

REDEFINING EDUCATIONAL PRACTICES INTEGRATING INDIAN EPISTEMOLOGY AND MODERN COGNITIVE NEUROSCIENCES

COMPENDIUM OF PAPERS

**Presented at the ICSSR Sponsored International Seminar
organised by NVKSD College of Education, Attoor,
Kanyakumari District in connection with the 13th Annual
Convention of Council for Teacher Education (CTE),
Kerala State Centre from January 7 – 9, 2015**



Published by
NVKS PUBLICATIONS
ATTOOR, KANYAKUMARI DISTRICT.
2015



CONTENTS

Sl.No	Title	Contributor Name	Page No
I. Learning and Cognition: Indian Epistemological Concerns			
1	Exploring New Avenues for Knowledge : A Brief Note on Different Approach to Learning	Dr.Prem Khatry	1
2	Epistemological Beliefs in Accountancy : A study among Higher Secondary School Students	Dr. P. Usha	6
3	Learning and Acquisition- Indian Epistemological Concerns: Nyaya, Sankhya, Yoga	Dr. Deepa A. P	10
4	Epistemological and Pedagogical Concerns of Constructionism: Relating to the Educational Practices	Dr. D. Hassan	13
5	Epistemological Concerns of Stress: Relevance to Education	Bindu Gouri V. P Dr. M. Sadananthan	18
6	Cognitive Attainment in the Complex Texture of Indian Philosophy	N. K. Sunil Kumar	21
7	Theory of Epistemology in Naya Philosophy	Betty Sunny Rejithamol E.K	25
8	Learning and Cognition- The Indian Epistemological Concerns	M. S. Kala Swarna S. Sahaya Sija D. Anusha	28
9	Learning Cognition: Indian Epistemological Concerns	Kumari Bindu R. S	31
II. Neuro Scientific Bases of Cognition and Metacognition in Learning			
10	Peculiar Bent of Mind	Dr. R. Rajeswari	34
11	Attention: A Process of Cognition	T. Blessy Dr B. William Dharma Raja	37
12	Brain Cognition Behaviour: A Conceptual Analysis	Himna P.A. Irshana Shahnaz Ulladan	41
13	The impact of Cognitive Conflicts in Reducing Ontological Misconceptions on the basis of Metacognitive Approaches.	Nisha. S. Dharan	44
14	A Study on Metacognitive Learning Strategy on the Scholastic outcomes in Mathematics among Secondary School Students.	Jisha K. V.	47
15	Awareness of Metacognition among First Degree Students	S. Meenakshi Kirthika V. Sasikala	50
16	Metacognition in the Classroom and Beyond	A. Jasmine Agnal Geetha. N. R	54
17	Constructivism and Metacognitive Strategies to Promote Self-Directed Learners	Manju. M. S S. T. Sajith Lal Raj	57

18	Effectiveness of Metacognitive Affective Model of Self-Regulated Learning on Metacognitive Awareness of Students at Higher Secondary level	Dr. Minikutty A. Sindhu P. G	61
19	Education and Cognitive Neuroscience : An Overview	Dr. S. Payan P. Selvakatheeswaran	67
20	Metacognition	Dr. Karthy Jayakumar Issac Johnson	69
21	Exploring Neuroscientific bases of creativity	Dr. Sindhya V.	71
22	Developing Cognitive Strategies – Bricks for Learning	A. H. Anusooya Rukmani	76
23	Neuroscientific approaches of perception and cognition in learning	E. Gethsiah	78
24	Cognitive abilities for positive learning environment	Jose Brightly. H	80
25	Relationship between Cognition and Language Learning	Jaya S. R.	83
26	Cognitive Skills for Successful Learning	J. Jebila Dr. A. Beaula	85
27	Cognitive and Meta cognitive Strategies for Learning Disabled Students	Swapna K. S Dr. M. A. Sudhir	87
28	Cognitive Neuroscience: Key Processes and Techniques	S. Anithamary	90
29	Cognitive Neuroscience of Attention	Anitha Narayani. M.	93
30	Skills of Metacognition: An Overview	Jalin Mary Sheeba Selva Rani	96
31	Metacognition among Adolescence Students	M. Mary Sherli K. Jega	100
32	Enhancing Teaching Competency through Metacognition	R. S. Padma Rekha	102
33	Cognitive Skills and Brain Function	T. Srikarthick S. Meltorose , Dr. T. Vijila,	104

III. Neuro psychological aspects of learning

34	Cognition and Learning Neurological Aspects	Dr. S. Saravanan	106
35	Brain & The Mind	Immanuel Thomas	110
36	An overview on Neurotransmitters	Soya Mathew Dr. Betty. P. J.	114
37	Neuropsychological Aspects of Learning	V. Sundar Dr. K. Rajagopalan	117
38	Neuroplasticity: A Tool for Learning	Jeena E.M Dr A. Veliappan	119
39	How the Brain Learns Mathematics	Chandra Malar M. S. Pon Ambika Dr. Deepa R. P	122
40	Neuropsychological Assessment	Berlin Rajan	125
41	Psycholinguistics	Beena Florence Donark Angel Sukila Anitta Berin Jeya Sheela	127

42	The Key Concepts of Neuro informatics	V. Rajasree C. G. Chitra	129
43	Cognitive Dissonance: Logical techniques to reduce dissonance	D. Gladis Obeliea	132
44	Role of Educational Neuroscience in the field of Learning Disabilities.	Roshna V. Gopal Swapna. P	135
45	Neuropsychological aspects of learning	K. S. Shobha	138
46	Do cognitive distortions trim down brain function?	A. Linsey Cranab	141
		Dr. B. William Dharma Raja	
✓47	Helping children with cognitive disabilities	Dr. S. Praveen Kumar	144
✓48	Teaching Strategies for Children with Cognitive Disorder	Dr. Prema Latha. B	146
✓49	Effect of Yoga on Maximum Expiratory Pressure of Mentally Retarded Children	Dr. A. Ravi	149
50	Developing the cognitive abilities of learners with language learning difficulties	P. Renju	155
51	Importance of Neuropsychological Evaluation in Learning Disability	M. Kalai Selvi C. Hema M. Sobharani	158
52	Role of Neuro-Endocrine System in Stress mediation	Mohanraj. S Periyasamy. P	160
53	Cognitive Behaviour Interventions to redress Social Cognitive Deficits among Children with Conduct Disorder	Dr. Sony Mary Varghese Sheeja.R	162
54	Is Cognitive Dissonance affect Achievement in Mathematics? - A Survey among Higher Secondary School Students	Shimimol.P.S Dr. Hassan Koya M.P	164
✓55	Conflict Resolution Strategies of Adolescents	Dr. S. Sreelatha	167
✓56	Integration of Neuropsychology in Educational Planning following Traumatic Brain Injury	P. H. Jebalin Paul Dr. Mini Kumari V. S	170
57	Conflict Resolution Education Programs	M. Renukha R. Jacklin Jemi	174

IV. Designing Brain Compatible Learning Environments

58	Designing brain compatible learning environments	Dr. Leela Pradhan	176
59	Co-operative learning is an excellent Brain compatible Learning Technique- An Experimental Anaysis	Dr. C. M. Bindhu Niranjana .K	178
✓60	Brain Based Learning Strategy for developing Thinking Skills	Dr. Rajeswari .K	181
61	Brain Based Learning -An Active Processing of Information	Dr. Merlin Sasikala	185
62	Designing Brain compatible classrooms	Dr. Sreevrinda Nair .N	188
63	Creating Brain Compatible Classrooms through Experiential Learning	Dr. Sreekala K. L.	191
64	Brain-based Approach to teach English as a Second Language.	Sreekala S.	193
65	Whole Brain Learning - The Garden of Choices	Dr. Giby Geevarughese Anu Rachel Jogi	196
66	Designing Brain Compatible Learning Environments	Deepti Aggarwal	199
67	Knowledge, Perception and Implementation of Secondary School Teachers on Brain-Based Learning Strategy	Dr. A. Ananthi P. Narumanam A. Sevarkodiyon S. Lavanya	205

68	Compatible Learning Environment via Lower Order Cognitive Abilities	Amudha Asaph	208
69	Six Elements of a Brain Compatible Classroom	Dr. B. William Dharma Raja	211
70	Brain Compatible Learning Environments	Arsha N.	213
71	Brain Compatible Learning Environment	Aji R.	215
72	Brain Based Approach to Ignite Learning	Priya S.	218
73	Brain friendly classrooms for better Achievement	Remya M. V.	221
74	Development of a Brain Compatible Classroom	S. Rajalakshmi	225
75	Effectiveness of Graphic Organisers for Learning Economics at Higher Secondary School Level	V. Deepthi	227
76	Nourishment of Learning: An act of Survival	V. Sasikala	230
77	Brain Compatible Constructivist Classroom Strategy Based on Eisencraft's Fundamentals of Teaching and Learning	Dr. M. Maria Saroja	233
78	A Comparative Study On Brain Based And Ancient Indian Epistemology Based Teaching In Developing Cognitive Outcomes Of Secondary School Students	Anupamamol M. K	237
79	Change the classroom through Brain Based Learning	Sajeena .S	241
80	Effectiveness of brain based learning on Achievement in Biology of Secondary School Students	Siji John	244
81	Brain Compatible Learning	A. Prabakar Devaraj	247
82	Brain - Based Learning in connection with Multiple Intelligence	Dr. R. Subburaman	250
83	New Way to Learn, New Way to Success: Brain-Based and Constructivist Learning Approaches	Sithara Vinod	253
84	Enriching classrooms through brain based learning.	Dr. C. Sivapragasam	256
85	Brain Based Learning in Science	Anil M. P	260
86	Brain-Based Teaching with reference to Adolescents	Muraleedharan T	261
87	How Brain Compatible Learning Environment helps in Learning	Sunny Raj A	264
88	Accommodating different learning styles through brain based learning	T. Golda Mayor	265
89	Role of Teachers in designing Brain Compatible Learning Environments	A. Sarlet	268
90	Brain -Based Learning	Prasida	271
91	Brain Based Learning as a determinant of Academic Performance in Struggling Learners	J. Mary Vasantham	272
92	Brain Imaging- The Natural Relationship between Brain Structure and Learning	P. Vel Murugan	275
93	Motivating Students using Brain based Learning Strategies.	Veena C.S.	277

V. Social Cognition: Neuro Scientific bases

95	Social Cognition: Grasping the Humanity	Dr. B. William Dharma Raja	282
96	Persuading Aspects of Culture in Social Cognition	Fathima Jaseena Bindu .T .V	286
97	Social Cognitive Learning in the Classrooms	Dr. Raghi. P. Nair	289
98	Classroom Practices Promoting Social Intelligence	R. R. Sheeja,	292
99	Cultural Intelligence for Understanding Cultural Diversity	V. Pravitha Dr. B. C. Sobha	295
100	Social Cognition-Neuroscientific Bases	Anusha .K .R	297

VI. Implications of Cognitive Neurosciences on Education

101	Attainment of Improved Cognition Through Mastery Learning Model	Dr. Malini. P. M	299
102	Cognitive Neuroscience: Implications for Education	Dr. K. Thiyaagu	302
103	Educational Implications of Cognitive Neuroscience	Vidhya V. S. Dr. Jaya Jaise	306
104	Cognitive Neuroscience Perspective for Mathematics Learning	J. Johnsi Priya	308
105	Cognitive Apprenticeship Approach in Educational Practices	V. Annet Joy	312
106	5f Model for Peer Tutoring in Mathematics at Secondary Level	Dr. Binu B.L.	315
107	Implications of Cognitive Neuroscience on Education	Geetha Rani T. Sajitha J. S. Emy Brindha T.	319
108	Implications Of Cognitive Neuroscience On Educational Practices	Gino D.J. A. Jothi	321
109	Effect of Nonviolent Communication Method on Assertion of Needs in Interpersonal Relationship. A Study among Iran Adults	Zohreh Ramezanipoor Dr. J. Jasseer	324
110	Critical Visual Literacy : A Neurolinguistic Approach to English Language Teaching	Dr. Jaya Jaise Shimna Suresh	328
111	Influence of Thinking Styles on Attainment of Integrated Process Skills in Physics of Higher Secondary School Students	Dr. Lavanya. M. P. S. Lenin	331
112	Cognitive Factors in Second Language Learning	M. Caroline Maria	334
113	Learning Styles of Prospective Teachers	Dr. S. Mani	337
114	Impact of Neuroscience on Higher Education	A. Evangelin Anusha N. Shiji	341
115	Role of Neuro-Endocrine System in Stress mediation	Mohanraj. S Periyasamy. P	343
116	Neurolinguistic Modeled VAK Learning Styles and English Language Teaching-Learning Process	A. John Lawrence Dr. C. Bright	345
117	Cognitive Neuroscience on Education	Dr. K. Dhanalakshmi R. Raj Kumar	347
118	Implications of Cognitive Neuroscience on Education	C. Rajeshwari E. Jeyasutha T. Selvakani E. Sree Vaisnava Devi	351

119	Integration of Cognitive Neuroscience in Education with Special Reference to Secondary School Students	Rajeswari K. C. J. Kirupa Kani	354
120	Music - An Effective Means to Reduce Test Anxiety	Dr. B. William Dharma Raja Dr. R. Ramkumar	357
121	Neuroscience – A Key to change classroom environment	P. Jeya Puvaneswari	360
122	Developmental Cognitive Neuroscience of Arithmetic: Implications for Learning and Education	Y. A. Shiny	363

VII. Affective Neuroscience

123	Affective Neuroscience –Paradigm for Developing Emotional Competencies in Learners	Dr. Bindu.R.L	366
124	Sensitizing the Adolescents About the Problems of Aged : An Affective Neuroscientific Perspective	Dr. P. Rekha Dr. K. Vijayakumari	373
125	Effectiveness of Value Discussion Model on the Affective Domain Competencies of Adolescents	Anitha. G Dr. Celine Pereira	376
126	The Role of Affective Neuroscience in developing Emotional Competencies	Karthika A . R Sreeja . T Devika. S Dr.Asha. J.V	380
127	Enhancing Emotional Intelligence in Children: The Need of the Hour	Jisha GR	385
128	Affective Neuroscience and Learning	N.J. Ajitha A. Emmaculin Anulet Dr. A. Beaula	389
129	Neural Impulse Propagation through Excitatory and Inhibitory Post Synaptic Potential in developing Emotional Competence	Dr. Madhubala S.	391
130	A Study on Emotional Intelligence of Prospective Teachers	T. Sachutha Prasad. P.S	395
131	Combining Emotion and Cognition	K. Sheeba, Dr. N. Kalai Arasi	397
132	Developing Emotional Competencies in Students – The Commitment of School Teachers	J. Angel Mary Jane Dr. S. Praveen Kumar	401
133	Developing Emotional Competencies in Teachers	M. Josephin Bella E. Johncy Manjula	404
134	Instilling and Developing Emotional Competence Strategies and Culture in Teaching – Learning	Jyotsna P Dr. Nimmi Maria Oommen	406
135	Impact of Epilepsy on emotions of children	Dr. Renuka Sonny .L.R	410

VIII. Computational Neuroscience & Neuro Informatics

136	Computational Neuroscience	Shyla T	415
137	Computational Neuroscience	Suji N.	418
138	Neuro Informatics	V. P. Bindu Gouri. Vinitha K. Kanimozhi M.	421

Brain Based Learning as a determinant of Academic Performance in Struggling Learners

M.A.Sreelekshmi.

PG Student, AVC, Tholayavttam.

Dr. Sreelatha.S

Associate Professor in Early Childhood Education, N.V.K.S.D.College Of Education, Attoor

Abstract

The enormous interest in the brain-based multiple intelligences help to bring about the new field of Brain-Based Learning (BBL). Brain-Based Learning can be viewed as techniques gleaned from research in neurology and cognitive science used to enhance teacher instruction. Jensen (1995/2000) defines BBL as "learning in accordance with the way the brain is naturally designed to learn" (p.6). In the context of Education, due to the great array of development, a large amount of insight has been gained that have implications for teaching and learning. All these developments lead to the newer approach of teaching and learning, which is *Brain-based learning* that can have the capability of bringing phenomenal transition in the whole education system.

Introduction

A basic component of brain-based learning is that our emotions influence our ability to learn. Our brains are constantly striving to make connections between intellect and emotions. In other words, teachers are most likely to gain and keep the attention of students when they engage students' brain-based emotional systems in a challenging yet non-intrusive manner. Neuroscience research that explains how the brain learns is a dynamic field. Students come in all shapes and sizes. Even with the growth of scientific information, the human brain is, for the most part, still unknown, as the brain is extremely complex. The brain is the major controller of the body, similar to a computer's CPU (central processing unit). It is the information processor of the human body. The brain is capable of multitasking, and it "assembles, patterns, composes meaning, and sorts daily life experiences from an extraordinary number of clues" (Jensen,2000, p. 12). The brain, in addition to being extremely complex, is a dynamic and adaptive system. The brain contains hundreds of billions of neurons and interneurons that produce an enormous number of neural nets, or groups of neurons working together, from which our daily experience is created (Lackney,n.d.).

Brain-Based Learning

All learning is undoubtedly brain based, but all the teaching is not brain based, and this is the only point which precisely differentiates brain-based

learning from the conventional teaching and learning process. The brain-based learning is based on the firm pillars of the Brain/Mind learning principles, which acquaint the teachers to provide the instructions to the students in such a manner that the students can process, store and retain all the information given to them in the best possible manner and thus not only learning, but also teaching becomes brain based. Brain-Based learning is a comprehensive approach to instruction based on how current research in neuroscience suggests our brain learns naturally.

Fundamental elements of brain-based learning

Three important elements associated with brain-based learning are given below:

- Orchestrated immersion: Creating learning environments that fully immerse students in an educational experience.
- Relaxed alertness: Trying to eliminate fear in learners, while maintaining a highly challenging environment
- Active processing: Allowing the learner to consolidate and internalize information by actively processing it.

BBL Principles in Learning

Caine and Caine (1995, 2001) established the brain-based theory of learning with basic principles that apply to classroom instruction. They

proposed the following 12 principles for brain-based learning:

One: The brain is a parallel processor.

Thoughts, intuitions, pre-dispositions, and emotions operate simultaneously and interact with other modes of information. Good teaching takes this into consideration.

Two: Learning engages the entire physiology.

This means that the physical health of the child — the amount of sleep, the nutrition — affects the brain. We are physiologically programmed, and we have cycles that have to be developed. An adolescent who does not get enough sleep one night will not absorb much new information the next day.

Three: The search for meaning is innate.

Both familiarity and novelty must be combined in a learning environment. The brain needs and automatically registers the familiar while simultaneously searching for and responding to additional stimuli. In teaching we should give the children a chance to reflect, and to see how things are related one another.

Four: The search for meaning occurs through "patterning."

Patterning refers to the organization and categorization of information. The brain's goal is to invest information with personal meaning through making and detecting patterns based on what we already know or have experienced (link to prior knowledge). The ideal process in learning is to present information in a way that allows the brain to extract patterns rather than attempt to impose them. The brain is capable of taking in enormous amounts of information when that information is related in a way so the brain can pattern appropriately.

Five: Emotions are critical to patterning.

Emotions from each experience determines whether we want more or less of that experience. Emotions motivate us to learn, and to create. Neuroscientists believe that emotions are fundamental to learning. Motivation in the brain is driven by emotions. Different aspects of memory are activated in different emotional contexts.

Six: Every brain simultaneously perceives and creates parts and wholes.

Both hemispheres interact in almost every activity. The brain reduces information into parts

and perceives holistically at the same time. The learners use both the left and right hemispheres and the brain processes parts and wholes simultaneously.

Seven: Learning involves both focused attention and peripheral perception.

The brain responds to the entire sensory context in which teaching and communication occur. Children learn from everything. Everything goes into the brain. Children are immersed in learning in the school, in the home, in the community. They interact with each other in this rich learning environment.

Eight: Learning always involves conscious and unconscious processes.

Much of our learning is the result of unconscious processing, which means that understanding may not occur during class, but may occur hours, weeks or months later. "Active processing" allows students to review how and what they've absorbed so they begin to take charge of their learning and of the development of personal meaning.

Nine: We have at least two types of memory — a spatial memory system and a set of systems for rote learning.

Spatial Memory registers everything. It is always engaged, inexhaustible, and motivated by novelty. Rote Memory recalls unrelated information and motivated by reward and punishment. With this system, students are motivated by reward and punishment; many trials are usually needed; and the brain is easily fatigued since there is stress on a limited number of brain cells. Learning means that information is related and connected to the learner.

Ten: The brain understands and remembers best when facts and skills are embedded in natural spatial memory.

Building the necessary neural connections by exposure, repetition, and practice is important to the student; the richer and more complex the experiences we have, the more elastic our brain becomes (a denser brain leads to greater capacity for new and deeper understanding).

Eleven: Learning is enhanced by challenge and inhibited by threat.

The brain learns optimally with maximum connections when appropriately challenged, but becomes less flexible and reverts to primitive

attitudes and procedures under perceived threat. Many children come to school downshifted because they come from an environment of threat. Relaxation techniques are the only thing we know that will reverse the stress hormones in the body.

Twelve: Each brain is unique.

Each person's brain matures differently, and brain size and weight can vary by as much as 50%. The brain works better when facts and skills are embedded in real experiences. We have many things in common, but we also are very, very different. We need to understand how we learn and how we perceive the world and to know that men and women see the world differently.

Struggling Learners

A struggling learner is a student who has difficulty in keeping up with classmates of the same age in a learning environment. Struggling learner's often have difficulty in organizing themselves and their work environment, do not take oral instructions the first time given, are overwhelmed by work tasks and need work chunked for them and have weak social and emotional skills. These children can easily fall between the cracks of the educational system unless we provide them with the assistance they need.

BBL to improve the Academic Performance of Struggling Learners

Brain-based learning is really dealing the weak emotional skill of struggling learners, their stress level, which arises due to various academic reasons, the fear or threat of the tests or examination, which collectively hampers the academic performance of the struggling learners in the most deteriorating manner. Struggling learners need the instructions in the way when their needs and every problem can be considered and Brain-based learning can be the solution to every arise question

and can positively affect their academic performance and if once their needs and problems are solved then with this whole classroom and in turn the whole educational system will surely be positively benefitted.

Brain-based learning provides teachers with a format for using research in the neurosciences as well as research-based effective instructional practices to guide them in planning, implementing, and assessing a sound program for all the learners. Teachers who utilize Brain-based strategies in the classroom to enhance their students' performance are seemingly better able to positively impact learners on social, emotional and cognitive levels.

What the research on Brain-based educational techniques seems to indicate is that teachers should continue to learn how to implement classroom techniques that support student's growth both socially and academically. In the light of Brain-based learning, if the struggling learners and their problems will be considered who falls in the crevices of whole education system, then they surely will be benefitted. This Brain-based learning will not only turn fruitful for the normal learners, but also for the struggling learners and will give the whole education system a transition.

Conclusion

Brain-based research is validating the assertion that learning is individual and unique. This implies that current practices such as standardized materials and instruction may, in fact, diminish or inhibit learning. Brain-based learning provides new directions for educators who want to achieve more focused and informed teaching. With additional research in brain-based approaches, there may be better options for those struggling with learning. Brain-based research needs to be interpreted for educators so that they can utilize this information in the classroom.

References

- Caine, R. N., & Caine, G. (1990,). *Understanding a brain-based approach to learning and teaching*. Retrieved on September 14, 2014 from <http://poncelet.math.nthu.edu.tw/chuan/note/note/brain-based>
- Caine, R. N., & Caine, G. (n.d.). *Principles wheel*. Retrieved on December 2, 2014 from <http://cainelearning.com/pwheel/>
- Jensen, E. 1995/2000 (revised). *Brain-based Learning: The New Science of Teaching and Training*. Rev. ed. Thousand Oaks, Calif.: Corwin Press.