

A COGNITIVE SCIENCE APPROACH TO CREATIVITY

By

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Dedicated

to my Mother

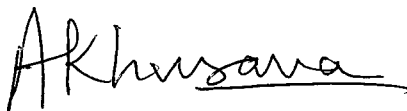
whose memories give special meaning to my life

CERTIFICATE

This is to certify that the thesis entitled "**A COGNITIVE SCIENCE APPROACH TO CREATIVITY**," being submitted by BIBHUDUTTA BARAL to the Indian Institute of Technology, Delhi, for the award of the degree of Doctor of Philosophy, is a record of bonafide research work carried out by him.

Bibhudutta Baral has worked under my guidance and supervision, and has fulfilled the requirements for the submission of this thesis, which to my knowledge, has reached the requisite standard.

The results contained in this thesis have not been submitted in part or in full, to any other University or Institute for the award of any degree or diploma.



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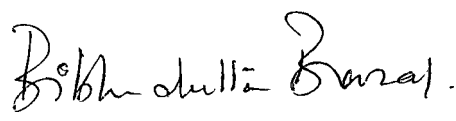
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ABSTRACT

The present study aimed at providing a cognitive structure and process account of creativity. "Creativity" is a problem for all the disciplines comprising cognitive science. An attempt has been made to explain creativity from a cognitive science perspective.

It has been argued that creativity in any of its forms is a cognitive phenomenon. It involves various cognitive structures and processes in any level of its development. From a wide review of literature, it was observed that almost all kinds of creativity seem to have six underlying complex and higher order cognitive processes i.e., Memory, Attention, Analogy, Language, Emotion, and Planning (MAALEP). Creativity in any field of knowledge has been observed to involve these six core cognitive processes, to differential degree of hierarchical dominance and participation. These cognitive processes can enter into many kinds of permutations and combinations among themselves, some of which are conducive to creative thinking.

Keeping this in mind, a cognitive process model of creativity (MAALEP) has been developed. MAALEP is a dynamic self-organizing process system. It is a neurally inspired model. Arguments and research findings from cognitive neuropsychology form the bases of this model. MAALEP takes off from the basic postulate that all cognition is the result of neurological activity. This means that pattern recognition, reading, attention, memory, imagery, consciousness, thinking and the use of language as well as the other forms of cognition, are a reflection of the activity of neurons, mostly those that are

concentrated in the brain's cerebral cortex. Since the activities a person does - speaking, solving problems, operating machines, and so on - are based on cognition, all behavior is likewise predicated on neural activity.

Along with these six cognitive processes, MAALEP involves Luria's concept of successive and simultaneous forms of information processing. Creative thinking involves both successive and simultaneous information processing to various order of integration among them. MAALEP admits dual coding representational system to its structure. Dual coding adds flexibility, complexity and efficiency to the cognitive system. MAALEP also admits that Hebb's cell assembly concept is the cortical process underlying the process of cognition. It has been observed that creativity is a product of general cognitive processes, which also underlie other ordinary thinking. It is only the nature of patterning and synchronization of the general cognitive processes that accounts for creativity. MAALEP has attempted to incorporate ideas from different sources of cognitive science.

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