

M&M Teachers Institute 2015: Bring STEM and Manufacturing Careers Into Your Classroom.
References in support of STEM Outreach Efforts
Prepared by Peter Dimoulas

On the following pages, please find a list of references and the conclusions that they support. The associated conclusions, or statements are have been listed as they will appear during today's presentation.

Table of contents

Topics	Pages
HS graduation rates	2
Persistence in postsecondary education	2-3
Postsecondary student debt	3
Labor market outcomes and participation	3-4
College, STEM readiness	5
Labor force skills gap	5
Job growth	6
Recommendations for industry groups, businesses, and educators	7
Classroom studies	7-8

M&M Teachers Institute 2015: Bring STEM and Manufacturing Careers Into Your Classroom.

Why our efforts are important: from an urban and suburban perspective, including high school graduation rates, college persistence, student debt, and labor market outcomes.

Topic	Interest group: urban, suburban, or both	Statements and References (all links were active as of March 1, 2015)
HS graduation rates	Both	<p>4-year graduation rates (%) in CT for 2013: CT = 85.5; Bridgeport = 67.3; Hartford = 71.2; New Haven = 71.4; Oxford = 97.4; Torrington = 84.5; Waterbury = 66.5. Breakdown among various groups and categories is also available.</p> <p>1) http://www.governor.ct.gov/malloy/cwp/view.asp?A=4010&Q=545016 2) http://blogs.lib.uconn.edu/outsidetheneatline/2014/05/15/4-and-5-year-graduation-rates-for-connecticut-schools-in-2013/. 3) http://nces.ed.gov/pubs2014/2014391.pdf</p>
Persistence in postsecondary education	Both	<p>Nationally, of HS graduates from the class of 2005, 55.4% finished a 4-year degree. http://nces.ed.gov/programs/digest/d13/tables/dt13_326.10.asp</p>
Persistence in postsecondary education	Both	<p>Of all first-time students who started in fall 2012, 68.7 percent returned to college at any U.S. institution in fall 2013. http://www.studentclearinghouse.org/about/media_center/press_releases/files/release_2014-07-10.pdf</p>
Persistence in postsecondary education	Both	<p>Among CT HS graduates from the class of 2009-2012, 73% enrolled in college. Of CT HS graduates from the class of 2007, 46% finished a college degree within 6 years. The findings are worse among low-income and minority students. http://www.sde.ct.gov/sde/lib/sde/pdf/evalresearch/college_enrollment_persistence_graduation_statewide_results.pdf</p>
Persistence in postsecondary education	Urban	<p>Among New Haven Public School graduates from the class of 2006, 22.8% finished a college degree within 6 years.</p>

		<p>Bailey, M. (2013, Mar. 7). 23% Of HS Grads Finished College Within 6 Years. <i>The New Haven Independent</i>. Retrieved March 1, 2015 from: http://www.newhavenindependent.org/index.php/archives/entry/23_high_school_grads_finish_college_in_6_years/.</p>
Postsecondary student debt	Both	<p>Postsecondary, student debt among 2013 graduates in Connecticut: 64% of graduates are in debt; average debt = \$30,191.</p> <p>http://projectonstudentdebt.org/state_by_state-data.php</p>
Postsecondary student debt	Urban	<p>Low-income and minority students are more likely to incur significantly more debt as a result of pursuing postsecondary studies.</p> <p>1) Chen, R., & DesJardins, S., L. (2010, Mar./Apr.). Investigating the Impact of Financial Aid on Student Dropout Risks: Racial and Ethnic Differences. <i>Journal of Higher Education</i>, 81(2): p179-208. Retrieved March 1, 2015 from: http://inside.collin.edu/iro/pdata/pdf/articles/JHE%2081-2%20Chen%20Financial%20Aid%20and%20Dropout%20Risk.pdf.</p> <p>2) Ratcliffe, C., & McKernan, S.-M. (2013, June). Forever in Your Debt: Who Has Student Loan Debt, and Who's Worried? The Urban Institute; Washington DC. Retrieved March 1, 2015 from: http://www.urban.org/publications/412849.html.</p>
Labor market outcomes and participation	Both	<p>Youth and young adult unemployment rates are high compared with historical averages. Unemployment rates are higher among Hispanics and African Americans.</p> <p>http://www.ctvoices.org/sites/default/files/econ13sowctfull.pdf</p>
Labor market outcomes and participation	Urban	<p>Nationally, and among developed countries, minorities tend to realize unemployment at higher rates and for longer periods.</p> <p>1) http://www.newhavenindependent.org/index.php/archives/entry/job_crisis_forum_draws_a_crowd/</p> <p>2) Cheung, L. (2006, Jan.). Racial Status and Employment Outcomes. Canadian Labour Congress. Retrieved March 1, 2015 from: http://www.canadianlabour.ca/news-room/publications/racial-status-and-employment-outcomes.</p>

		<p>3) Keuhn, D. (2013, Feb.). Labor Market Performance of Young Black Men in the Great Recession. The Urban Institute; Washington DC. Retrieved March 1, 2015 from: http://www.urban.org/publications/412747.html.</p> <p>4) Lalani, M.; Metcalf, H.; Tukefci, L; Corley, A; Rolfe, H.; & George, A. (2014, May). How place influences employment outcomes for ethnic minorities. National Institute of Economic and Social Research; The Joseph Roundtree Foundation, York, UK. Retrieved March 1, 2015 from: http://www.jrf.org.uk/sites/files/jrf/ethnicity-employment-location-full.pdf</p> <p>5) Simms, M.; Fortuny, K.; McDaniel, M.; & Monson, W. (2013, Aug.). Education and Unemployment of Low-Income Men. The Urban Institute; Washington DC. Retrieved March 1, 2015 from: http://www.urban.org/publications/412984.html.</p>
Labor market outcomes and participation	Urban	<p>Minorities, especially African Americans experience longer periods of unemployment among similarly educated peers.</p> <p>Ritter, J.A., & Lowell, J.T. (2011). Racial Disparity in Unemployment. <i>Review of Economics and Statistics</i>, 93(1): 30–42.</p>

M&M Teachers Institute 2015: Bring STEM and Manufacturing Careers Into Your Classroom.

Why our efforts are important: college readiness, job growth, and the labor force skills gap, especially for STEM and manufacturing.

Topic	Statements and References (all links were active as of March 1, 2015)
College, STEM readiness	<p>Approximately ½ of high school seniors pursuing postsecondary studies in STEM and related areas do not have STEM proficiency (based on Mathematics portion of ACT in 2008).</p> <p>http://www.bhef.com/publications/increasing-number-stem-graduates-insights-us-stem-education-modeling-project</p>
College, STEM readiness	<p>More than 30% of STEM majors (between 2003-2009) either dropped out or switched majors.</p> <p>http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2014001rev</p>
Labor force skills gap	<p>Access to talent is the greatest driver of competitiveness among STEM-related and manufacturing firms around the world. Moreover, in the US, many STEM-related jobs remain (or go) unfilled, from skilled production workers and technicians to scientists and engineers.</p> <p>http://www.deloitte.com/assets/Dcom-Global/Local%20Content/Articles/Manufacturing/dttl_WEF_The-Future-Manufacturing_4_20_12.pdf</p>
Labor force skills gap	<p>Many employers find that their interviewees know information in the abstract, but in terms of applications, especially when immediate solutions are required, they are inadequate. Bridges between theory, functional critical thinking, understanding concepts, and application are weak, if not faulty. We recommend the incorporation of hands-on experiential learning (within secondary school instructional activities) requiring the creation or repair of everyday items or applications to enhance content knowledge as well as applications thereof.</p> <p>Klancko, Robert. New Haven Manufacturer’s Association. Personal communication (February 28, 2015).</p>

Labor force skills gap	<p>Employers are concerned with work habits of their employees, including being not only punctual but focused on their work (e.g., not answering their personal phone while involved with some task, and being willing not only to do what is requested, but also contribute ideas to make things better). Soft skill weaknesses among college graduates sometimes includes a disconnect between lofty aspirations and unwillingness to pay their dues (e.g., learn the various phases of the operations first). Firms are seeking graduates who come to work and not only apply themselves to what is needed but also have a propensity and a desire to learn and improve things. Employers are more concerned with the ability to solve problems and adapt, over detailed memory of data. Indeed, industry expects graduates to know technical basics, seek answers from various sources, and be adaptable.</p> <p>Crane, Jack. ConnStep. Personal communication (March 5, 2015).</p>
Job growth	<p>In order to keep pace with anticipated domestically growth of STEM-related occupations, 1.6%, the US would have to increase its share of STEM graduates by 30% through 2030.</p> <p>http://www.mckinsey.com/insights/employment_and_growth/the_world_at_work</p>

M&M Follow-up Workshop: Bring STEM and Manufacturing Careers Into Your Classroom.

What should we be doing (better) and what we can expect.

Topic	Statements and References (all links were active as of March 1, 2015)
<p>Recommendations for industry groups, businesses, and educators</p>	<p>Several organizations, in the US and abroad, have advocated partnerships or collaboration among students, parents, educators, industry groups, and businesses to ensure that the education of young adults is relevant and services their communities.</p> <ol style="list-style-type: none"> 1) Justin, A. (2011, Dec.). A Jobs-Centered Approach to African American Community Development: The Crisis of African American Unemployment Requires Federal Intervention. The Economic Policy Institute; Washington DC. Retrieved Dec. 30, 2014 from: http://www.epi.org/publication/bp328-african-american-unemployment/. 2) McNeely, T. (2012, Dec.). Statewide Strategic Plan for Secondary Career and Technical Education: Report to the Legislature. Office of the Superintendent of Public Instruction; Olympia, WA. Retrieved Dec. 30, 2014 from: http://www.k12.wa.us/LegisGov/2012documents/StrategicePlanforCTE2012.pdf. 3) Eichhorst, W.; Rodriguez-Planas, N.; Schmidl, R.; & Zimmermann, K.F. (2012, Dec.). A Roadmap to Vocational Education and Training Systems Around the World. The Institute for the Study of Labor; Bonn, Germany. Retrieved Dec. 30, 2014 from: http://www.iza.org/en/webcontent/publications/papers/viewAbstract?dp_id=7110. 4) Bridging the Gap: Rebuilding America's Middle Skills. (2014, Nov.). Harvard Business School; Boston, MA. Retrieved Dec. 2014 from: http://www.hbs.edu/competitiveness/research/Pages/research-details.aspx?rid=66. 5) Clark, P.; Dayton, C.; Stern, D.; Tidyman, S.; & Weisberg, A. (2007, Oct.). Can Combining Academic and Career-Technical Education Improve High School Outcomes in California? California Dropout Research Project; Santa Barbara, CA. Retrieved 4 Jan., 2015 from: http://casn.berkeley.edu/resource_files/ca-dropout-project410-06-03-12-54-51.pdf.
<p>Classroom studies</p>	<p>Students perform better when they feel that what they are doing in class is not only meaningful but will help them realize their career aspirations.</p> <ol style="list-style-type: none"> 1) Hulleman, C.S., & Harackiewicz, J.M. (2009, Dec. 4). Promoting Interest and Performance in High School Science Classes. <i>Science</i>, 326: 1410-1412.

- 2) Greene, B.A.; Miller, R.B.; Crowson, H.M.; Duke, B.L.; & Akey, K.L. (2004). Predicting high school students' cognitive engagement and achievement: Contributions of classroom perceptions and motivation. *Contemporary Educational Psychology*, 29: 462-482. Retrieved Jan. 4, 2015 from: <http://ceep.indiana.edu/hssse/Greene.pdf>.
- 3) Fadigan, K.A.; & Hammrich, P.L. (2004). A Longitudinal Study of the Educational and Career Trajectories of Female Participants of an Urban Informal Science Educational Program. *Journal of Research in Science Teaching*; 41(8): 835-860. Retrieved Jan. 4, 2015 from: <http://www.duluth.umn.edu/~kzak/documents/fadigan04-fem.pdf>.