Creativity of an Aha! Moment and Mathematics Education

Editors: Bronislaw Czarnocha and William Baker

Creativity of an Aha! Moment and Mathematics Education introduces bisociation, the theory of Aha! moment creativity into mathematics education. It establishes relationships between Koestler’s bisociation theory and constructivist learning theories. It lays down the basis for a new theory integrating creativity with learning to describe moments of insight at different levels of student development. The collection illuminates the creativity of the eureka experience in mathematics through different lenses of affect, cognition and conation, theory of attention and constructivist theories of learning, neuroscience and computer creativity. Since Aha! is a common human experience, the book proposes bisociation as the basis of creativity for all. It discusses how to facilitate and assess Aha! creativity in mathematics classrooms.

Contributors are: William Baker, Stephen Campbell, Bronislaw Czarnocha, Olen Dias, Gerald Goldin, Peter Liljedahl, John Mason, Benjamin Rott, Edme Soho, Hector Soto, Hannes Stoppel, David Tall, Ron Tzur and Laurel Wolf.

Readership
Everyone interested in scientific creativity, teachers of mathematics and science, researchers of human creativity, libraries and institutes of creativity, computer creativity specialists.

Bronislaw Czarnocha, Ph.D. (1976), Yeshiva University, a quantum physicist and a teacher-researcher, is Professor of Mathematics at Hostos CC, CUNY. He published 50 papers in Mathematics Education and edited four books, including Creative Enterprise of Mathematics Teaching Research (Sense, 2016). He is the Editor-in-Chief of the Mathematics Teaching-Research Journal.

William Baker, Ph.D. (1993), teaches mathematics at Hostos Community College CUNY, and as a member of a teaching research team he collaborates with colleagues to research effective instructional methods to motivate students to access their own creativity, and to publish the results.
## Table of Contents

Preface  
Acknowledgements  
List of Figures and Tables  
Notes on Contributors  

Introduction  
*Bronislaw Czarnocha*  
1 Arthur Koestler’s Bisociation Theory  
*Bronislaw Czarnocha*  

**PART 1: Bisociation in the Classroom**  
2 Teaching-Research Analysis: The Constructivist Teaching Experiment as a Methodology of Teaching  
*Bronislaw Czarnocha*  
3 Classroom Facilitation of Aha! Moment Insights  
*Bronislaw Czarnocha and William Baker*  
4 Assessment of the Depth of Knowledge Acquired during an Aha! Moment Insight  
*Bronislaw Czarnocha*  
5 The Role of the Teacher in Facilitating the Aha! Moment  
*William Baker*  
6 The Work of the Teaching-Research Team of the Bronx: Creativity  
*William Baker, Olen Dias, Edme Soho, Hector Soto and Lauren Wolf*  

**PART 2: The Aha! Moment and Affect**  
7 Creativity in the Eyes of Students: Espoused and Enacted Beliefs in Mathematical Projects  
*Hannes Stoppel and Benjamin Rott*  
8 Building Long-Term Meaning in Mathematical Thinking: Aha! and Uh-huh  
*David Tall*  
9 A Conative Perspective on Aha! Moments  
*Gerald A. Goldin*  
10 Illuminating Aha! Moments through the Relationships between Cognition, Affect, and Conation  
*Bronislaw Czarnocha and Peter Liljedahl*  

**PART 3: Bisociation and Theories of Learning**  
11 Bisociation, Creativity, and Interiorization  
*William Baker*  
12 Two Stage Changes in Anticipation: Cognitive Sources of Aha! Moments  
*Ron Tzur*  
13 Aha! Moments, Bisociation, and Multifocal Attention  
*John Mason and Bronislaw Czarnocha*  

**PART 4: Bisociativity from Without**  
14 The Aha! Moment at the Nexus of Mind and Brain  
*Stephen R. Campbell*  
15 Bisociative Structures  
*Hannes Stoppel and Bronislaw Czarnocha*  
16 Conclusions  
*Bronislaw Czarnocha*  
17 Collection of Aha! Moments  
*Bronislaw Czarnocha*  

Glossary  
Index