



OKAN Policy Brief

Making the case for Afterschool:

STEM Education and Oklahoma's future workforce

INTRODUCTION

STEM Education & Workforce

National, state and corporate competitiveness requires a skilled workforce and innovative ideas. For Oklahoma to succeed in an increasingly global economy, our workforce needs to possess the skills that today's high-tech and knowledge-based jobs demand. Research estimates that 80% of future jobs will require awareness and/or proficiency in STEM (Science, Technology, Engineering and Math).

Afterschool programs are a way to increase STEM subjects for Oklahoma students by offering extended learning opportunities that engage students in hands-on experiential settings.

Despite growth opportunities in current STEM-based industries, a serious need exists for skilled workers. More interest, investment and focus on STEM education is critical.

Investing in quality afterschool programs enriched with STEM education components can strengthen a pipeline of college-ready students, prevent dropouts and prepare a skilled workforce for Oklahoma's emerging and growing industries.

Making the Case:

Job Growth and Dropouts

Between 2008 and 2018, Oklahoma will create 541,000 job vacancies both from new jobs and from job openings due to retirement¹. More than half (57%) of all jobs created in Oklahoma will require some postsecondary training beyond high school.

OKLAHOMA			
CHANGE IN JOBS BY EDUCATION LEVEL: 2008 AND 2018			
Education Level	2008 Jobs	2018 Jobs	Difference
HS Dropouts	194,000	211,000	17,000
HS Graduates	550,000	592,000	42,000
Postsecondary	978,000	1,064,000	87,000

Source: The Georgetown University Center on Education and the Workforce

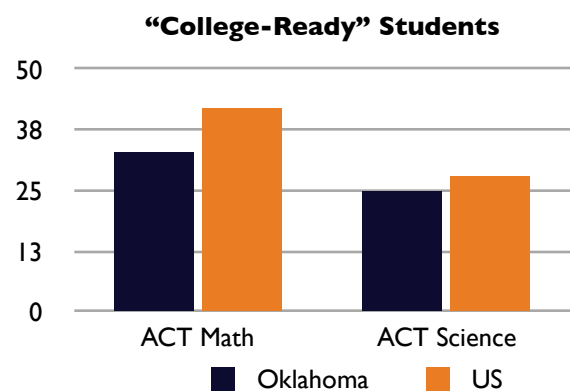
The Oklahoma Department of Commerce reports that increasing the percentage of Oklahomans with at least a high school degree could:

- Increase annual earned income by \$830 million
- Increase annual revenues by almost \$76 million
- Save over \$12 billion in lifetime health-related costs
- Save over \$63 million annually in crime-related costs

Making the Case:

A College-Ready Student Pipeline

The ACT College Readiness Report analyzed the 2009 class of high school graduates, which included 27,054 students who took the ACT as sophomores, juniors, or seniors. Only 18% of Oklahoma students are "College Ready" and fall far below national benchmarks in mathematics and science.



Percentage of H.S. Graduates ready for College Level 2009 Source: Alliance for Science & Technology Research in America, 2010 K-12 STEM Ed Report Card.

Over the past ten years, as STEM-related jobs are increasing, student interest in STEM fields are decreasing. ACT-tested students who said they were interested in majoring in engineering has dropped from 7.6 percent to 4.9 percent.

Scientific innovation has produced roughly half of all U.S. economic growth in the last 50 years.

National Science Foundation 2004



Oklahoma's current and future industry clusters include biosciences, weather, energy, medical and aerospace fields, depend upon a STEM-skilled workforce. Creating a sustainable, long-term economic growth strategy will require an investment in our state's STEM-knowledge infrastructure. *Extending the school day in spaces like afterschool programs enable hands-on, project-based learning, and can create interest and passion in STEM subjects for children of all ages.*

STEM Industry Cluster

Aerospace

Oklahoma's aerospace industry employs 143,000 workers with a payroll of \$4.7 billion and includes the largest military (Tinker AFB) and commercial (American Airlines) aircraft Maintenance, Repair and Overhaul (MRO) facilities in the nation.

Recruiting and retaining a skilled workforce is the greatest challenge. The industry recently identified key strategies regarding STEM education including:

- Promoting company participation in STEM and national aerospace education efforts for youth 18 and younger
- Industry sponsorship and mentoring for STEM competitions and camps
- Industry support of state efforts to increase STEM related education and training of teachers
- Industry partnerships to actively promote applied STEM curriculum statewide
- An increase in grant and scholarship programs to reach more students and teachers

Making the Connection:

STEM and Afterschool: Why Afterschool Matters

Schools can't do it alone. First, average Americans spend less than 5% of their time in a classroom and second, a growing body of evidence reveals that most science is learned outside of school.

To inspire our next generation of scientists and engineers will take a comprehensive effort. Partnerships between schools, community-based organizations and industry can be the key to engaging student's interest in STEM careers.

Afterschool programs offer extended learning opportunities that engage students in hands-on learning that inspires future careers. Across America, quality afterschool programs are playing a critical role in shaping tomorrow's workforce. However, Oklahoma is one of only 14 states that does not fund afterschool programs.

The stakes are high and there is no time to waste.

Oklahoma can emerge a leader in the 21st Century

economy only if policymakers and industry leaders come together to invest in Oklahoma's most valuable asset: our children.

Why Business Cares about Afterschool⁵

- 77% of mothers of school-age children are employed.
- The gap between work and school schedules amounts to as much as 25 hours per week.
- Child care-related absences cost U.S. companies an estimated \$3 billion annually.

Q&A

STEM, Afterschool and Oklahoma's Workforce

What is STEM?

STEM refers to Science, Technology, Engineering and Mathematics. STEM spans academic and professional fields.

How does STEM education impact Oklahoma's economy?

The link between economic development and quality STEM education is strong. To compete for high quality jobs, Oklahoma must be able to supply a highly skilled workforce including engineers, and technicians.

How can afterschool programs help better prepare students for careers in STEM fields?

Research demonstrates that elementary and middle school students who regularly attended high-quality afterschool programs demonstrated significant gains in standardized math scores. ^{citeHLLPPReport} Programs that take place beyond the normal school day bring hands-on, experiential learning opportunities to students.

What programs are available in our K-12 schools?

Oklahoma is one of only 14 states that does not fund afterschool programs. (cite) Afterschool programs exist in locations throughout the state through faith-based efforts, public-private partnerships and through 95 federally funded 21st Century Community Learning Centers. A few program sites offer STEM programs, but lack curriculum resources and consistent funding.

Oklahoma has a premier Career Technology education system. What is happening with STEM at CareerTech?

Utilizing the Project Lead The Way (PLTW) courses, CareerTech has developed and piloted STEM High School Academies at approximately 30 sites. These academies serve over 1500 students and have trained 60 teachers.

For middle school students, the Gateway To Technology (GTT) program provides activity-oriented curriculum to help students explore STEM projects at 18 sites with 18 teachers trained in the PLTW courses.

Two biotechnology academies have also been created for high school students through a partnership with Southern Technology Center and the Noble Research Foundation.

Are Oklahoma's private sector STEM industries involved in promoting STEM education?

The Oklahoma Aerospace Alliance sponsors an annual summit that includes an education and training day for educators. This event provides resources for teachers to use in the classroom to provide insight into how to engage students in STEM activities. The industry also promotes educational opportunities for youth offered at the Tulsa Air and Space Museum, the Stafford Air & Space Museum and the Science Museum Oklahoma.

How do we increase the number of students who study toward STEM careers?

Students need more exposure to the wide range of career paths available to them in STEM fields. By making students aware of the opportunities, we can engage them. The Oklahoma Department of Commerce recently developed the okcareerplanner website and produced a series of videos targeting young audiences about STEM careers. OKAN is currently partnering on this project to spread the word.

What steps will Oklahoma need to take to invest more in STEM education?

More cooperation and communication must exist between industry leaders and policymakers at the legislative and community levels. Investments and partnerships in afterschool programs between schools and STEM industries must be strengthened and encouraged. More educators will also need to be trained in quality, STEM-based curriculum.

Note: An asset overview of STEM programs was assembled for Oklahoma's Race to the Top application in 2010. The list includes K-12 programs through the State Department of Education, the Oklahoma School of Science and Mathematics, the Oklahoma department of Career and Technology Education and the Oklahoma State Regents for Higher Education. The list can be found on the OKAN website.

Sources

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Oklahoma Afterschool Network, *Focus on Afterschool in Oklahoma*, 2009. www.okafterschool.org.

The ACT, *ACT Profile Report of College Readiness Benchmark Scores: Graduating Class 2009 Oklahoma*, 2009. www.act.org.

The Georgetown University Center on Education and the Workforce, *Projections of Jobs and Education Requirements Through 2018, June 2010*. cew.georgetown.edu.

United States Department of Labor, Employment and Training Administration, *The STEM Workforce Challenge*, April 2007. www.doleta.gov.

Vandell, Deborah Lowe, *Outcomes Linked to High-Quality Afterschool Programs: Longitudinal Findings from the Study of Promising Afterschool Programs*, Charles Stewart Mott Foundation, October 2007. www.mott.org.

The resources above are located on the OKAN website at www.okafterschool.org/STEMresources.



ONLINE RESOURCES

Afterschool Alliance
afterschoolalliance.org

Oklahoma Department of Education
sde.state.ok.us

Oklahoma State Department of Commerce
okcommerce.gov

Oklahoma Department of Career Technology
okcareertech.org

C.S. Mott Foundation
mott.org

Oklahoma Aerospace Alliance
okaero.com

NOYCE Foundation
noycefdn.org

Oklahoma Center for the Advancement of Science and Technology
ok.gov/ocast

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OKAN is a statewide initiative

