Research Paper
Impact Factor: 3.567
Peer Reviewed Journal

IJMDRR
E- ISSN –2395-1885
ISSN -2395-1877

COMPARATIVE STUDY ON BRAIN HEMISPHERE DOMINANCE AND LEARNING STYLE ON ENGINEERING STUDENTS

A. Gomathi
Ph.D Part Time Research Scholar, Department of Psychology, Bharathiar University, Coimbatore. & Assistant Professor, Department of Psychology, Sree Saraswathi Thyagaraja College (Autonomous), Pollachi, Coimbatore District, Tamilnadu.

Abstract
The right hemisphere appeared to be dominant in the following intellectual areas; rhythm, spatial awareness, gestalt (wholeness), imagination, day dreaming, colors and dimension. The left hemisphere appeared dominant in a different but equally powerful range of mental skills; words, logic, numbers, sequence, linearity analysis and lists. Students learn in many ways – by seeing and hearing; reflecting and acting; learning styles refer to a range of competing and contested theories that aim to account for differences in individuals' learning. Learning in a structured educational setting may be thought of as a thought of a two step involving the reception and processing of information. This paper discusses about the concepts of Comparative Study on Brain Hemisphere Dominance and Learning Style on Engineering Students in around Coimbatore city.

Key Words: Learning, Right Hemisphere, Left Hemisphere, Dimension of Learning Styles, Cognitive Process.

Introduction

In the late 1960s Professor Roger Sperry of California, who was subsequently awarded the Nobel prize for his research, announced the result of his investigation into the brain's most highly evolved area, the cerebral cortex ('cortex' meaning 'outer shell'). Sperry's initial finding indicated that the two sides, or hemisphere, of the cortex tend to divide the major intellectual functions between them. The right hemisphere appeared to be dominant in the following intellectual areas; rhythm, spatial awareness, gestalt (wholeness), imagination, day dreaming, colors and dimension. The left hemisphere appeared dominant in a different but equally powerful range of mental skills; words, logic, numbers, sequence, linearity analysis and lists. The study of language learning strategies has sought to identify patterns of strategy use that are indicative of successful language learning. Some early studies investigating language learning strategies have found some correlations between strategy use and a number of factors such as academic discipline (e.g., Naiman, Stern, & Todesco, 1978; Rubin, 1975; Stern, 1975), while recent studies have focused on the appropriateness and effectiveness of strategies in particular academic contexts (e.g., Norton & Pavlenko, 2004; Parks & Raymond, 2004; Peacock& Ho, 2003) and the influence of added factors such as gender and learning styles (e.g., Chen & Hung, 2012; Li & Qin, 2006;Ma & Oxford, 2014;Wong & Nunan, 2011). Few studies, however, have examined how individual students use strategies in contexts beyond language learning. Learning strategies and styles have been researched in tandem using large-scale survey instruments; the relationships between strategies and styles are, however, rarely studied in the context of specific tasks (Cohen, 2003).

The Learning Style

The Learning style recognizes that each person prefers different learning styles and techniques. Learning styles group common ways that people learn. Everyone has a mix of learning styles. Some people may find that they have a dominant style of learning, with far less use of the other styles. Others may find that they use different styles in different circumstances. There is no right mix. Nor are your styles fixed. You can develop ability in less dominate styles, as well as further develop styles that you already use well. Visual – they prefer using pictures; images, and spatial understanding, Aural – they prefer using sound and music, Verbal – they prefer using words, both in speech and writing, Physical – they prefer using body, hands and sense of touch, Logical - they prefer using logic, reasoning and systems, Social – they prefer to learn in groups or with other people, Solitary – they prefer to work alone and use self-study.

In discussing this situation, we will explore

1. Which aspects of learning style are particularly significant in engineering education?
2. Which learning styles are preferred by most of the engineering college students?
3. What can be done to reach students whose Brain Hemisphere Dominance and Learning Style of engineering education?

Limitations

The model needs to be "tested" by engineering college students to determine if it has an effect on the students' ability to understand learning style. Students also need to give feedback if they understand better if they are taught according to their

preferred way of learning while also being challenged to use different learning strategies to encourage whole brain learning. Future directions. The importance of understanding the role that learning styles play in the learning of physiology requires further investigation. The role of whole brain learning strategies can be investigated and compared for students registered for different modules in physiology to guide both lecturers and students. The objective is to improve the understanding and application of physiology, especially for students embarking on medical and paramedical careers.

Administration of Research and data collection

The finalized questionnaire was administrated on sample student's personality.

Data Analysis

The data collected through questionnaire was coded and analyzed through SPSS 16.0, percentage score; chi-square value and one-way ANOVA were computed.

Result

Data collected through questionnaire was analyzed in light of objectives of the study. Gender wise, learning style wise and personality factor wise calculated in percentages. To infer the significance of results, F-test and chi-square were applied. The findings drawn from the data analysis are given below.

Table- 1,Hemisphere Dominance and Visual Learning Style

Hemisphere Dominance	Visual Learning Style			Total	Chi-Square Value	df	p-value
	Low	Medium	High				
Bilaterlization	19	70	20	109	35.56	4	0.0469**
	3.8%	*14%*	*4%*	*21.8%*			
Left	30	90	30	150			
	6%	*18%*	*6%*	*30%*			
Right	45	160	36	241			
	9%	*32%*	*7.2%*	*48.2%*			
Total	**94**	**320**	**86**	**500**			
%	**18.8%**	**64%**	**17.2%**	**100%**			

Note: ** Denotes significant at 1 % level

There is no association between hemisphere dominance and visual learning style. The values of chi-square test (35.56) at low p-value of (0.0469) indicate that the null hypothesis is rejected at 5 per cent level of significance. Hence it may be concluded that there is a significant difference between hemisphere dominance and visual learning style.

A maximum of 150 respondents are using right hemisphere dominance in visual learning style at medium level (32%).

Table 2,Right Hemisphere and Aural Learning Style

Groups	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4.817	1	4.817	.401	0.484* (NS)
Within Groups	96.083	8	12.010		
Total	100.900	9			

Note: * The F ratio is significant at 0.05 % level

There is no significant difference between right hemisphere and aural learning style. The above table reveals that the p-value is more than 0.05; the null hypothesis is accepted at 5 per cent level of significance. It is concluded that there is no significant difference between right hemisphere and aural learning style. (F=0.401; p>0.05)

Table 3,Hemisphere Dominance and Verbal Learning Style

Hemisphere Dominance	Verbal Learning Style			Total	Chi-Square Value	df	p-value
	Low	Medium	High				
Bilaterlization	18	5	27	50	2.333	4	0.675* (NS)
	3.6%	*1%*	*5.4%*	*10%*			
Left	65	16	150	231			
	13%	*3.2%*	*30%*	*46.2%*			
Right	60	20	139	219			
	12%	*4%*	*27.8%*	*43.8%*			
Total	**143**	**41**	**316**	**500**			
%	**28.6%**	**8.2%**	**63.2%**	**100%**			

Note: NS - Not significant at 5 % level

There is no association between hemisphere dominance and verbal learning style. The values of chi-square test (2.333) at high p-value of (0.675) indicate that the null hypothesis is accepted at 5 per cent level of significance. Hence it may be concluded that there is no significant difference between hemisphere dominance and verbal learning style.

A maximum of 231 respondents are using left hemisphere dominance in verbal learning style at high level (30%); a low level of 65 respondents (13%) and 16 respondents (3.2%) at medium level.

Table 4,Hemisphere Dominance and Physical Learning Style

Hemisphere Dominance	Physical Learning Style			Total	Chi-Square Value	df	p-value
	Low	Medium	High				
Bilaterlization	20	80	100	200	2.500	4	0.645* (NS)
	4%	*16%*	*20%*	*40%*			
Left	15	60	75	150			
	3%	*12%*	*15%*	*30%*			
Right	10	60	80	150			
	2%	*12%*	*16%*	*30%*			
Total	**45**	**200**	**255**	**500**			
%	**9***%*	**40***%*	**51***%*	**100***%*			

Note: NS - Not significant at 5 % level

There is no association between hemisphere dominance and physical learning style. The values of chi-square test (2.500) at high p-value of (0.645) indicate that the null hypothesis is accepted at 5 per cent level of significance. Hence it may be concluded that there is no significant difference between hemisphere dominance and physical learning style.

A maximum of 200 respondents are using bilaterlization in physical learning style at high level (20%); 80 respondents are with (16%) of medium level and low level of 20 respondents (4%) at low level.

Table 5, Left Hemisphere and Logical Learning Style

Groups	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	4.671	2	2.336	1.060	0.396*
Within Groups	15.429	7	2.204		
Total	20.100	9			

Note: * The F ratio is significant at 0.05% level

There is no significant difference between left hemisphere and logical learning style. The above table reveals that the p-value is more than 0.05; the null hypothesis is accepted at 5 per cent level of significance. It is concluded that there is no significant difference between left hemisphere and logical learning style. (F=v1.060; p>0.05).

Table 6,Hemisphere Dominance and Social Learning Style

Hemisphere Dominance	Social Learning Style			Total	Chi-Square Value	df	p-value
	Low	Medium	High				
Bilaterlization	30	31	45	106	47.62	4	.0313**
	6%	*6.2%*	*9%*	*21.2%*			
Left	105	95	143	343			
	21%	*19%*	*28.6%*	*68.6%*			
Right	16	15	20	51			
	3.2%	*3%*	*4%*	*10.2%*			
Total	151	141	208	500			
%	30.2%	28.2%	41.6%	100%			

Note: ** Denotes significant at 1 % level

There is no association between hemisphere dominance and social learning style. The values of chi-square test (47.62) at high p-value of (0.03) indicate that the null hypothesis is rejected at 5 per cent level of significance. Hence it may be concluded that there is a significant difference between hemisphere dominance and social learning style.

A maximum of 343 respondents are using left hemisphere dominance in social learning style at high level (68.6%); 95 respondents are with (19%) of medium level and low level of 105 respondents (21%) at low level.

Table 7,Left Hemisphere and Solitary Learning Style

Groups	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	22.350	2	11.175	2.629	0.141*
Within Groups	29.750	7	4.250		
Total	52.100	9			

Note: * The F ratio is significant at 0.05 % level

There is no significant difference between left hemisphere and solitary learning style. The above table reveals that the p-value is more than 0.05; the null hypothesis is accepted at 5 per cent level of significance. It is concluded that there is no significant difference between left hemisphere and solitary learning style. (F= 2.629; p>0.05).

Discussion and Conclusion

This study aimed to determine brain dominance and learning style of engineering college students and reveal the relations between them. According to this results obtained from there is a significance between right brain hemisphere dominance and visual learning style. According to this research there is relationship between hemisphere and the verbal learning style and on the other hand Bilaterlization hemisphere dominance between physical learning style in these mean while this research finding the there is no significance difference between left hemisphere and social learning style the final interpretation shows that they preferred solitary learning style who are dominating the left hemisphere.

Reference

1. Amabile, T. M. (1988). A model of creativity and innovation in organizations. In B. M. Staw, & L. L. Cummings (Eds.), Research in organizational behavior (Vol. 10, pp. 123–167). Greenwich, CT: JAI Press.
2. Association of American Colleges & Universities (2006). Academic Freedom and Eduational Responsibility.
3. Responsibility.http://www2.winthrop.edu/acad/AcademicFreedomEducationalResponsibility.pdf.

4. Council of the European Union. (2009a). Conclusions of the Council and of the Representatives of the Governments of the Member States, meeting within the Council, of 26 November 2009 on developing the role of education in a fully- functioning knowledge triangle. Official Journal of the European Union, C 302/303.
5. Council of the European Union. (2010). 2010 joint progress report of the Council and the Commission on the implementation of the „Education and Training 2010 work programme". Official Journal of the European Union, C117/111
6. Craft, A. (2005). Creativity in schools: tensions and dilemmas. London: Routledge. Dialogue Magazine (2011).
7. H. Simon, What We Know About the Creative Process, Working Paper, Carnegie Mellon University, 1984.
8. J. C. Santamarina and K. Akhoundi, Findings in Creativity and Relevance in Civil Engineering,
9. J. D. Couger, Creative Problem Solving and Opportunity Finding, New York: Boyd and Fraser Publishing Co. (1995).
10. J. D. Zakis, Concepts and methods of engineering design and practice, Global J. Eng. Educ., 1(2), 1997.
11. J. P. Guilford, Creativity, American Psychology, 5, 1950, pp. 444-454
12. Khalil Allah Eishani A, Ebrahim Ata Saa'd b, Yaghoob Nami C, The Relationship Between Learning Styles And Creativity, Science Direct, Procedia - Social and Behavioral Sciences 114 (2014) 52 – 55.
13. Madara Ogot and Guè L E. Okudan, Systematic Creativity Methods in Engineering Education: A Learning Styles Perspective, Tempus Publications, Int. J. Engng Ed. Vol. 22, No. 3, pp. 566576, 2006.
14. Mirjana Radovic-Markovic, Creative Education and New Learning as Means of Encouraging Creativity, Original Thinking and Entrepreneurship.
15. P. G. Klukken, J. R. Parsons and P. J. Columbus, The creative experience in engineering practice: implications for engineering education, ASEE J. Eng. Educ., April 1997, pp. 133-138.
16. Sally Ashton-Hay, Drama: Engaging All Learning Styles, Ashton-Hay, Sally (2005) Drama: Engaging all Learning Styles. In Proceedings 9th International INGED (Turkish English Education Association) Conference, Economics and Technical University, Ankara Turkey.
17. www.memletics.com