From Brain to Mind: Using Neuroscience to Guide Change in Education

James E. Zull

Summary Review by Emiliano Aguilar '15

Sterling, VA 2011.

In James Zull's Introduction to From Brain to Mind: Using Neuroscience to Guide Change in Education, he recognizes that teaching's overall mission needs to change. In order to change education Zull claims that educators need focus on the role of the mind in education. This needed change is due to the evolution of technology, as new devices replace skills of the brain. His suggested change is that education needs to cease just teaching the subjects in the standardized curriculum, and gain an understanding of the process of learning itself. In order to understand the process of learning the educator should develop creative and in-depth thinking skills in the student. Zull continues in his introduction to state his occupation as simply an "interpreter," Zull himself is not a practicing neuroscientist. His approach to these concepts is that when he reads them he asks himself "Does this have anything to do with education?" and if so will write his interpretation of the concept. However, he does have biological understanding of the human body as a professor of Biology, Biochemistry, and Cognitive Science.

The book is divided into ten chapters, each beginning with a picture of the section of the brain Zull is going to discuss. These chapters are presented in chronological order, in what Zull calls a journey. Zull stresses that individuals have separate journeys and begin along different points in his book. This book is reflective of the importance of personalized experiences, with Zull beginning the chapters with italicized autobiographical pieces that relate to the theme of the chapter. Zull reiterates throughout the book that personalizing education is key to developing minds.

Each chapter starts with a quote, and ends with a section for notes used in that chapter. The first chapter, entitled "The Natural Journey from Brain to Mind: Brief History and Overview," Is Zull's quick general overview of the entire book on a general scale. In the following nine chapters, Zull continues using his personal experiences and a beginning quote to examine the ideas of neuroscience in education. The chapters are broken into micro-chapters that Zull uses to expand on a certain point in the concept. Very few of the micro-chapters are longer than a page or two. Which assists with making the reader seem like they haven't read much, or become fatigue with reading.

Zull organizesthe book in the order of his own experiences. The first section is transformation, the change of ideas and thoughts into action. The following chapter focuses on emotion, which Zull associates with motivation. He believes that the emotion associated with thoughts lead to a form of curiosity that eventually becomes discovery of a new idea. The author notices that schooling tends to lack integration, or the connection of multiple ideas and concepts into something larger. Chapter five discusses images as representations of our thoughts. The chapter on images is followed by symbolizing, which Zull claims assist to develop the mind and thoughts. Memory is a concept essential to making learning last. When information is learned the individual needs to create a memory

of it to access it later. Using memory is not an "inert action", and how we grow accustomed to using memory to solve a problem is a process of adapting. A main factor of the brain that Zull examines is the use of "plasticity", which he claims assists with constant change of the brain as the individual ages and experiences more in life. The final chapter focuses on metacognition, and connecting the previous chapters into some final product of the mind. After taking time to explore each term and concept, Zull uses this final chapter to illustrate the importance of integrating information for true learning to take place.

The author provides very few actual guidelines for how to adapt these items into lessons to engage the students. Rather, his narratives explore how the mind works, and how the brain's specific locations fit into the larger picture of the mind. By prompting the reader to think differently about the approaches to education, Zull leaves the application of his ideas to the reader. He simply wishes to present the foundations of neuroscience, tell the reader what makes certain functions possible and leave the reader to develop applications for their scenarios. The author talks of some specific items, but these terms are just presented and discussed briefly. This proves helpful for educators who may not be aware of terms like "plasticity," "frontal lobe," or "metacognition."

By dividing the chapters into smaller subsections, Zull is allowed to jump from various parts of the brain, psychological concepts, and applications. He occasionally will use guidelines for applyng his ideas, but even these are few. In chapter four, Zull does provide a brief overview of applications to promote critical and innovative thinking. One such idea is that all mathematical problems should be realistic "story problems," and not exaggerated stories. Zull is also a supporter of learning not on a timetable schedule, such as in school. He would prefer educators not to overload learning with a schedule of prolonged back-to-back coursework, because students should have time to reflect on what was just learned. Zull would prefer students to focus on the ideas instead of worrying when the next class would start, or their current one end.

Many of Zulls' ideas require the educator to adhere to the integrative cortex. He outlines the integrative cortex as having eight vital functions in deeper learning. These functions are to perceive and manipulate the parts of the bigger picture, parts of details, arrangement of the big picture and arrangement of the details. In chapter nine Zull suggests a book report as the best application to working all eight functions of the integrative cortex. However, he still claims that only by applying a situation to someone specific interest can they learn, which is why a book report proves so beneficial. The student is granted choice of topic that interests them in that field, and as long as the prompt adheres to those eight functions they will develop deeper learning.