & Behbahan, Iran.; Theory and Practice in Language Studies, Vol. 5, No. 8, pp. 1722-1729, August 2015 DOI, ISSN 1799-2591. The purpose of the present paper was the study of learning styles, thinking styles, and English language academic self-efficacy among the students of Islamic Azad University of Behbahan considering their field of study and gender. The results showed that the engineering students had more academic self-efficacy than humanities students. Humanities students had more divergent accommodate learning styles, but engineering students had more convergent and assimilate learning styles. The rate of academic self-efficacy among male students was greater and had more assimilate learning style but female students had more divergent learning style. The results also showed that the prevailing thinking style among male students was the judicial thinking style, among female students and humanities students were the executive thinking style but engineering students had more legislative thinking style.

Learning Style Construct in Student's Learning, Bakar. Z.A., Ali. R., Mimbar Pendidikan Journal, Vol 1, No 2 (2016). This explorative study focuses on the literature that supports the issues of validity, effectiveness, and applicability of learning style construct in school learning and general learning. The relationship of learning styles to academic achievements, attitudes toward learning, and multimedia technology was identified as the important element. There are clear and marked differences between cognitive and learning style.

An Analysis on the Relationship of Thinking and Learning Styles with Communication Style was searched by Liliweri.A., Cendana. N., University, Kupang, Indonesia . The study focuses on identifying and describing (1) the communication style, (2) the thinking style, (3) the learning style of the postgraduate (graduates and postgraduates) students of Nusa Cendana university (Universitas Nusa Cendana (Undana), (4) the level of relationship of thinking style and communication style of the students, (5) the level of the relationship of learning style and communication style of the students, (6) the level of the relationship of both, thinking and learning styles with the communication style, and (7) the level of the difference between thinking style, learning style and communication style of the students.

Right Hemisphere

The right cerebral hemisphere, which controls the left side of the body is called the minor, subordinate of mute side because it cannot verbalize what it knows. This was found by Geschwid (1970) to be anatomically smaller than the left hemisphere. Research has indicated that the right hemisphere has remained underestimated and even today neurophysiologists to the view that the right hemisphere is a mere unconscious automation while we live in left hemisphere.

The studies of Goldberg and Costa (1981) concludes that the right hemisphere has a great neuronal capacity to deal with information complexity. The studies on the development aspect of the brain indicate that her right hemisphere matures earlier than the left hemisphere and balance between two in children is no similar to one found in adults. The right hemisphere has a greater ability to process many modes of information within a single cognitive task, while the left hemisphere is superior in tasks which require fixation upon a single mode of representation of execution.

Left Hemisphere

Each hemisphere is capable of functioning in a manner different from the other for many years attention was focused on the left hemisphere in which speech was localized, the so called 'dominant' leading or major hemisphere. It was hypothesize that this hemisphere was primarily responsible for the processing of language and planning, the two functions which clearly distinguished men from the right hemisphere, as evidenced by neonatal studies (Geschwind 1972). It is considered to be more active than the right hemisphere in most adults, as indicated by EEG analysis.

Psychological and split brain researches show that the two hemispheres have specialized, Complementary functions. The left hemisphere apparently specializes in sequential logical, verbal, symbolic, convergent production and logic functioning.

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Area of Research

There may be any difference between the preference for hemisphericity in Govt. and private school student prefer different in learning and thinking. Public school students may prefer particular hemisphere in learning and thinking. Government school students may prefer any other hemisphere in learning and thinking. There even may be difference in the whole brain processing.

The following are the areas of the research in broad spectrum.

1. Learning Style, Thinking Style and Brain Hemisphericity concerned with cognition: people perceive and gain knowledge differently.
2. Learning Style, Thinking Style and Brain Hemisphericity concerned with conceptualization: people form ideas and think differently.
3. Learning Style, Thinking Style and Brain Hemisphericity concerned with affect: people feel and form values differently.
4. Learning Style, Thinking Style and Brain Hemisphericity concerned with behaviour: people act differently.

Operational Definitions of the Terms

Learning Style

"Consisting of distinctive behaviours which serve as indicator of how a person learns from and adopts to the environment. It also gives clues as to how a person's mind operates", Greagore. Keefe perceives cognitive, affective, and psychological behaviours that serve as relatively stable indicators of how learners perceive, interact with and respond to the learning environments. Hunt believes that learning style describes a student in terms of those educational conditions under which he is most likely to learn. Learning style describes how a student learns, not what he has learned.

Thinking Style

James S. Ross has defined thinking as "mental activity in its cognitive aspect; or 'mental activity with regard to physical objects' whether or not these objects are accessioned directly by objects in the outer world." According to C.W. Valentine, "In strict psychological discussion it is well to keep the term 'Thinking' for an activity which consists in essentially of a connected flow of ideas which are directed towards some end or purpose.

Right Hemisphericity

The right cerebral hemisphere, which controls the left side of the body, is called the minor, subordinate of mute side because it cannot verbalize what it knows. The studies on the development aspect of the brain indicate that her right hemisphere matures earlier than the left hemisphere and balance between two in children is no similar to one found in adults. The right hemisphere has a greater ability to process many modes of information within a single cognitive task, while the left hemisphere is superior in tasks which require fixation upon a single mode of representation of execution.

The right hemisphere of the brain is characterized by numerous functions and no more particular technique of teaching will suffice to develop these functions specifically musical, artistic, creativity, divergent thinking and special tasks etc.

Left Hemisphericity

Each hemisphere is capable of functioning in a manner different from the other for many years attention was focused on the left hemisphere in which speech was localized, the so called 'dominant' leading or major hemisphere. It was hypothesize that this hemisphere was primarily responsible for the processing of language and planning, the two functions which clearly distinguished men from the right hemisphere, as evidenced by neonatal studies

(Geschwind 1972). It is considered to be more active than the right hemisphere in most adults, as indicated by EEG analysis.

The left hemisphere controls the right side of the body apparently specializes in sequential logical, verbal, symbolic, convergent production and logic functioning.

Integrated Hemisphericity or Whole Brained

When both the hemisphere functionally takes part they contribute to whole brain functioning.

Objectives of the Study

The present study will be conducted keeping in view of the following objectives:-

1. To find out the right brain hemisphericity and learning and thinking style of government and private secondary school students.
2. To find out the left brain hemisphericity and learning and thinking style of government and private secondary school students.
3. To find out the integrated brain hemisphericity and learning and thinking style of government and private secondary school students.
4. To compare the left brain, right brain or integrated brain hemisphericity and learning and thinking style of government and private secondary school students.

Variables Involved in the Study

The number of factors in each dimension of learning and thinking styles generating the variables Right Hemisphericity, Left Hemisphericity And Integrated Hemisphericity or Whole Brained are given below:

Learning Style

Verbal

Relating to or in the form of words.

Content Preference

Preference of that has to be expressed.

Class Preference

Preference of branch of learning.

Learning Preference

Preference of the way of learning.

Interest

The feeling of a person whose attention, curiosity is particularly engaged by something.

Thinking Style

Logical Thinking

This is the highest type of thinking. When a person, in the process of mental thinking, makes use of various concepts with a definite object or aim & links them together, then he does Logical Thinking.

Divergent Thinking

Divergent Thinking is a thought process or method used to generate creative ideas by exploring many possible solutions.

Convergent Thinking

Convergent Thinking is the process of finding a single best solution to a problem that one is trying to solve.

Creative Thinking

A way of looking at problems or situations from a fresh perspective that suggests unorthodox solutions.

Problem Solving

Problem Solving is the process of finding solutions to difficult or complex issues.

Imagination

Imagination is the faculty or action of forming new ideas, or images or concepts of external objects not present to the senses.

Brain Hemisphericity

The two hemispheres of the cerebral cortex processes organize and encode information differently. Each cerebral hemisphere is capable of functioning in a manner different from the other. The brain also specializes within each hemisphere as well as across the hemispheres.

Right Hemisphericity

The right cerebral hemisphere, which controls the left side of the body, apparently specializes in spatial tasks, musical, artistic, creativity, imagination, body control and awareness.

Left Hemisphericity

Left brain hemisphere, which controls the right side of the body, apparently specializes in sequential logical, verbal, abstract, symbolic and convergent production and functioning and more analytical and convergent thinking.

Integrated or Whole Brain Hemisphericity:

When both the hemisphere functionally takes part they contribute to whole brain functioning.

Hypothesis

1. There is no significant difference between the right brain hemisphericity of learning and thinking style of the secondary school students of government and private schools.
2. There is no significant difference between the left brain hemisphericity of learning and thinking style of the secondary school students of government and private schools.
3. There is no significant difference between the integrated or whole brain hemisphericity of learning and thinking style of the secondary school students of government and private schools.

Methods of the Study

Descriptive survey method of research will be used.

The study Consisted in taking a representative sample of 100 students (50 student of Govt. school and 50 students of Pvt. School)of Class IXth standard from Daulatpur Higher Secondary School (Govt.) and Elite Coed H.S. School (Pvt.) of West Bengal. The school wise breakup of the sample is given below:

	No. of Students
Government School	50
Private School	50
Total	100

Tools of the Study

In the present study by investigator for collection of relevant date (SOLAT) STYLE OF LEARNING AND THINKING Constructed by Dr. D. Venkataraman (1994) is used to indentify style of learning and thinking of the students.

Selection of Tool

The criteria for the selection of the tool were high reliability, validity and suitability in Indian contest by the investigator for the study:-

The tool used was:-

Style of Learning and Thinking (Solat)

Developed By Dr. D. Venkataraman (1994)

SOLAT

The difference in preference of the hemispheres for information processing has been referred to as styles of learning and thinking by Torrance (1977). Torrance and others have developed the SOLAT tool based on the hemisphericity function. It indicates a student's learning strategy and brain hemisphere preference in problem solving. SOLAT tool was constructed on the basis of the function of right hemisphere and left hemisphere of the brain. There are 50 items in learning style and thinking style based on the specialized information processing preferences associated with hemisphericity. Statements were written explicating and refrying the references for right and left hemisphere functions at the rate of one statement for each type of preference for each item.

Application of Tools & Techniques

Structure of Solat Tool

The number of factors in each dimension of learning and thinking styles generates the variables Right Hemisphericity, Left Hemisphericity and Integrated Hemisphericity or Whole Brained. The number of items in each dimension of learning and thinking styles are given below:

Learning Style

No.	Dimension	No. of Items
1.	Verbal	5
2.	Content Preference	5
3.	Class Preference	5
4.	Learning Preference	5
5.	Interest	5
Thinking Style		
1.	Logical/Fractional	5
2.	Divergent/Convegent	5
3.	Creative	5
4.	Problem Solving	5
5.	Imagination	5
Total		50

Instructions for the Administering The Test

SOLAT has 50 items. Each item consists of two statements. Responses are obtained on the test book itself. There is no time limit but generally 30 minutes have been found sufficient for responding all the items. Instructions for the time of administration of the test are also given in the manual. The respondents are asked to mark on the statements in the check list. The students should be told the purpose of test. Any doubts raised by the student should be answered frankly. They should be assured that the responses obtained on the test will be kept secret.

Scoring of the Tool

In the tool, against serial number 1 to 50. Checking of the first statements indicates left hemisphere, checking of the second statements

indicates right hemisphere and checking both the statements indicates integrated hemisphere or whole brained.

The hemisphericity dominance is determined on the basis of the highest score in three categories of dominance, as far as a group testing of scoring is concerned.

Analysis and Interpretation of Data

The process of analysis & interpretation is essentially one of stating what the result show and what is their significance? Here facts, objectives, data never determine anything. They become significant only as interpreted in the light of accepted standards and assumptions, the standard in final analysis are not susceptible of scientific determination in ordinary life, we seldom deal with facts interested.

Analysis of data & interpretations of the result was done properly by the following standards:

1. Calculation of mean.
2. Calculation of S.D.
3. Calculation of 't' value
4. Testing the significance of 't' value
5. Tables

Statistical Techniques

For analysis and interpretation of data following statistical techniques were used.

Mean

Mean was used as a measure of central tendency of the distribution of scores on different factors; the use of mean was justified because the variables ware continuous as the measurement was of interred level. Means were calculated by using the following formulas.

Mean (M) = $\Sigma X/N$

Here M= Mean

ΣX = Sum of the Frequencies

N = Number of Scores

Standard Deviation

Standard Deviation of any distribution shows the dispersion of the scattered scores in the distribution along with them. Here in the present study the Standard Deviation was calculated by using the following formula.

Formula

$$s_D = \sqrt{\frac{\Sigma D^2 - \frac{(\Sigma D)^2}{N}}{N-1}}$$

Where SD (σ) = Standard Deviation

D = Deviation of the item from mean (X-M)

N = Total no of frequencies

'T' Value

't' test of measuring of the first group

$T = M_1 - M_2/\sigma_d$

Where M_1 = Mean of the first group

M_2 = Mean of the second group

σ_d = Standard error of difference

Here $\sigma_d = (\sigma_1^2)/N + (\sigma_2^2)/N$

σ_d = standard error of difference

σ_1 = standard deviation of first group

σ_2 = standard deviation of second group

N_1 = Number of frequencies of first group

N_2 = Number of frequencies of second group

Reliability of the Tool

The reliability of the tool was measured by test-retest method. The reliability co-efficient of correlation for the right hemisphere function was found to be 0.89, for the left hemisphere function the com-efficient of correlation was found to be 0.65. The co-efficient of correlation for the integrated score was 0.71. The co-efficient suggest that the SOLAT possesses reliability to a significant level.

Validity-Content Validity Evidence

A compilation of findings was made from an extensive survey of literature on specialized cerebral functions of the hemisphere (Venkataraman 1989). The item were constructed by attempting to translate research findings on hemisphericity into a multiple choice formula without representing particularly right hemisphere functioning or left hemisphere functioning. The initial construct validity study was conducted by the author. The SOLAT was tested with 50 students from a variety of academic disciplines. As a part of the course, each student took several tests of creativity which provided to construct validity evidence.

Concurrent Validity

The SOLAT tool was constructed and validated with the help of Standardized SOLAT tool constructed by Paul Torrance. To find out the validity of the tool both the SOLAT tools (i.e. tool prepared by Torrance and tool prepared by the investigator) were administered on 300 subjects. The correlation between the two tests scores was 0.842 for the right hemisphere part 0.621 for the left hemisphere and 0.678 for the integrated part.

Level Of Significance

Here two levels of significance of any statistics were considered viz. 0.05 and 0.01 levels. If the probability the value of statistics by chance were less than 0.05, it was considered significant at the level similarly when the probability was less than 0.01, it was considered significant at that level. It may be recalled that level of significance devoted the type to commit in rejecting a true null hypothesis.

Findings

Table -1, Showing means, S.D. and 't' value of the Scores Hemisphere

Cherebral Hemisphere	Govt. School		Private School		't' Value
	Mean	S.D.	Mean	S.D.	
Right	23.5	4.1	23.6	5.0	1.2
Left	20.2	3.3	16.8	5.8	3.6
Integrated	6	4.3	6	4.3	0

Results and Discussions

The important findings of the study are given below:

1. The mean value of right hemisphere scores of government school students is 23.5 and means value of private school students is 23.6 and 't' value is 1.2. The right brain hemisphericity of the secondary school students of government and private schools is non significant at 0.01 level and at 0.05 level of significance. Thus there is no significant difference between the right brain hemisphericity of learning and thinking style of the secondary school students of government and private schools.

2. The mean value of left hemisphere scores of government school is 20.2 and mean value of private school is 16.8 and 't' value is 3.6. The left brain hemisphericity of the secondary school students of government and private schools is significant at 0.01 level and at 0.05 level of significance. This shows that government school students had preference for left hemisphericity than private school students. Thus there is significant difference between the left brain hemisphericity of learning and thinking style of the secondary school students of government and private schools.
3. The value of integrated hemisphericity scores is 6 for both type of schools and 't' value shows non-significant difference between the two. Thus there is no significant difference between the integrated or whole brain hemisphericity of learning and thinking style of the secondary school students of government and private schools.

Conclusion

On the basis of the discussion of results, the following conclusions are drawn:-

The knowledge of preferred hemisphere can help a teacher to design learning tasks for effective learning tasks for effective learning to take place. A right hemisphere person appears to be more efficient at those tasks for which the right hemisphere is specialized. The right cerebral hemisphere, which controls the left side of the body, apparently specializes in spatial tasks, musical, artistic, creativity, divergent thinking, imagination, body control and awareness. A left preference person should be more efficient at left hemisphere specializations left brain hemisphere, which controls the right side of the body, apparently specializes in sequential logical, verbal, abstract, symbolic and convergent production and functioning and more analytical and convergent thinking.

The government school students prefer left hemisphere would tend to think "in word" and would prefer inductive reasoning while dealing with any task. On the other hand means value shows that private school students prefer right hemisphere meaning that individual ward tend to think "in pictures" and would prefer deductive reasoning in dealing with tasks.

Private school teachers can design their instruction based for the right brain thinkers. Deductive approach and many other preferred activities can be designed according to their cognitive preferred style of learning and thinking. For the left brain thinker new concepts would be introduced in an analytical manner with verbal emphasis followed by non-verbal "hands on" exploration of materials to encourage spatial –synthetically modality. In the present study students shows equal preference for right and whole brain processing.

The difference in mean values showing preference of the right and left hemisphere of the private and government students respectively in learning and thinking style be can used in various ways to give brain based education. Student use different style in learning and thinking and an educator

should be aware of his students' preferred learning style to make learning interesting and effective.

Determining the preferred dominance of hemisphericity can provide the impetus toward a framework built on a sound knowledge base and toward an emerging psychology which will help us promote the implementation of learning and thinking style. Thus we may be able to help the child by what the child initiates. Now educational institutional should become sensitive to understand the needs of the individual learner and more toward 'brain-compatible' approaches for learning.

Educational Implications

1. By establishing a relationship between the learning style & thinking in the govt. & private high school students which can thus modify the behavior pattern in the relevant direction.
2. The study will be useful for the students who are more analytical and convergent thinkers or creative and divergent thinkers. The instructional designs should be made according to their need for learning.
3. By determining the preferred dominance of hemisphericity can provide the impetus toward a framework built on a sound knowledge base and toward an emerging psychology which will help us to promote the development of holistic personality of a child.
4. The study will be useful for the educational institutional for they should become sensitive to understand the needs of the individual learner and more toward 'brain-compatible' approaches for learning.

Limitation of the Study

The investigator without any hesitation confesses the following limitations in the work:-

1. The sample of the study in only 100 students (50 students of government and 50 students of private school). The study can be done on a bigger sample.
2. The study in limited to compare the learning style and thinking of government and private school students, other aspects related with learning and thinking style can also be the part of the study.
3. The study is limited to compare the learning and thinking style of secondary school students only.
4. The study is limited to students of government and private school. The study can be done on boys and girl separately in government and private school.
5. The study is limited to compare the brain dominance of government and private school students. There are fifty items related to three brain dominance variables.

Suggestions

1. A similar study can be done on primary of middle classes studies and brain dominance in government and private school.
2. A similar study can be done on the students to urban area and rural area.
3. A similar study can be done on the relationship between personality development and learning styles.

4. A similar study can be done on the other selected group of students, such as those having learning disabilities, high and low achievers, and the gifted and the talented.
5. A study can be done on relationship between learning and thinking styles of parents and siblings.
6. A study can be done to know will instruction improve when students learning and thinking styles are matched with appropriate teaching styles.
7. A study can be done to know do various socio-economic groups possessing contrasting learning and thinking styles.
8. A study can be to search that do students actually learn more according to the brain dominance.
9. A study can be done to know will instruction improve when students learning styles are matched with appropriate teaching styles.

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