

## **The Effect of Whole Brain Teaching on the Academic Outcomes of African-American Elementary Male Students**

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The often faltering academic achievement of African-American male students is a concern of many school districts throughout the Nation and it has plagued public school education for decades. The National Assessment of Education Progress (NAEP) assessments given in the early 1970's provided the first national research based evidence of a substantial gap in Reading and Math test scores between African-American and White students (Miksic, 2014). A primary goal of the 2001 No Child Left Behind Act was to eliminate the academic achievement gap between groups of students. However, it is evident that despite many reform efforts, various targeted programs, and countless studies, the achievement gap that exists between African-American and White male students continues to persist. In fact, statistics show that African-American male students are twice as likely to drop out of high school than their White peers, and only 52% who enter high school will graduate in four years (Casper, 2013). Compounding this concern is that African-American male students are more likely to have teachers who ineffective and lack appropriate certification (Casper, 2013).

Clearly, the poor academic performance of African-American male students does not begin during high school, but gaps are evident as early as preschool. One study conducted by Yeung and Pfeiffer, uses a nationally representative sample and indicates significant achievement gaps between African-American and White preschool students in the areas of reading and math (Magnuson & Duncan, 2006). Even with early identification, the gaps continue to be a critical concern in American education.

Intrigued by this perpetual dilemma, some educators are looking more towards brain based neuroscience research to help determine how to reach students who have traditionally faced academic challenges. Sanchez (2008) stated that, "What is known about how the brain functions

should be incorporated into every teaching process and practice in order to help high-risk children and their families" (Sanchez, 2008, p.10). Biffle (2013), co-founder of the Whole Brain Teaching program posits that challenging students must be taught with strategies that utilize multiple parts of the brain (Biffle, 2013). This type of engaging multi-sensory instruction which often incorporates kinetic gestures and peer teaching is being used in an increasing number of schools throughout the country. The Whole Brain Teaching program provides promising indication that its philosophy, implementation, and institutionalization within elementary schools can significantly decrease the academic achievement gap between African-American and White male students. This paper will provide a review of literature and contextual framework for future research.

### **Incorporating Neuroscience into Education**

As the research of how neuroscience and education work together continues to reveal an inextricable relationship, the challenge for many educators is determining how to translate this insight into practical strategies and brain based instructional practices (Franklin, 2005). This is particularly important for teaching challenging students. Consequently it is important to review the research that focuses on how the brain receives, processes, and retains information and how these factors pertain to teaching and learning. It is also relevant to consider student engagement and kinesthetic teaching research. In addition, albeit limited, a review of the research on Biffle's Whole Brain Teaching program is provided.

**Brain based instruction.** The research indicates that teachers who are knowledgeable about brain based strategies and who use their understanding of how the brain acquires information to teach their students are more likely to be able to help their students learn how to think

critically and make meaning of information (Hruby & Goswami, 2011; Jensen, 2009; and Smith, 2007). Kurt Fischer, Harvard University Graduate School of Education professor and director of the Mind, Brain, and Education program, postulates that our tools for teaching must no longer be one-dimensional but multi-dimensional. Instruction must provide students with the tools to not only recall information but to engage their brains in thinking processes that promote generation of new thoughts (Brown, 2012; Worden, Hinton, & Fischer, 2011). Research also indicates that memory is not stored in a single area of the brain but is broken apart into visual images, emotion, movement, and other sensory areas of the brain (Willis, 2007; Wolfe, 2015). When the brain recalls information it actually reconstructs it from each sensory area of the brain. These neuroscience research findings provide a basis for engaging multiple parts of the student's brain when teaching and providing multiple pathways for learning (Wolfe, 2015).

The research also indicates that there is a substantial relationship between emotion and the brain's learning processes (Jenson, 2005). The brain's ability to retain information is heightened by the intensity of the emotion generated during the acquisition process. This becomes important for instruction because students who participate in classroom discussion and learning experiences that are charged with emotion are more likely to remember key elements of that experience. Emotion can either be a catalyst or blocker for connecting information through the brain's neurons (Mitchell, 2008; Sylwester, 1994). For example, if the student experiences a traumatic event prior to arriving to school, the student's brain can block the pathways for the neurons within the brain to connect. Whereas a student who becomes excited about learning a particular lesson experiences a positive biological response in the brain which encourages the ability to process new information. This finding is compelling for teaching challenging students who often experience traumatic events outside of the school environment. African-American male students are more likely to have a low socio economic status and often fall below the poverty line. The brain based research supports the need to provide a safe nurturing environment for the student

along with teaching that utilizes many parts of the brain.

A critical component of an effective learning environment is a multi-sensory, brain-based instruction driven classroom (Wilmes, Harrington, Kohler-Evans, & Sumpter, 2008). Other factors such as teacher-student relationship, providing a safe environment, and ensuring that the student's basic needs are met contribute to the brain's ability to be able to most adequately receive, process, and retain information. Once these factors are in place, there is an increased likelihood that the student will be able to engage in the teaching and learning process. Meeting these basic needs reduces stress factors and research indicates that there is a negative impact on the brain's ability to process information when under stressful conditions (Conant, 2001; Jensen, 1998)

**Student engagement.** Research indicates a significant and substantial relationship between engagement and achievement for African-American students when compared to their White peers (Darensbourg & Blake, 2013; Moller, Stearns, Mickelson, Bottia, & Banerjee, 2014). Also, impacting student engagement is the influence of the teacher through their relational ability and level of care. These findings suggest that when students are highly engaged by caring teachers, their potential for learning increases.

There is also an abundance of research that provides a positive correlation between student engagement and student behaviors. The more students are engaged academically, the less they are to exhibit disruptive behavior. If the whole brain is engaged in learning, there isn't any mental are left over for challenging behaviors (Biffle, 2013). In one study a significant positive correlation was found between teaching and engagement and a significant negative correlation was found between teaching and disruption (Scott, Hirn, & Alter, 2014). This supports previous research studies which determined that increased teacher instruction is associated with positive student behavior (Brophy, 1986; Farbman & Kaplan, 2005). Parsons and Taylor (2011) add significantly to the body of literature on student engagement by concluding that engagement is not only critical to reductions to

classroom behavior but that the foundational intention of student engagement was meant to target disengaged minority predominantly socio-economically disadvantaged students who were at risk of dropping out of high school. Over time, student engagement strategies have evolved for the broader purpose of generally managing classroom behaviors (Parson & Taylor, 2011).

**Kinesthetic teaching.** Kinesthetic teaching involves using body movements to teach concepts. This method of teaching encourages the participation of all students through hand gestures or body movements to demonstrate understanding. One study of middle school students indicates that significant growth for students who were previously identified as underachieving (Lister & Ansalone, 2006). Student attitude and the degree to which students are involved in their own learning is also an important factor, especially with underachieving students. The research further reveals that both achievement and attitude to learning are enhanced when tactual/ kinesthetic strategies are employed. In so doing, it suggests that delivery systems, especially those that engage students actively in the leaning process, may facilitate the development of positive academic and attitudinal outcomes (Lister & Ansalone, 2006).

There is a significant amount of research that indicates a positive relationship between movement and learning, as well as movement and retention. Movement can be an effective cognitive strategy to (1) strengthen learning, (2) improve memory and retrieval, and (3) enhance learner motivation and morale (Jensen, 2009). This body of research supports the use of movement as a modality to help engage students and facilitate learning. Jensen (2009) wrote, “It’s truly astonishing that the dominant model for formal learning is still ‘sit and get.’ It’s not just astonishing; it’s embarrassing. Why do we persist when the evidence that lecture alone does not cut it is so strong?” (p. ). This compelling statement speaks to the necessity and resistance to implementing instructional practices that kinesthetic elements and moving away from those practices that have been proven to be ineffective.

#### **Biffle’s Whole Brain Teaching Program.**

In a study that sought to evaluate the impact of Whole Brain Teaching on the behaviors of challenging students, nine types of student behaviors were evaluated with fifth grade students. The results of this study indicated a 50% decrease in student negative behaviors from the pre-observations to the post-observations after implementing Whole Brain Teaching (Palasigue, 2009). These results support student engagement theories that state that the more a student is engaged in the lesson, the less likely the student will engage in disruptive behaviors (Scott, Hirn, & Alter, 2014).

In a video developed by the Public Broadcasting Service, called *Teachers Tap Into Brain Science to Boost Learning* (published on July 1, 2015), highlights the emergence of the Whole Brain Teaching program in schools throughout the country. This video showcases a 3<sup>rd</sup> grade teacher in the Philadelphia school district of Pennsylvania and indicates that students are fully engaged. The video also references a study on the effect of whole brain teaching in one California elementary school found test scores in math and language arts rose by an average of 11 percent.

#### **Summary**

Research indicates that connecting neuroscience to instructional practices has promising implications for tackling the long standing achievement gap between African-American and White male students. Research also supports the strategies included as part of the Whole Brain Teaching program.

It is clear that no single variable can account for the continued existence of this achievement gap because of variances in the contextual frameworks of social, cultural, and school environments. It is also clear that emotion and stress impact the brain’s ability to process information, so the basic needs of students must be considered.

The continuation of the achievement gap is unacceptable for public education in the United States. The gap is in direct opposition to historical laws such as the Equal Education Act of 1974 which ensures that school districts are to provide an equal education to all students. The costs of this disparaging gap continuing include deficits in

literacy as well as increases in drop-out rates and unemployment. These implications extend well beyond the elementary school years where gaps first begin to widen. The Whole Brain Teaching program provides an opportunity to potentially change the trajectory of educating African-American male students.

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