Can Working after High School Set Students on a Rewarding Career Path? A Case Study of the Manufacturing Connect Program

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I. Introduction: Challenging the necessity of higher education in pathways out of poverty

As the American economy has climbed out of the Great Recession and into a jobless recovery, policymakers have taken a renewed interest in the U.S. manufacturing industry – or the "advanced manufacturing" industry as it now called, indicating that today's manufacturing jobs are more about problem-solving and innovation, and less about manual dexterity or physical work.[1,2] In the face of a dwindling American middle class, labor market analysts have suggested that a growing manufacturing sector could once again provide pathways to family-sustaining careers for less educated Americans.

But one narrative that has dominated the discussion around "advanced" manufacturing is the assumption that today's manufacturing workforce will need more higher education. Writing from the depths of the 2000-2001 recession, Peter Drucker argued in "The next society" that

> "[…] the most striking [job] growth will be in "knowledge technologists": computer technicians, software designers, analysts in clinical labs, manufacturing technologists, paralegals. These people are as much manual workers as they are knowledge workers; in fact, they usually spend far more time working with their hands than with their brains. But their manual work is based on a substantial amount of theoretical knowledge which can be acquired only through formal education, not through an apprenticeship."[3]

This narrative about our shift to a "knowledge economy" – where even blue-collar jobs will require advanced theoretical knowledge received through formal education – resonates with an older emphasis on educational attainment as a key pathway out of poverty. For decades, U.S. policymakers and advocates have taken it for granted that college enrollment is a key to socioeconomic mobility. Drucker's framing validates this focus, suggesting that workers without a college degree will be increasingly excluded from the economy of the future. Empirical studies that illustrate the growing "wage gap" between high school and college graduates appear to further underscore a need to boost college enrollment.[4]

However, an increasing body of evidence shows that, for many, there is far from a straight line between college enrollment and socioeconomic mobility. A recent article in the Washington Post sums up the paradox: "Being poor is a big impediment to getting the education that lifts you out of poverty."[5,6] So while promoting educational attainment might help some poor students access manufacturing careers, for myriad reasons, that road remains too bumpy for many for whom such careers could be an important step toward socioeconomic mobility. Some policy solutions have focused on enumerating and tackling these barriers to success in formal education.[7] But other approaches have questioned the necessity of inserting formal post-secondary education into the path between high school and work, relying instead on work-based learning to prepare

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[1] National Science and Technology Council, Executive Office of the President. (Feb 2012). A national strategic plan for advanced manufacturing.
[2] Yakimov, G. and Woolsey, L. (2010). Innovation and product development in the 21st century: Report to Hollings Manufacturing Partnership Advisory Board.
[3] Drucker, P. (1 Nov 2001). The next society. *The Economist.*
[4] See, for example, Pew Research Center. (2014). The rising cost of not going to college.
[5] Tankersley, J. (15 Dec 2014). The college trap that keeps people poor. *The Washington Post*.
[6] See, for example, Gina Bellafante's New York Times series "Degrees and Difficulty", e.g.: Bellafante, G. (3 Oct 2014). Community college students face a very long road to graduation. *The New York Times*.; Bellafante, G. (19 Dec 2014). Raising ambitions: The challenge in teaching at community colleges. *The New York Times.*
[7] For example, Washington State's I-BEST program, based on research that showed relatively few Adult Basic Education enrollees earned even one college credit within five years, seeks to build stronger and more direct links between ABE and college coursework.

students for career-path manufacturing jobs. Rather than looking at the college vs. high school wage gap and concluding that more workers need college degrees, these approaches ask what linkages need to be built to create stronger career pathways for high school graduates.

The Manufacturing Connect (MC) program at Austin Polytechnical Academy, a Chicago public school, is one such approach. A critical driver of success for MC is the role the program plays as a sector-based workforce intermediary, engaging a network of employers in a process of what Nichola Lowe calls "skill reinterpretation" – collaborating with employers shift the ways that they identify and evaluate skill and to build internal infrastructure to support, mentor, and invest in workers.[8] More than just placing students in jobs, MC staff proactively shape employers' human capital strategies to increase the odds that those jobs will be the first step on a prosperous and fulfilling career path.

Especially as federal policy has begun to recognize the value of preparing students for manufacturing careers – one section of the White House's Advanced Manufacturing Strategy focuses on "Educating the Next Generation"[9] – policymakers must understand how approaches like Manufacturing Connect relate to embedded frameworks and assumptions about formal education. As this case study shows, pathways to advanced manufacturing careers cannot be simply grafted onto traditional educational pathways, but instead require new ways of thinking about the relationship between school, skill, work and career.

II. Case study: The Manufacturing Connect program

Program Origins

The Manufacturing Connect program at Austin Polytechnical Academy is implemented by the Chicago Manufacturing Renaissance Council (CMRC), a coalition of organized labor, manufacturing firms, local government, community leaders and educational institutions. In 2005 the coalition began developing the concept for manufacturing-oriented high school that would create "a consistent stream of educated and skilled young people to provide leadership in all aspects of manufacturing."[10] Small and medium manufacturing firms were deeply involved in the design process, and emphasized "a need for broader than a simple vocational program: 'this was not about teaching people to push buttons, they needed employees that knew how to think.'"[11]

In 2007, in partnership with Chicago Public Schools, CMRC founded Austin Polytechnical Academy (Austin Polytech), so named after the west-side residential neighborhood in which it is based.[12] The partnership was structured so that Chicago Public Schools retained control of the overall academic performance and curriculum, while CMRC took on implementing Austin Polytech's elective technical curriculum and career readiness and job placement supports.

CMRC chose the Austin neighborhood for its pilot because it was one of the most distressed in Chicago; 36% of families there live below the federal poverty line.[13] Although implementing the

[8] Lowe, N. (forthcoming). From skill mismatch to reinterpretation: Challenges and solutions for manufacturing worker retention and recruitment. *In* J. Bryson, J. Clark, and V. Vanchan (eds). *Handbook of Manufacturing Industries in the World Economy.* Under contract with Edward Elgar.
[9] National Science and Technology Council, Executive Office of the President, 17.
[10] Swinney, D. (2010). Austin Polytech: Building the road as we travel.
[11] Fryberger, C. (2013). "Employer involvement in the Austin Polytechnical Academy in Chicago, Illinois." Paper prepared for PLAN 774, UNC-Chapel Hill, Fall 2013. Copy in possession of author.
[12] Swinney, 2010.
[13] Swinney, D. (2014). Austin Polytech, Manufacturing Renaissance, and Manufacturing Connect. Copy in possession of author.

MC program within a neighborhood school in an economically distressed community significantly raised the difficulty of achieving success, CMRC leaders believed that "rebuilding our manufacturing in Chicago should begin in those communities hit the hardest by deindustrialization. We believe that these communities need to be prioritized in promoting development despite the many difficulties."[14]

The Curriculum

Each student at Austin Polytech can take manufacturing and engineering electives starting in their sophomore year. Through this training, students have the opportunity to earn up to five NIMS metalworking credentials. MC staff also work with teachers to incorporate manufacturing and engineering concepts into lesson plans – a geometry class, for example, might focus a lesson about ratios on the engineering considerations behind the wingspan-to-length-to-seating ratios of aircraft models. In their sophomore or junior year, students can participate in a one-day group job shadow with an employer partner and a five-day paid internship over their spring break. The summer before their senior year, students can participate in a longer paid internship with an employer partner. Upon graduation, students can interview with employer partners for open jobs – an opportunity that remains open to graduates on an open-ended basis. As of 2014, 27 MC students had been placed manufacturing jobs; 13 were still working with their manufacturing employers. Although they earn an average salary of $12/hour, there is a large variation in earnings, with one student earning upwards of $70,000 at a young age of 20.

Employer Partnerships

A distinctive characteristic of Manufacturing Connect is its intensive engagement of employers, carrying forward relationships developed during the design phase. Employer roles in the MC program include informing the technical curriculum; guiding the program's investments in its machine shop; creating work-based learning opportunities; and interviewing MC graduates for jobs.

MC's employer network comprises about 55 Chicago-based firms, all small and medium manufacturers; the median firm has 40 employees and the largest employs 200.[15] Most have an aging workforce and typically hire through word of mouth. They have implicit career ladders, but little in the way of a formal training infrastructure. In most cases, advancement happens on a "you know it when you see it" basis – CEOs say they look for qualities like "curiosity about how the machines work" and "mechanical aptitude."[16]

As a result of these practices, few employers in the MC network place much value on the "signaling" element of an academic degree or even an industry credential. As one employer put it,

> "To get ahead here, you have to have a good mental capacity to learn […] a curiosity for continuous learning, and patience, because you can have the book knowledge, but if you don't have the tribal knowledge, the general experience, you're still not a fully effective person. Let's say we have all the money in the world and we can hire our staff all from engineering schools. Well, most of the kids coming out of engineering school today don't know which end of a screwdriver you put in a slot, because the applied learning and the shop classes have left the school."[17]

[14] Swinney, 2014.
[15] Data provided by Erica Swinney, Manufacturing Connect Program Director, cross-referenced with ReferenceUSA.
[16] Employer partner interviews by author, including J. Kopacz & K. Dudek, Dudek-Bock; J. Winzeler, Winzeler Gear; W. Dudek, Wm Dudek Manufacturing; C. Freedman, Freedman Seating. Recordings in possession of author.
[17] Author interview with J. Winzeler, Winzeler Gear. Recording in possession of the author.

The informality with which skill is recognized in these firms (the "you know it when you see it" approach) provides opportunities for MC to place students who lack higher education but can still demonstrate their value on the shop floor. But because most employer partners tend to hire from "within the family" (theirs or current workers'), most new hires already have accurate expectations about life on the manufacturing shop floor. Many employers therefore lack experience communicating clearly about expectations, especially about how employees should demonstrate the potential for advancement. In cases where new hires' expectations differ from the work environment they initially encounter, employers are often ill-equipped to proactively bridge these gaps.

A key to MC's success, then, is creating opportunities for students to become more accustomed to this work routine and culture, as well as to recognize and speak out about gaps in firms' human capital infrastructure. MC staff invest considerable time in "building cultural bridges" between students and employers, using programs like job shadows and internships as opportunities for students to learn about the expectations of prospective employers.[18] MC staff also host lunchtime sessions for students where they facilitate explicit discussions comparing students' own cultural values and those they are likely to encounter in the manufacturing workplace.[19] These exchanges have helped students recognize, for example, that asking questions is actively encouraged in the workplace; for many students, in their social lives, doing so is a sign of disrespect or ignorance and silence is a better coping strategy.

In addition to preparing students to adapt to the routines of manufacturing workplaces, MC staff work to "build the bridge from both sides" – developing the capacity of employer partners to support younger workers in starting on a manufacturing career path. With support from MC staff, a number of MC employer partners have strengthened their mentorship structures in an effort to retain workers hired through MC. Others have asked for more dedicated support in developing these skills. As the MC program continues to iterate on its model, the next major challenge will be building out and formalizing the reinterpretation processes in which it engages employers.

III. Conclusion: The Role of Reinterpretation in Building a New Pathway

The informal human capital strategies of MC's employer partners illustrate the key role of contextualized skill in career pathways within smaller manufacturing firms, suggesting greater opportunity for high-school-educated workers than accounts like Drucker's acknowledge. While many newer interventions reflect this reality by striving to integrate work-based learning into degree programs and college curricula, it is fair to ask whether students can also gain significant advantage from work-based learning that comes from entering a manufacturing job directly from high school and gaining contextualized skills on the job. Conventional wisdom is that formal degrees and certificates protect workers because they are defensible and transferable, but the immediate-college path also poses risks for students who are not academically and prepared or who face financial constraints.

The Manufacturing Connect program's approach reflects a classic "dual customer" sector-based workforce development model, including some of the tensions inherent in balancing the needs of jobseekers and employer partners.[20,21] In the face of these tensions, MC's experience

[18] Author interviews with S. El-Jamal and W. Vogel, Manufacturing Connect staff. Recordings in possession of the author.
[19] Author interview with S. El-Jamal, Manufacturing Connect staff. Recording in possession of the author.
[20] Giloth, R.P. (1998). "Introduction: A case for workforce intermediaries." In *Jobs and economic development*. Robert Giloth (ed.). Thousand Oaks: Sage Publications.

demonstrates the benefit to both jobseekers and employers of skill reinterpretation strategies, which

> "encourage manufacturing companies to recognize degrees of freedom when it comes to assessing and accessing skill. […] Skill reinterpretation is fundamentally about getting employers to look beyond [external educational] supports to accept greater responsibility for upskilling through on-going investments in their incumbent workforce and the development of internal pathways for career advancement."[22]

While the MC program is a work in progress, the fact that a small group of students have indeed been launched on manufacturing career paths through the program suggests the potential of an alternative model that emphasizes successful work-based learning over traditional (and more easily measured) academic achievement. But equally, MC's experiences demonstrate that building the infrastructure – both within and external to firms – to align the expectations of students and employers is no easy task. Crucial to the continuing success of this model will be developing a sustainable and replicable framework for helping small manufacturers build the skills to recognize, nurture, and develop the skill and talent of young workers.

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