

Early Education key to developing interest in STEAM

Dr. Jill M. Hackman

Berks County Intermediate Unit



High-quality early childhood education lays the foundation for a future workforce that has the Science, Technology, Engineering, Art and Math (STEAM) skills and other qualities that employers need.

According to the Harvard Center for the Developing Child, the first five years of life are a unique period of brain growth; we know that 700 synapses—the neural connections that support later learning and behaviors—are developed every second. Because this early stage is so critical, the achievement gap between children from advantaged and disadvantaged backgrounds shows up as early as nine months old. Children can be 18 months behind by the time they enter kindergarten, with significant gaps for both math and reading. Children who are not kindergarten ready are less likely to read well by grade three, and those children are less likely to graduate from high school, making it almost impossible to have a fully productive career.

Research demonstrates that high-quality early childhood education specifically addresses math achievement—as Ready Nation 2014 concludes, “Preschool children’s knowledge of mathematics predicts their later school success into elementary and even high school. Further, it predicts later reading achievement even better than early reading skills.” It also builds behavior traits—perseverance, problem-solving, patience—that help children make good choices and become productive employees, including in STEAM fields.

Because of these impacts, American Economist and Nobel Laureate James Heckman has estimated a return on investment for quality early education for children from disadvantaged backgrounds of up to 10:1. Young children are naturally curious – and reaching them at this stage teaches them they can be scientists before they might incorporate any message that math is hard or science is not for them.

Harvard Center research confirms that the brain is particularly receptive to learning math and logic between the ages of one and four. Young children are natural investigators and scientists who learn through play. They are naturally inquisitive learners who ask an average of 76 questions per hour. They make sense of the world around them by making predictions, checking them, and using evidence to make inductions and deductions.

According to Massachusetts Business Roundtable research, in the next 10 years, STEAM jobs will grow by 17%, compared to 9.8% for all other occupations. Across the US, in all occupations, there are 3.6 people for every 1 job. However, in STEAM, there is only 1 person for every 1.9 jobs. So while demand is high for STEAM workers, the supply is too low. But providing children with opportunities to have quality early learning experiences in STEAM enhances later interest in STEAM careers. Quality early education integrates STEAM learning throughout the day in all learning activities, with curriculum that recognizes how children learn that is focused on the ‘whole’ child, teachers who maximize learning activities to foster STEAM skills, and efforts to engage families in appropriate learning activities at home.

Pennsylvania has built a foundation to support STEAM skill development in early childhood. Hence, it is critical that we start early to put our county’s children on the right path and lay the foundation for a highly skilled future workforce who is being educated and trained for successful 21st century careers.