

“THE EFFECT OF METAGONITION WITH RESPECT TO THEIR BRAIN LATERALITY IN LEARNING”

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ABSTRACT

The purpose of this study is to determine the effects of brain Laterality and Metacognition and their relationship through an academic Achievement. This has a great impact on the learning process. Therefore, having an idea about the brain laterality in students and their result shows like, each individual differs in their brain laterality. The concept of Metacognition is of recent buzz in the education setting. Till now many researchers had researched on Brain Laterality and Metacognition separately and their result shows that both are very important factors in student's life since their role in academic achievement cannot be ignored. Data were collected from a sample of 400, 9th standard students of Mangalore Taluk. Tools used were Open Hemispheric Brain Dominance Scale 1.0: A Standardized Tool by Eric Jorgenson (2015) Meta Cognitive Inventory (MCI) developed and standardized by Dr. Punita Govil (2003). Karl Pearson's Correlation "r" were used to find out if there is any significant relationship between Brain Laterality and Meta Cognition. Statistical analysis revealed that there is significant relationship between brain laterality and metacognition. If the teacher knows his or her students well, he or she can use the methods, techniques and materials adequately. This research will help the teachers to find out the dominant part of their students' brains and use the appropriate classroom techniques, methods and tools according to them.

KEYWORDS: brain laterality, left hemisphere, right hemisphere, multiple intelligence, metacognition.

INTRODUCTION:

The Brain is the master controller of a network that transmits and controls any information sent to and from the other areas of the body. It consists of a great number of neural networks, and the complexity of these neural networks determines the level of thinking ability from the low order thinking skills to high-order thinking skills such as critical, creative, logical, analytical, and reflective thinking ability.

In a classroom, the teacher is to facilitate successful learning opportunities for all learners; he or she must know the learner. The learner, of any age is a product of nature and nurture. Each child belonging to a different culture, socio-economic status, gender and age deserves to have an equal opportunity to be successful in school. Knowing each student's talents is essential for providing successful learning opportunities.

Metacognition is an important part of intentional learning, since it involves actively thinking about what you know, what you don't know, and how you can get better at knowing and applying what you know. Metacognition enables us to be successful learners and has been associated with intelligence. Metacognition also involves thinking about one's own thinking process such as study skills, memory capabilities, and the ability to monitor learning. Metacognitive knowledge is about our own cognitive processes and our understanding of how to regulate those processes to maximize learning.

It shows that students come to the classroom with various level of facts with relationship between Brain laterality and Metacognitive skill. It is important to study the wide diversity of Brain Hemisphere techniques and findings related to Metacognition, self-evaluation, self-directed learning among 9th standard students. So that teacher can plan their teaching process in a such way that brings every student to reach their goal.

BRAIN LATERALITY

Brain Lateralization theory stresses the fact that the two halves of the brain known as right and left hemispheres function differently yet interdependently. If we study the brain anatomy, we will understand that the brain is divided into two hemispheres which are connected by the corpus callosum. Both these hemispheres regulate body movement and receive sensory stimuli from the opposite side of the body. For example: the left hemisphere controls the movement and sensory stimuli of the right side of the body.

The Right Brain, Left Brain theory originated in the work of Roger W. Sperry was awarded the Nobel Prize in 1981. According to the theory of Left Brain or Right Brain Laterality, each side of the Brain controls different types of thinking. People are said to prefer one type of thinking over the other.

In case of a normal brain, information will travel from the left hemisphere and pass through the corpus callosum to the right hemisphere of the brain and the reverse is equally true. Both the hemisphere of the brain function interdependently and the information is solely not processed by only a single hemisphere. Lateralization theory in psychology believes that one hemisphere dominates while carrying out certain tasks or functions. However, the degree or the extent of lateralization will differ from person to person or individual cases. For example: in case of right-handed people, the language control function is controlled by their left

hemisphere, whereas, in the case of left-handed people, this function is controlled by the right hemisphere of the brain. Whichever task one performs, one hemisphere of the brain will always dominate, though the other hemisphere will also have a role to play while handling that task to some extent

LEFT HEMISPHERE:

The left hemisphere is more analytical and pays attention to details, handles assignments or processes information sequentially and takes care of the tasks like Writing, Reading, and Speaking. This hemisphere of the brain is also concerned with reasoning, rationality, logic, discipline and rules and dealing with hard facts.

People with strong left hemisphere incline in science, maths, and technology, have a clear picture of their goals due to a clear sense of planning. They are physically quite active and extroverted. The left hemisphere controls the right part/ side of the body.

RIGHT HEMISPHERE:

The Right hemisphere deals with the softer facts of the life. This hemisphere of the brain is concerned with emotions, feelings, intuitions, visualization, spatial knowledge, creativity and recognizing patterns. The Right hemisphere also helps in making inferences and provides a holistic perception, as a result of which the right hemisphere helps develop a strong self-perception or sense of self awareness.

The Right hemisphere controls the left side of the body and looks after the motor skills, sports and play, risk enduring capabilities, variety, flexibility, and people with strong right hemisphere are mostly introverts.

BRAIN LATERALITY AND ITS RELATION WITH GARDNER'S THEORY OF MULTIPLE INTELLIGENCES:

This study aims at exploring the learning that is attributed to the brain and its relationship with multiple intelligences. When we hear the word intelligence, the concept of IQ testing may immediately come to mind. Intelligence is often defined as our intellectual potential, something we are born with, something that can be measured, and a capacity that is difficult to change.

This theory suggests that traditional psychometric views of intelligence are too limited. Gardner first outlined his theory in his 1983 book *Frames of mind: The Theory of Multiple Intelligences*, where he suggested that all people have different kinds of "intelligence".

To capture the full range of abilities and talents that people possess, Gardner theorizes that people do not have just an intellectual capacity, but have many kinds of intelligence, including musical, interpersonal, spatial- visual, and linguistic intelligences. While a person might be particularly strong in a specific area, such as musical intelligence, he or she most likely possesses a range of abilities. For example, an individual might be strong in verbal, musical, and naturalistic intelligence.

METACOGNITION

The word metacognition has a Greek origin. The Greek prefix "meta" means "to transcend". Hence, the construct "metacognition" refers to thinking that transcends first level of thinking. Metacognition is defined in simplest terms as "thinking about your thinking." The root "meta" means "beyond," so the term refers to "beyond thinking." Specifically, this means that it encompasses the processes of planning, tracking, and assessing your own understanding or performance.

Metacognition refers to "thinking about thinking" and was introduced as a concept in by John Flavell, who is typically seen as a founding scholar of the field. Flavell said that metacognition is the knowledge you have of your cognitive processes (your thinking). Flavell (1979). It is your ability to control your thinking processes through various strategies, such as organizing, monitoring, and adapting. Additionally, it is your ability to reflect upon the tasks or processes you undertake and to select and utilize the appropriate strategies necessary in your intercultural interactions.

Metacognition is considered a critical component of successful learning. It involves self-regulation and self-reflection of strengths, weaknesses, and the types of strategies you create. It is a necessary foundation in culturally intelligent leadership because it underlines how you think through a problem or situation and the strategies you create to address the situation or problem.

HOW CAN SCHOOLS MAKE THE BEST USE OF META-COGNITION:

There should be an explicit focus on teaching both cognitive and metacognitive techniques, and how to create a learning environment that supports the development of metacognitive skills and motivation.

- Encourage teachers to work together and share practice that promotes the development of metacognitive abilities in the classroom. For example, a group could meet regularly to reflect on a reading about metacognition or to share their experiences of implementing a new strategy.
- Support teachers in encouraging metacognitive practices at school. For example, exam wrappers are worksheets that learners complete before or after they receive test feedback. These include questions to help learners to reflect on the processes of planning, monitoring and evaluation when preparing for and sitting the test
- Involve the whole school community in promoting metacognitive talk. Monitoring and evaluating performance and using learning strategies effectively is not only helpful in the classroom, but also in the wider school and beyond.
- Evaluate the impact of new strategies that are implemented, whether these are tried across the whole school or by individual teachers or departments.

HOW CAN TEACHERS MAKE THE BEST USE OF META-COGNITION:

Make learning goals explicit and help students to plan strategies and ways of monitoring their progress towards achieving these goals. For example, encourage self-assessment against learning goals and redrafting of work as necessary to reach these goals.

- Help students to understand their mid and long-term goals. As well as metacognitive knowledge and regulation, learners need to employ motivation strategies such as deferred gratification to make sure they learn successfully.
- Plan for progression in the teaching of new metacognitive strategies, starting with activating prior knowledge and explicit strategy instruction, and ending with independent practice and structured reflection.
- Try to keep learners within their zone of proximal development (ZPD) – see Education Brief: Active learning. Scaffolding should be gradually reduced so that eventually learners are able to employ the metacognitive strategy independently.
- Learners should also be able to choose which strategy to employ in a new context, or when another strategy is not working.

MAJOR OBJECTIVE

The study was conducted to examine the differences in brain laterality and meta cognition among 400, 9th standard students. Specifically, the study aims to investigate the relationship of brain dominance and meta cognition of the students.

LITERATURE REVIEW

Lesley J. Rogers (2021) One way to increase cognitive capacity is to avoid duplication of functions on the left and right sides of the brain. There is a convincing body of evidence showing that such asymmetry, or lateralization, occurs in a wide range of both vertebrate and invertebrate species. Each hemisphere of the brain can attend to different types of stimuli or to different aspects of the same stimulus and each hemisphere analyses information using different neural processes. A brain can engage in more than one task at the same time, as in monitoring for predators (right hemisphere) while searching for food (left hemisphere). Increased cognitive capacity is achieved if individuals are lateralized in one direction or the other. The advantages and disadvantages of individual lateralization are discussed. This paper argues that directional, or population-level, lateralization, which occurs when most individuals in a species have the same direction of lateralization, provides no additional increase in cognitive capacity compared to individual lateralization although directional lateralization is advantageous in social interactions. Strength of lateralization is considered, including the disadvantage of being very strongly lateralized. The role of brain commissures is also discussed with consideration of cognitive capacity.

Rao, M. Nageswara (JAN 2018) Conducted research on “Meta cognition and hemisphere dominance among the high school students”. This research paper emphasizes that the relation between the Metacognition and Hemispheric dominance among the class ten High school students and also relationship between the student’s metacognitive abilities and Hemispheric dominance Sangareddy Town, Telangana State, India. Moreover, Students develop the positive attitude through the knowledge of cognition and regulation of cognition abilities in the academic achievements his own. Population for the present study consists of class ten English medium High Schools in Sangareddy Town, Sangareddy district, Telangana State (TS), India. Those schools are affiliated by TS State Board. The age range of the students is from 14-15years, academic year 2017-18. Total sample is 163. Sample was taken from the whole population. In this research, there is no gender importance. There is a positive correlation between whole-brain dominance and Metacognitive Awareness. Further, the results show that whole-brain is highly correlated with KC, followed by MA and the lowest with RC. These results indicate that students with high levels of whole-brain orientation are high in KC followed by MA and then RC

Sher Afahan Ali and Shahid Raza (2017) A study of right and left brain dominant students at IB&M with respect to their gender, age and educational background. Managers all over the world each day combat the challenges associated with Managing the workforce. In order to unravel their truest potential managers, have to understand them and motivate or sometimes above that i.e. to ignite the spark that gives the momentum to their capabilities that make them productive and give them an everlasting happiness. Management is termed as Right brain activity. It involves dealing with the human mind and emotions which are very complex and variable unlike the scientific method which we perceive management to be. In order to check the co-relation of the right and left brain people research was carried out. This study was conducted with approximately 50 Business students with a survey, as well as a comprehensive review and analysis of literature concerning the brain. This study would help the instructors to understand the fact Management is not a science and based on the number of left or right Brain students the current teaching methodology of Business student scan either be revised or transformed altogether.

METHODOLOGY

The method used for the study was descriptive survey method. Data were collected using 20-item Open Hemispheric Brain Dominance Scale 1.0: (Eric Jorgenson 2015) and 30- item Meta Cognitive Inventory MCI (Dr. Punita Govil 2003). Open Hemispheric Brain Dominance Scale 1.0: and Meta Cognition Inventory scale were administered to the respondents. All items are of 5- point Likert scale, and item receives a score in the range of 5 to 1. Thus a positive mean score indicates an academic achievements of a students. To carry out the analysis, inferential statistics was done.

RESULT OF THE STUDY

From a total of 400 questionnaires administered, Analysis revealed that 12% of the sample were left-brain dominant, whereas 63% were right-brain dominant and the remaining 25% were no clear preference learners. As a result, all statistical analysis was carried out with the 400 sample. For Inferential data analysis, the data was classified based on with respect to their brain Laterality and Metacognition. The result has been shown in table 1 and 2 figure 1

Table 1. Classification of students based on Brain Laterality and Metacognition

Group	Brain Laterality			Metacognition		
	Count	Sum	Average	Count	Sum	Average
Left brain	50	2509	50.18	50	3975	79.5
No Clear Preference	100	5948	59.48	100	7891	78.91
Right Brain	250	18515	74.06	250	19685	78.91

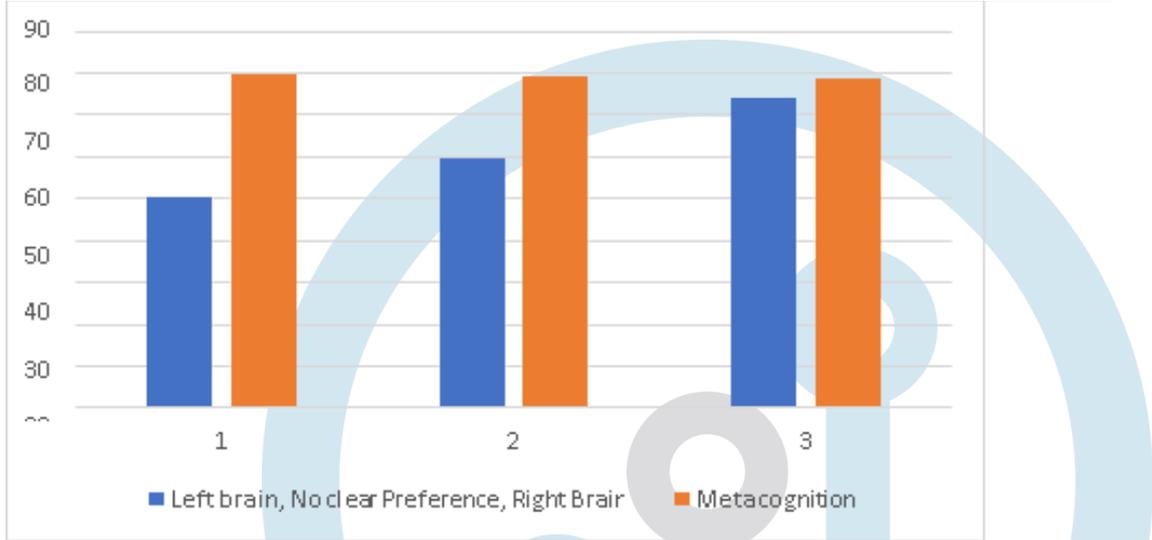


Figure 1: Bar Graphs of scores with respect to their Brain Laterality and Metacognition of 9th standard students of Mangalore taluk.

From the figure 1, it is clear that there is a significant difference in respect to their Brain Laterality and Metacognition of 9th standard students of Mangalore Taluk. It is shown by the Bar graph at different levels.

Table 1: ANOVA of scores showing the interaction effect of Left brained, No Clear preference, and Right brained with their Metacognition of 9th standard students of Mangalore Taluk.

Source of Variation	SS	df	Ms	F	Result
Between Groups	32187.6	2	16093.8	305.55	Significant at 0.05 level
Within Groups	20910.4	397	52.67		
Total	53098	399			

Table 2 “F” ratio of scores showing the interaction effect of different Brain Laterality and Metacognition of 9th standard students of Mangalore Taluk.

From the table 2, it is revealed that the “F”- value for Metacognition with respect to their Brain Laterality of students of 9th standard are significant at 0.05 level, it is also observed that Metacognition score are greater than with respect to their Brain Laterality. Hence it can be concluded that Metacognition with respect to their Brain Laterality are differ. Thus the null hypothesis is rejected.9th standard students Metacognition with respect to their Brain Laterality are differing from each other.

Pairwise Comparison	F _s (Numerator)	F _s (Denominator)	F _s	F _s CV	Result
Left Brain/No Clear Preference	86.49	1.12	76.79	8.10	Significant at 0.05 level
Left Brain/Right Brain	570.25	1.09	518.50		
No Clear Preference/ Right Brain	212.57	1.05	201.10		

CONCLUSION:

Knowing the brain laterality helps students as well as teachers to plan their works accordingly. teachers can help students in planning, monitoring and assessing students learning. Parents and teacher can facilitate students learning by understanding their metacognition. Students with right brain orientation can be provided more demonstration and pictorial classes. Learning and creativity can be facilitated by using learning strategies that activate the lesser used right side of the brain. High metacognition helps in student’s achievement. Left brain is responsible for students learning as per different studies (Buzan, P.17). Left brain students show high metacognition too. It helps the teacher to test a student's strengths and weaknesses which assess his or her deep think through organizing metacognition strategies. Left-brain students are strong in math and science, and can answer questions quickly. Right-brain students are the dreamers. They can be very intelligent and very deep thinkers, that they can get lost in their own little worlds. Students who are middle-brain oriented or No Clear Preference Group, can have strong qualities from either hemisphere. Those students can benefit from logic from the left and intuition from the right. The left and right sides of the brain are specialised to attend to different information, to process sensory inputs in different ways and to control different types of motor behaviour. Hence, planning and monitoring of students learning can be done by the teachers, students and other stake holders.

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