



Ignite. Educate. Accelerate.

Education and Training in Automotive Manufacturing:

A Review of the Literature on Career Pathways



AMTEC is supported by a National Science Foundation Grant

Purpose of Review

- To provide AMTEC a comprehensive review of programs that prepare individuals for careers with a specific focus on automotive and advanced manufacturing
- To provide a foundation for AMTEC to develop a sustainable, well-designed career pathway for careers in automotive manufacturing

Structure of Review

- Offers a definition and framework for career pathways
- Provides a typology for identifying types of career pathway programs
- Identified types of career pathways activities and best practices for automotive and advanced manufacturing
- Proposes an alignment of NAM and AMTEC models

Career Pathway Defined

- A career pathway is a framework for connecting a series of educational programs with integrated work experience and support services, thereby enabling students and workers to combine work and advance over time to better jobs and higher levels of education and training.
- (The League for Innovation, 2007)

Hallmarks of Career Pathways

- Clear and easy linkages between education and training
- “Wrap around” support services to help students succeed
- Partnerships that make good use of data
- Employer involvement in all phases
- Continuous improvement
- Commitment to sustainability

(The League for Innovation, 2007; Davis and Spence, 2006)

Types of Pathways

- Three types:
 - Secondary Pathways
 - Postsecondary Pathways
 - Employer and Industry Pathways

Secondary Pathways

- Educational programs that begin serving high school students and lead to postsecondary education or directly into entry-level work.
- These may include:
 - Career clusters
 - Career and technical education (CTE)
 - Career academies
 - STEM pathways
 - Tech Prep programs
 - CTE dual credit/concurrent enrollment programs

Secondary Pathway Exemplar: STEM Pathways

- Rigorous coursework and experiences that prepare students for college or career
- Career clusters that are linked to STEM industry sectors so students can find work
- Opportunities to master the skills and knowledge needed for 21st century jobs
- Hands-on field experiences and projects related to coursework and career studies
- Partnerships with all stakeholders – students, parents, businesses, community organizations, colleges



Ignite. Educate. Accelerate.



AMTEC is supported by a
National Science Foundation Grant

autoworkforce.org

Secondary Pathway
Exemplar:

STEM Pathways

- STEM Pathways are
 - Renowned for providing students with many hands-on experiences and project-based learning activities
 - Lacking available data on how well STEM pathways transition students into postsecondary education (Hughes, Karp, & Bailey, 2003).
 - Producing many new models, i.e. Los Angeles Trade-Technical College
 - LATTTC has designed a very thoughtful STEM pathway with area high schools, business and community partners (LATTTC, 2008)



Ignite. Educate. Accelerate.



AMTEC is supported by a
National Science Foundation Grant

autoworkforce.org

Secondary Pathways

Exemplar:

CTE Dual Enrollment Programs

- Curricular alignment of CTE secondary and postsecondary courses
- Sets course level standards using employer input
- Begin in 9th grade
- Monitors student transition from high school to college
- Provides opportunities for students to earn college credit while still in high school
- Provides career development activities to build career experience

(D'Antoni, 2005)



Ignite. Educate. Accelerate.



AMTEC is supported by a
National Science Foundation Grant

autoworkforce.org

Secondary Pathways
Exemplar:

CTE Dual Enrollment

- Growing number of Early Colleges, an example of dual enrollment pathways
- Many are applying career and technical education to these pathways
- The Alamo Dual Credit Academies provide two-year training and internship programs, offering high school students an opportunity to earn up to 30 college credits

Postsecondary Pathways

- Programs and/or agreements that
 - ease the transition from the community college to the four-year institution in STEM and CTE fields and/or
 - intentionally combine postsecondary education and training for different occupations along a career ladder from entry level to management
- These may include
 - Articulation agreements between 2-yr and 4-yr institutions
 - Community college health occupation career pathway programs
 - Community college manufacturing career pathway programs



Ignite. Educate. Accelerate.



AMTEC is supported by a
National Science Foundation Grant

autoworkforce.org

Postsecondary Pathway Exemplar

Articulation Agreements in Advanced Manufacturing

- Articulation agreements with many four-year institutions allow for AAS Advanced Manufacturing courses to apply for partial elective credit.
- Most four-year institutions that offer Bachelors of Applied Science (BAS) degrees accept articulate credits from AAS programs.
- Most Advanced Manufacturing program articulation agreements between community colleges and four year institutions are in the Engineering disciplines and STEM related areas

(AASCU, 2007)

Industry and Employer Pathways

- Industry certifications and credentialing are becoming an increasingly prominent aspect of the reform movement in CTE.
- Useful as an external validation of students' skill competencies and workplace readiness and should be considered “predictors of success” (Virginia DOE, 2008).
- Not a guarantee for entry into a specific occupation
- Examples include:
 - NOCTI
 - ASE



Ignite. Educate. Accelerate.



AMTEC is supported by a
National Science Foundation Grant

autoworkforce.org

Industry and Employer Pathways: Exemplar

Industry

Certification Boot Camps

- Accelerated training camps/programs provided at a training site or at a client's location
- Focuses on “real world skills” to master certification exams and to advance within a career
- Robotics and Manufacturing Boot Camps offered at many high schools

AMTEC Career Pathway Model

- Three career pathways
 - Engineering and Management
 - Highly Specialized Technicians
(Mechatronics, Maintenance, etc.)
 - Entry Level (Maintenance and Production)