

RAFT

A Case for Hands-on Learning

“Teachers who conduct hands-on learning activities on a weekly basis outperform their peers by more than 70% of a grade level in math and 40% of a grade level in science.”

Part 1: Hands-on is Essential to Learning

“I hear and I forget, I see and I remember. I do and I understand.”
Chinese Proverb

Research shows that hands-on experiences increase student performance and motivation.

A meta-analysis of 15 years of research on the advantages of hands-on learning, including 57 studies of 13,000 students in 1,000 classrooms, demonstrated that students in activity-based programs performed up to 20% higher than groups using traditional or textbook approaches. The greatest gains occurred in creativity, attitude, perception, and logic (Bredderman, 1982).

The National Assessment of Educational Progress (NAEP), also known as “The Nations’ Report Card,” revealed that teachers who conduct hands-on learning activities on a weekly basis outperform their peers by more than 70% of a grade level in math and 40% of a grade level in science (U.S. Department of Education, 1999). President Barack Obama declared July 9, 2009 as National Summer Learning Day in order to “provide students with hours of focused time for hands-on learning and creative projects.”

Hands-on is not new. Renowned educator John Dewey promoted learning experiences grounded in student interests and prior knowledge (Dewey, 1938). Later Jean Piaget demonstrated that physical experiences are central to child development (McAnarney, 1978). Other education experts agree: “Children are by nature observers and explorers, and the most effective approach to learning should capitalize on these intrinsic abilities.” (Shaply & Luttrell, 1993).

Science and math educators value hands-on learning because it requires students to think like scientists: creating hypotheses, making observations, and performing inquiry. Hands-on activities increase skill proficiency in science processes such as laboratory work, graphing, and data interpretation (Mattheis & Nakayama, 1988). The US Department of Education’s 2009 Mathematics Framework includes the use of manipulatives as part of their assessment of national achievement (National Assessment Governing Board, 2008).

Hands-on teaching helps educators connect with all types of students. English Language Learners benefit because hands-on learning has been shown to help in the development of language skills for bilingual students (Rodriguez & Bethel, 1983). Based on a four year study on the benefits of kit-and-inquiry science instruction in a California elementary school, researchers found that the longer ESL students participated in hands-on learning, the higher their scores were in science, writing, reading, and mathematics (Amaral & Garrison, 2002). Hands-on activities unleash the learning potential of special education students who are struggling with mathematics (Peltenberg et al, 2009) Programs that include hands-on learning can help immigrants or students from traditionally underserved communities become more engaged in learning and invested in completing their education (Cabral, 2006). Students who are disadvantaged economically or academically gain the most from activity-based programs (Bredderman, 1982).

Teachers benefit from hands-on learning as much as their students. Professional development workshops that stress hands-on learning are significantly more successful in improving teacher confidence in math and science (Basista & Mathews, 2002). Here at RAFT, we use hands-on teaching to train teachers to facilitate hands-on learning in their classrooms. RAFT workshop participants report similar improvements in confidence levels.

Hundreds of studies have shown that hands-on learning is the key to a successful education. When hands-on activities are employed, teaching is more fun and students are more motivated to learn. 86% of RAFT teachers tell us they are doing more hands-on activities in their classrooms since joining RAFT, and 89% report offering a wider variety of hands-on activities. 93% report that their students are more engaged in learning and retain knowledge longer as a result of their hands-on experiences. (RAFT Member Survey, January, 2009). As one teacher put it, “You can’t learn to swim without getting in the pool.”

Citations

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