Beyond the skills gap: How the lack of systemic supports for teaching and learning undermines employer, student, and societal interests

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Both instructors worked for the same 4-year university in central Wisconsin, but when asked about how to balance the academic goals of higher education with the vocational needs of students, the two voiced disparate perspectives. Michael, the chair of a specialized science program geared toward a prominent local industry, expressed disbelief. "If we started just not caring what industry did," he explained, "then our students would very rapidly not get jobs." He added, "How could you not care about what your students are going to do when they're graduating?" On the other hand, Kelly, a mathematics instructor in the university's pre-engineering program, said she did not see herself as "someone who's producing future employees." Instead, she pointed to what she called the "learn how to learn" model of a college education. "I personally am a believer in the liberal arts concept and [what] we're really going for is a deeper skill set that students can then use to learn for years into the future," she said.

That such different perspectives could be expressed by two educators from the same university belies the current state of higher education not only in Wisconsin, but across the world. Widespread anxiety about the global economy and the availability of well-paying jobs, the rising price of college and subsequent student debt have all caused considerable tension in the sector, leading some to wonder if college is really "worth it" (Bennett & Wilezol, 2013; Bok, 2013; Selingo, 2016). Much of that tension speaks to the long-standing debate about the purpose of higher education: Should colleges and universities provide moral and intellectual development, prepare students for jobs, or some combination of both? Neoliberal discourses in the 1980s, based on the power of markets and deregulation to improve efficiency and governance, popularized the view that public higher education was more a private than a public good, while the economic anxiety brought on by the 2008 recession solidified the vocational argument, with policymakers increasingly viewing higher education primarily as a resource to spur job creation and economic growth (Mettler, 2014; Slaughter & Rhoades, 2004). This outlook stands in contrast to the philosophies of thinkers such as Aristotle and Thomas Jefferson, who argued that a broad-based education encompassing moral, civic, and intellectual enlightenment—not just utilitarian job training—would benefit the individual as well as all of society (Roth, 2015).

While the basic contours of this debate have remained relatively static for generations, its lexicon has changed over time (Grubb & Lazerson, 2005). The latest incarnation of the neoliberal perspective is framed as a "skills gap," a term referring to the idea that a plethora of jobs exists but employers struggle to find applicants with appropriate qualifications, largely because higher education is improperly attuned to workforce needs (Sullivan, 2012). Additional assumptions that underlay the skills gap idea are that the missing competencies are primarily technical in nature in "high demand" occupations, such as those requiring experience in the science, technology, engineering, or mathematics (STEM) fields, and that the primary solution is

to create or expand academic and training programs and articulated career pathways for these fields (Business Higher Education Forum, 2011; Sullivan, 2012). Based in part on these ideas, workforce development policies such as the federal Workforce Investment and Opportunity Act (WIOA) and Wisconsin Fast Forward (WFF) aim to more closely "align" postsecondary education with workforce needs by emphasizing technical programs in high-demand occupations, articulating career pathways from school to work, and fostering cross-sector partnerships that oversee state and regional workforce initiatives.

The skills gap idea is also notable for being controversial and largely unsupported by empirical evidence. Researchers have failed to find evidence such as higher wages in occupations supposedly in short-supply of workers to support the gap's existence (Levine, 2013; Osterman & Weaver, 2014), leading some to argue that employer challenges have more to do with worker attitudes than technical expertise (Carnevale, Gainer, & Meltzer, 1990) or that hiring and training practices may exacerbate employer problems (ManpowerGroup, 2015). Further, much of the evidence supporting the skills gap argument is based on industry-supported reports and anecdotes about employers' problems with the labor market (Cappelli, 2015; Levine, 2013). Finally, the notion of "skills" themselves as being primarily technical in nature or synonymous with occupational categories is being widely challenged as insufficiently capturing the role of "non-cognitive" (Heckman & Kautz, 2012) or the variety of technical and inter-personal skills that are known to be essential for performance in the workplace.[1]

Responding to these gaps in the literature, we initiated an empirical study in 2013 examining the nature of skills needs, their cultivation in classrooms and companies, and cross-sector relations in Wisconsin. Recognizing that systematic, large-scale interviews with both employers and educators were needed, we interviewed 145 people in two prominent STEM-related sectors—biotechnology and advanced manufacturing—as well as related higher education programs in 2- and 4-year colleges and universities. Instead of engaging in the debate about whether or not the skills gap existed, we focused on documenting the experiences of people "in the wild" of their factory floors, classrooms, and research laboratories. Essentially, we aimed to address the fact that "there has been little testing of the assumptions" that support the skills gap narrative, and yet this idea has informed workforce development and higher education policy at the state and national levels (Cappelli, 2015, p. 283).

To examine these complex issues we draw on field theory to provide a more nuanced account of "skills" through the concept of cultural capital, or the norms, practices, and knowledge that are highly valued within particular social and institutional contexts or fields (Bourdieu, 1986; Martin, 2003). Cultural capital is cultivated and reproduced via parenting, teaching, and training, and then used as a form of social currency to gain prestige, status, jobs, and other social benefits across different venues (Winkle-Wagner, 2010). These processes unfold within specific fields

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[1] The U.S. Department of Labor publishes an online resource center, Occupational Information Network or O*Net, that provides occupational descriptions and data for job seekers, workforce development offices, human resources professionals, students, researchers, and others that include a variety of categories including tasks, tools and technology, knowledge, skills, abilities, and work values.

(e.g., higher education and industry) that interact with one another through coordination and/or conflict, with the state field acting as an influential arbiter of resources, governance, and power (Fligstein & McAdam, 2012). Consequently, alignment among fields can be viewed in structural terms where programs act as a conduit for the sharing of resources among organizations, and also in ideational terms where actors have similar or different views on particular topics such as valuable cultural capital. Taken together, these concepts help clarify key issues implicit in the skills gap debate while providing rich theoretical tools for generating an account of skills-related issues that can be compared to assumptions underlying the skills gap narrative and subsequent policies such as the WIOA and WFF (Levinson, Sutton, & Winstead, 2009).

With this framework in mind, we conducted a qualitative field study of education-industry dynamics seeking to answer the following four research questions:

(1) Which fields or institutional contexts directly impact higher education-industry relations, and what are their primary characteristics?

(2) Which forms of cultural capital are considered valuable within the educational and industrial fields related to biotechnology and advanced manufacturing?

(3) How are valued forms of cultural capital actively cultivated by educators and employers in these fields?

(4) To what degree do these fields interact with one another, and how (if at all) does this influence the valuation and cultivation of students' and employees' cultural capital?

In answering these questions we found that the skills gap narrative and subsequent workforce development policies do not correspond well with the reality and complexity of education-industry dynamics on the ground in Wisconsin. Instead of solely focusing on technical mastery of a field, employers and educators value a variety of technical expertise, interpersonal competencies, and personal attributes that they believe will enable students and employees to succeed in the workplace over the long term. Known as "21st century competencies," these diversified skillsets have been linked to academic success, increased wages, and even impaired health outcomes (Pellegrino & Hilton, 2012). Educational and training programs that respondents felt best cultivate these competencies utilize experiential, hands-on teaching methods while also exposing students to multiple disciplines over a sustained period so that students can acquire new, discipline-specific habits of mind. The data also reveal that employers play an important role in challenges with the hiring process by screening applicants for "fit" with their organizational culture, and that relatively few companies offered formal (15%) or informal (42%) training opportunities for their employees. Finally, multiple forms of cross-field relations exist, including internship programs and curricular co-construction, each with different implications for the development of students' social and cultural capital. Altogether, these results highlight the need for a systemic approach to skills-related problems that places the use of active learning techniques by educators *and* employers as a central focus.

While the idea of a skills gap and policies such as the WIOA and WFF that are based upon its assumptions are facilitating education-industry partnerships and renewing focus on college

students' career development, they fall short in a variety of ways. The skills gap narrative ignores the role of classroom teaching and active learning in cultivating 21st century competencies, views skills-related problems solely in terms of educational practice while ignoring the role of employer training and hiring practices, and fails to adopt a balanced and systems-oriented vision of addressing the challenges facing higher education. Coupled with massive budget cuts to public higher education and the ongoing denigration of the teaching profession, which we observed throughout our fieldwork in the state of Wisconsin, these policies ultimately undermine the interests of the business community, students, and society at large. As technological, political, and financial forces inexorably change how colleges and universities operate, leaders should resist the temptation for quick fixes and instead focus on the more difficult task of strengthening systems that support high-quality experiential learning opportunities for all learners.

Background

In this section we describe the broader context for this study with a brief discussion of the political and economic milieu in which the idea of a skills gap took root, empirical research on skills-related issues, and the theoretical framework used—field theory—to examine these complex issues.

Context for the Skills Gap: From Jefferson to Neoliberalism

Debates on the role of postsecondary education in American society have been ongoing for centuries. Thomas Jefferson, in developing plans for the University of Virginia, believed a multi-disciplinary curriculum of science, mathematics, philosophy, and classical languages cultivated the practical skills, moral sensibilities, and critical thinking skills necessary to thrive in a free society (Gilreath & Jefferson, 1999). Jefferson's notions have acted as something of an idealized blueprint for many colleges and universities in the United States since the early 19th century. However, this model has often been at odds with the idea that higher education should play a more practical role in American society by primarily preparing students for the workforce. Taxpayer-funded institutions, in particular, have continually changed their educational approaches in response to workforce needs and varying political pressures since Jefferson's time, slowly but surely incorporating more career-oriented vocational approaches through the early 19th century and, significantly, with the passage of the federal Morrill acts in the mid- to late-1800s (Reynolds, 1992).

Yet many postsecondary institutions in the U.S. managed to balance the dual goals of professional preparation and academic training aimed at developing students' intellects and sense of civic engagement. At the University of Wisconsin (UW) in Madison, one of the nation's first land grant institutions, President Charles Van Hise pronounced that the state university's mission should be to serve every family in Wisconsin. Known as the *Wisconsin Idea*, or the view that the university should improve people's lives in and outside the classroom, the mission was a nationally recognized attempt to integrate higher learning with public engagement (Hoeveler, 1976, 2016). In addition, Van Hise supported the pursuit of research that had no "practical

value," or scientific inquiry based on the desire to advance knowledge, regardless of its immediate and/or obvious value to the marketplace or society at large (Van Hise, 1904, p. 204).

As the 20th century drew to a close, however, an emerging market- and economic-driven political discourse and set of policy prescriptions ushered in by conservative movements in the U.S., Germany, and Britain significantly changed the conversation (Harvey, 2005; Saunders, 2010). Founded on the ideals of deregulation and free-market solutions to public problems, neoliberalism, as the discourse is called, has extensively influenced public governance, and higher education has been under particular pressure to develop a more economically oriented perspective (Slaughter & Rhoades, 2004). According to the neoliberal view, colleges and universities—whether four-year research universities or two-year technical colleges—should operate according to market-driven principles, including partnering more closely with industry, creating corporate-style performance metrics, and encouraging more career-driven educational programming (Olssen & Peters, 2005; Saunders, 2010). Indeed, amid declining state support, many policymakers have argued that postsecondary institutions should operate like businesses (Sorenson & Flaherty, 2015), with academics—or "state-subsidized entrepreneurs"—expected to secure external grants and create spin-off companies (Slaughter & Leslie, 1997, p. 125). While some argue against these trends, critics of a primarily vocation-centered higher education have become marginalized in recent years (Grubb & Lazerson, 2005).

Other developments buffeting the higher education sector include advances in instructional technology, such as massive open online courses, that has made postsecondary coursework accessible to learners around the world. Additionally, competency-based education that focuses on documenting students' acquisition of specific skillsets via non-degree credentialing (e.g., badges and certificates) is also becoming a significant force in the higher education world.

In fact, some argue that traditional models of higher education are giving way to an "unbundled" approach that capitalizes on these new technologies and credentials, which promise to address long-standing inequities in college attainment while providing students with competencies that employers demand (Craig, 2015; Kamenetz, 2010; Selingo, 2016). Consequently, the skills gap is a narrative that dovetails with technological developments in instruction and credentialing, and with ongoing marketization trends that portray institutions, programs, and faculty primarily in terms of productivity, accountability, and profit (Slaughter & Rhoades, 2004).

The Skills Gap Frame: Higher Education is to Blame for Labor Market Woes

The broader context for contemporary debates about skills and educational programming is that of the Great Recession, the most damaging U.S. economic slump since World War II. Between the peak of employment in 2007 and the 2009 nadir, the economy lost nearly 9 million jobs (Goodman & Mance, 2011). The recession's "jobless" recovery (e.g., Peck, 2010), which was particularly painful and slow going compared to that of historic economic downturns, led businesses and policymakers to search for answers. One such answer, the "skills gap," was a long-standing idea that gained renewed focus after 2008 as the media increasingly reported on employer dissatisfaction with the skills of job applicants despite the persistently high

unemployment rate (Cappelli, 2015). The skills gap narrative became particularly influential as industry advocacy organizations issued reports on the subject (e.g., American Society for Training and Development, 2012; Business Higher Education Forum, 2011; Morrison, Maciejewski, Giffi, DeRocco, McNelly, & Carrick, 2011). This skills gap narrative or "frame," advanced by industry groups and representatives with close ties to powerful policymakers, was diagnostic and prognostic, at once analyzing and foretelling the supposed problem regarding low skills through disseminated reports and other media-focused releases (Benford & Snow, 2000). The frame included several fundamental assumptions, perhaps the most basic of which was that employers were having a hard time finding the employees that they needed because job applicants lacked the technical or "hard" skills to adequately perform their work (Morgan, 2013). The reasons for this shortage, advocates argued, was that postsecondary educational institutions had become too focused on 4-year liberal arts degrees that were not tied directly to careers, a mismatch between the curriculum and occupational tasks a number of organizations dubbed "misalignment" (e.g., Business Higher Education Forum, 2011; Institute for Higher Education Policy, 2014; Vandal, 2009). Instead, they contended, state resources should support short-term training for "middle-skill" jobs, or those occupations that require some postsecondary training but not a bachelor's degree (Sullivan, 2012), an argument often reinforced by anecdotes about college graduates working in coffee shops or bars (e.g., Casselman, 2013; McGrath Goodman, 2015). Finally, though such a skills gap necessarily implicated employers, local communities, state governments, educational institutions, families, and even society at large, advocates for skills gap-related change argued that reforms needed to focus on higher education (Sullivan, 2012).

This notion of a skills gap, however, is far more expansive an account than more delimited ideas such as "skills shortages" or "skills mismatches" that refer to discrete problems with supply and demand in specific occupations (Cappelli, 2015). As a "frame" meant to mobilize policy change, the idea of the skills gap has defined, organized, and interpreted the jobs situation in specific ways—via rhetorical and symbolic devices—that shape popular interpretations of reality (Benford & Snow, 2000). As such, when particular narrative frames resonate with a population based on the credibility of those articulating them as well as the frames' salience with on-the-ground experience, they can mobilize action such as the development of policy, which is precisely what has happened with the skills gap.

Indeed, the idea had particular resonance in the state of Wisconsin as it was articulated in a series of influential reports researched, written, and distributed by business and advocacy organizations with close ties to the conservative state officials—including the Wisconsin Manufacturers and Commerce business lobby (Wisconsin Manufacturers and Commerce, 2013), and a consortium of state business and economic leaders called Competitive Wisconsin (Competitive Wisconsin Inc., 2012). One report, in particular, was significant to the changes that would come. The former chief executive officer (CEO) of the manufacturing company Bucyrus International Inc., acting as a special advisor to Governor Scott Walker, released a report entitled *The Road Ahead: Restoring Wisconsin's Workforce Development* (Sullivan, 2012). The report's central thesis was that a skills gap undermining the state's economic capacity originated in an

"an education system that has not been able to keep pace with evolving workforce needs" (Sullivan, 2012, p. 7). The report further suggested de-emphasizing four-year colleges as the primary destination for high school graduates in favor of two-year technical colleges, offering alternative and modular credentials, utilizing performance-based funding for technical and community colleges based on students' employment prospects after graduation, as well as a number of other propositions.

State and National Skills Gap-oriented Policy Changes in Higher Education

The reports were influential in policymaking circles almost immediately. Upon receipt of *The Road Ahead*, the governor told reporters that Wisconsin was "looking to make dynamic changes in workforce development" and that the report was "a good starting point for true reform" (Content & Herzog, 2012). That reform began most prominently with Wisconsin Act 9, the workforce development policy also known as WFF, that allocated increased funding to the Wisconsin Technical College System (WTCS) as well as $15 million in new funding for workforce training grants for short-term programs (Wisconsin State Legislature, 2013). Establishing a new Office of Skills Development within the state Department of Workforce Development, WFF focused on training grants ranging from $4,000 to $400,000 a year before an additional $35 million was awarded to support further short term training programs focused on shortening waitlists in high demand fields at technical college campuses and providing industry-recognized certificates for secondary school students (Wisconsin Department of Workforce Development, 2015). While training grants expanded education in information technology, health care, and transportation, the manufacturing industry received a proportionally larger share of funds. At the same time, as Salem, Dresser, and Mackey (2015) note, the program is remarkable for being the first time the state has designated general purpose state revenue for workforce training programs. Earlier, Wisconsin only managed federal job-training resources.

The skills gap frame manifested itself in further budgetary changes as well. While Wisconsin policymakers were steering increased resources to business/technical college partnerships focused on short-term programming, they spearheaded systematic cuts to state colleges and universities not closely "aligned" with workforce needs. By cutting some $500 million from the UW System from 2011 to 2015, Wisconsin joined a growing list of states that have reduced funding for public transfer colleges and universities in recent years (Deprez, 2015). While Wisconsin's cuts were ostensibly about balancing the state budget, lawmakers nevertheless sent signals that the UW System was increasingly irrelevant to workforce needs. For example, Wisconsin Assembly Speaker Robin Vos, in response to a question about the impacts of budget cuts on research at the UW–Madison, put it plainly. "I want to have research done in a way that focuses on growing our economy," he said, "not on ancient mating habits of whatever" (Schneider, 2014). This effort was followed by controversial alterations to UW tenure protections and shared governance policies to provide postsecondary administrators with CEO-like authority to hire and fire as they see fit (Savidge, 2015; Sorenson & Flaherty, 2015).

Such workforce development policies focused on technical programs and career pathways are not limited to Wisconsin. The skills gap narrative has guided U. S. federal government

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policymaking as well, usually toward the goal of "aligning" workforce agencies, technical college programs and services, and industry to ensure postsecondary credentials are valued when students graduate (see, for example, National Skills Coalition, 2016). One important example is the federal WIOA, which is a coordinated set of programs overseen by the Departments of Labor, Education and Health and Human Services. One of the key components of the WIOA is a requirement that every state and local region develop a workforce development board whose main role is to direct federal, state, and local funding to workforce development programming. The legislation also requires states to develop a workforce development plan describing the state's overall strategy for workforce development as well as how the strategy will meet identified skill needs for workers, job seekers, and employers. Wisconsin, tellingly, submitted a state plan that framed the "skills gap" as the main economic issue: "The real story in Wisconsin is not of industry job growth or occupational demand; rather, it is one of labor force and talent constraints" (Wisconsin Department of Workforce Development & Wisconsin Technical College System, 2016, p. 5).

One of the defining characteristics of policies such as the WIOA or WFF, as well as many skills gap-related reports (e.g., Sullivan, 2012), is that they privilege and prioritize employers' voices, interests and experiences, rather than professional educators or even students themselves. Further, while some analyses of education-industry relations do highlight the role of teachers and the responsibility for employers to improve their hiring and training practices (Gonzalez et al., 2015), such a multi-faceted approach is the exception. Instead, analyses that view the primary issue at hand in terms of the apparent misalignment of educational programs to meet employer needs are the norm.

With the influence of the skills gap narrative in mind, we must to ask what we really know about the skills gap frame that informs so many of these policies. What, exactly, does the research literature tell us about the skills gap?

What Do We Really Know about Skills Gaps?

As the skills gap frame causally links higher educational programming to skills shortages and sluggish economic growth, it implicates a huge array of variables affecting multiple sectors, including global competition and outsourcing in industry as well as dramatic changes in the postsecondary education sector's funding and instructional models. Yet as some have noted, there is a dearth of empirical research on any number of facets of this complicated causal argument (e.g., Cappelli, 2012).

Skills gap advocates, indeed, have relied on targeted evidence speaking to discrete parts of the equation. For example, a fundamental claim behind the skills gap narrative is that employers have a hard time finding needed employees. Though industry representatives have been voicing this complaint since at least World War II (Mangum, 1990), recent evidence suggests that employers have had challenges recently. The annual *Talent Shortage Survey* ManpowerGroup (2015), for example, surveyed 41,700 hiring managers across several dozen countries and found 38% of respondents reported difficulties filling jobs, particularly in the skilled trades,

engineering, and sales. Still, the explanation for these difficulties is not as simple as failed educational systems. A study of North Carolina employers found that in addition to insufficient technical skills, hiring difficulties were due to unsatisfactory job experiences, low wages, and the criminal records of applicants (North Carolina Association of Workforce Development Boards and Labor & Economic Analysis Division, North Carolina Department of Commerce, 2014). Additionally, Cappelli (2012) argues that overly stringent hiring criteria are largely to blame for employers' difficulties. Thus, while hiring challenges appear to exist, and are associated with the insufficient supply of graduates in particular fields, a number of other factors are at play, such that sole attribution of problematic hiring to education is inaccurate.

Other research supports this fact. A number of studies, for instance, question the link between employer hiring challenges and macroeconomic indicators, as research comparing supposed skills shortages (i.e., defined as occupations supposedly in shortage) to economic indicators such as wages have also found no evidence for the existence of a skills gap. Indeed, two teams of economists have examined Wisconsin economic data and found no evidence of the kind of skills gap employers report (Loritz, Nerad, Sletten, & Cunha, 2013; Levine, 2013). Levine (2013) fails to identify increases in average weekly hours or rising wages in occupations that were supposedly experiencing skills shortages, the indicators one would expect to see if there were indeed a shortage of skilled labor. The real problem, scholars suggest, is an oversupply of over-skilled workers in an economy that is not producing enough high-skill, high-wage jobs (Sutherland, 2012; Mavromaras, Mahuteau, Sloane, & Wei, 2013). Others have found that three-quarters of manufacturers report no problems with finding skilled labor, and that overly stringent hiring criteria and poor coordination among industry clusters may explain persistent vacancies (Weaver & Osterman, 2016).

While other analysts concur that a surplus of overeducated workers is the main source of the problem, they also point to the research supporting skills gap advocates. Cappelli (1995; 2015), suggests that there is not only a paucity of non-technical competencies like professional "attitudes" in the workplace, but that the business community is inadequately committed to training its own workforce. Employer complaints, Cappelli (2015) says, are "an effort to secure policy changes that will lower labor costs" by shifting responsibility training from business to students and the educational sector (p. 281). ManpowerGroup (2015) concurs, concluding that one in 20 employers is increasing starting wages to attract more qualified applicants, and one in five is providing training or professional development to existing stage. In addition, while U.S. employers invest considerable funds in workplace training, with $413 billion in informal training and $177 billion in formal training, the majority of those training dollars are differentially distributed to "prime-age" employees aged 25-54 and those holding bachelor's degrees (Carnevale, Strohl, & Gulish, 2015).

While this work paints something of a mixed picture of the skills gap narrative, other work seems to confirm aspects of the argument with regard to postsecondary curriculum and instruction. Critiques of the quality and efficacy of undergraduate education in general, and of how courses are taught in particular, have increased in recent years (e.g., Arum & Roksa, 2011; President's Council of Advisors on Science and Technology, 2012). Further, besides confirmation that employers do

report challenges with finding skilled workers (ManpowerGroup, 2015), researchers have found evidence of disjuncture between course curricula and industry needs. For example, Kim, Hsu, and Stern (2006) compared postsecondary information science curriculum with industry needs, finding that though project management skills were valued by employers, they were rarely taught. Dacko (2006) investigated skill development in a European business school's master's program from the viewpoint of graduates and marketing practitioners, identifying mismatches between the decision-making, leadership, and creativity skill needs of employers with the abilities of students (also see Llorens, Llinàs-Audet, Ras, & Chiaramonte, 2013). Another report comparing the competencies Chinese college graduates needed on the job and what they actually gained during their education highlights the lack of educational preparation in computer programming, management, argumentation, operations analysis, and negotiation (Molnar, Wang, & Gao, 2015).

Ultimately, however, empirical research exploring the links among the labor market, skills, and postsecondary education is not only inconclusive, but offers no systematic analysis of the complicated chain of variables (i.e., curriculum and instruction, hiring, economic growth) posited by the skills gap frame. Not only that, but a significant proportion of available research, particularly in labor economics, does not seem to square with the reality on the ground reported by many business leaders: that job applicants do not have the skills employers need.[2] While the conclusions of rigorous academic studies should not be discounted, as researchers with anthropological and sociological training, we agree with Jim Morgan of Wisconsin Manufacturers and Commerce that talking to people in the field is essential for understanding their experiences. These experiences—of employers and educators—illuminate on the ground realities regarding the relationship between higher education and the workforce while accounting for the influence of factors that the skills gap narrative ignores. Our goal, then, is to investigate real-world accounts of the people most closely involved in postsecondary and workforce education spheres in Wisconsin, then compare and contrast these experiences to the skills gap frame and related policies.

Theoretical Framework

Upon first glance, a theoretical framework that would allow for the analysis of the relationships among education and industry would be human capital theory, which examines the economic outcomes associated with investments in education (Becker, 2009). While this approach has proven useful in highlighting the economic value of various investments in education, it has been critiqued for overly focusing on the commodification of educational endeavors (and actors) as well as for ignoring the role of culture, social class, and power in shaping educational outcomes (Blaug, 1976; Slaughter, Taylor, & Rosinger, 2015). Consequently, by "reducing the universe of exchanges to mercantile exchange" the theory supposes an unrealistically neutral social and political sphere in which education and achievement unfolds (Bourdieu, 1986, p. 246). What is needed instead is a framework that accounts for a variety of non-monetary forms of exchange (e.g., skills, knowledge, and abilities)

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[2] Jim Morgan, a representative of Wisconsin Manufacturers and Commerce, argued researchers' conclusions were at odds with those of the executives with whom he had spoken. "How can you tell the manufacturers in this state that they don't have a problem when you have never talked to a single one of them?" Morgan (2013) asked.

and transfer that influence educational outcomes such as job attainment, the underlying structures of society that shape these exchanges, and how individual aptitudes come into play.

A framework that addresses these considerations can be found in field theory from relational sociology (Bourdieu, 1998; Martin, 2003). According to Pierre Bourdieu's version of field theory, social life is best understood as the interactions among three key ideas: *fields* that are structured spaces within which individuals (or organizations) occupy particular positions based upon their accrual of different forms of *capital* (e.g., monetary, social, and cultural resources), and who develop particular constructions of the world in the form of cognitive schemata "whose layered articulation compose the *habitus*" (Wacquant, 2013, p. 275).

These forms of capital include social capital that conveys important social contacts and resources (Lin, 1999) as well as three forms of cultural capital including institutionalized (e.g., degrees or certificates), objectified (e.g., books, paintings), and embodied (e.g., tastes and knowledge) forms that could be used to gain "profits" in the academic market and wider society (Bourdieu, 1986, p. 247). The emphasis on non-monetary forms of exchange, especially cultural capital, makes field theory uniquely suitable for an examination of education-industry dynamics and skills-related problems. Given that the term "skills" fails to capture both a broad array of competencies and the socio-cultural aspect of how competencies are valued, reproduced, and rewarded, in the remainder of this paper we do not use the term skills to refer to these different characteristics, but instead use "valued cultural capital," following Bourdieu or the term "competencies," following the Pellegrino and Hilton (2012).

The notion of embodied cultural capital also proved useful to our study given the nature of many non-technical competencies and aptitudes (e.g., critical thinking and communication) that are commonly thought of as acquired from social or cultural sources such as family or peers (Pellegrino & Hilton, 2012). These "shared subjectivities," or specific, socially situated ideas regarding valuable forms of cultural capital, are passed down to neophytes and other beginning group members (Martin, 2003, p. 42). One of the primary venues for this process of cultural reproduction is through education and apprenticeships, where particular skills, knowledge, and norms are conveyed, practiced, and then mastered (Lave, 2011). Importantly, the assimilation or internalization of shared norms is not a rapid process but instead, the process of cultivation "costs time which must be invested personally by the investor," much "like the acquisition of a muscular physique or a suntan" (Bourdieu, 1986, p. 248), which is significant to our argument herein.

Another important point to consider is that cultural capital is not valued the same way in different fields, such that certain forms of cultural capital (e.g., peer-reviewed publications) are assigned different value between two given fields (e.g., a research university or a manufacturing firm). This differentiation causes certain traits or competencies to be exchanged at varying rates depending on the field in which one is acting. As Winkle-Wagner argues (2010, p.94), "Cultural capital is relevant only in the field, or marketplace, in which it is recognized and given its value." This ascription of value occurs primarily because within a given field, group members develop common language, norms, and purposes—based on power differentials, political and policy

related machinations, and a unique history shaping the field's positions—in which they are drawn toward one another in the pursuit of similar resources (Bourdieu, 1998).

It is also important to account for the fact that fields do not exist in a vacuum, but are themselves embedded within larger fields, such that they can be located within one another like Russian dolls with macro-level fields containing smaller fields, which in turn contain smaller fields, and so on (Fligstein & McAdam, 2012). The macro-field of industry, for instance, contains specific industries like biotechnology and advanced manufacturing. Further, the relations between and among different fields can be viewed in a variety of ways, including *unconnected* where no social links or resource flows exist between fields, *dependent* where one field relies on the other for rules or resources, and *interdependent* where a mutuality exists between fields (Fligstein & McAdam, 2012). Inter-field relations can be ascertained by determining whether direct social relations are shared, which can range from routinized and direct interactions to relations through a third party. In any case, the nature of field relations has impacts on communications between agents within fields as well as the types of resources (i.e., cultural and social capital) that are conveyed to field members.

Finally, a key insight from field theory is that fields are not closed systems, but instead are influenced by other actors and proximate fields that include the global economy, accrediting agencies, and perhaps most importantly, the state field which in some cases has considerable power to influence how issues are framed, how policies are designed, and how resources are allocated (Fligstein & McAdam, 2012; Naidoo, 2004). In some cases, third party entities called *internal governance units* may act to maintain the privileges and standards of a group, such as academic professional associations. Institutional theorists also advance this insight (DiMaggio & Powell, 1983), though they emphasize how fields experience relative stability or instability as different actors contest resources and power within a given arena. In this focus on the nature of cross-field relations we offer an alternative accounting of "alignment" that is central to the skills gap argument. Instead of viewing education-industry relations solely in terms of whether educational programs are directly linked to in-demand occupations, we focus on a variety of programmatic features that provide structured opportunities for the bi-directional sharing of various forms of capital (i.e., social, cultural, fiscal) as well as the correspondence (or lack thereof) among agents' perspectives on the types of capital that are important in the world of work.

These points are critical because during the time of our fieldwork in Wisconsin, the skills gap idea was being advanced as a particularly influential narrative or "frame" about the lack of relations or alignment between higher education and the workforce, and became taken up by policymakers and reified in policies such as the WIOA and WFF. Yet the idea of a skills gap is woefully under-theorized in terms of accounting for the role of culture, power, and the diversity of cross-field relations that go beyond a simplistic account of education-industry alignment (e.g., Business Higher Education Forum, 2011). Instead, a framework is needed that conceptualizes these relations with more nuance and emphasis on the socio-cultural aspects of sectoral relations, as well as a deeper understanding of what "skills" are and how they can best be cultivated in

students and workers as they make transitions from college to the workplace. Thus, we adopt the explanatory power of field theory and its various manifestation to explore these issues.

Methods

With the lens of field theory in mind we embarked on a study of education-industry relations in Wisconsin. This study utilized a non-experimental, descriptive case study design where the focus was on documenting and describing human behavior and organizational systems in naturalistic settings (Yin, 2008). Our approach is also informed by the growing focus on practice-based research in education and the decision sciences that aims to document real-world practices and analyze the alignment (or lack thereof) between these behaviors and policy initiatives focused on changing behavior and/or organizational practice (Coburn & Turner, 2012; Klein, 2008; Levinson, Sutton, & Winstead, 2009; Spillane, 2012). Using field theory as a guiding theoretical framework we conducted in-depth interviews with a purposive sample of educators and employers to examine the dynamics among fields, cultural capital, and habitus in the context of the biotechnology and manufacturing industries in Wisconsin.

Study Sites and Sampling Strategies

Between November 2013 and December 2015 we visited six regions in Wisconsin that roughly align with the state's economic development regions. Within each region we identified cities with a high concentration of manufacturing/and or biotechnology companies as well as local colleges or universities that offered programs in disciplines related to these fields. We selected these industries due to their roles in representing the old and the new economies of the state and region, as well as their inclusion in the broad category of high-demand STEM-related industries (National Science Board, 2015). The regions and major cities within them are the Northern region (Superior), the Eastern region (Green Bay, Appleton, Oshkosh, Neenah), the Southeastern region (Milwaukee), the Southern region (Madison, Janesville), the Western region (La Crosse), and the Central region (Wausau, Marshfield, Stevens Point).

Within each city we developed sampling frames for educators and employers using publicly available documents, including online Chamber of Commerce listings, industry-specific membership guides, and college or university websites. Criteria for including employers in the sampling frame involved company size (i.e., two or more individuals) and industry niche (i.e., we excluded pharmaceutical companies in the biotechnology sector, and clothing and food manufacturers). Then, we selected 2- and 4-year educational programs whose students could conceivably go into the target industries: engineering or manufacturing-related programs and biology-related or biotechnology programs. Individuals included in the sampling frames were limited to human resource staff and/or company executives (employers), and instructors and administrators directly involved with curricular decisions (educators). In addition, career counselors were included in the educator sample as early interviews with educators indicated the importance of these professionals for students' career decision-making.

Potential respondents were contacted via telephone or email requesting participation in the study. We contacted 456 companies and educators, and received positive responses from 121 individuals.[3] The respondent sample increased to 145 as several individuals brought colleagues with them to their interviews unbeknownst to the study team. Ultimately, 75 individuals from 52 companies were included in the employer category, and 70 individuals from 17 postsecondary institutions were included in the educator category (see Table 1).

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[3] Although low, our response rate of 26.5% led to findings similar to others who have studied this subject (Carnevale et al., 1990; ManpowerGroup, 2015).

Table 1. **Description of full sample**

	Number of respondents	Number of Educational institutions	Number of companies
Total	145	17	52
Sex			
Male	85 (58.6%)	N/A	N/A
Female	60 (41.4%)	N/A	N/A
Region			
Southern	44 (30.3%)	3	15 (28.8%)
Central	27 (18.6%)	4	10 (19.2%)
Eastern	26 (17.9%)	4	12 (23.1%)
Southeastern	19 (13.1%)	2	6 (11.5%)
Northern	18 (12.4%)	2	7 (13.5%)
Western	11 (7.6%)	2	2 (3.8%)
Employers			
All employers	75 (51.7%)	N/A	52 (100%)
Manufacturing	64 (44.1%)	N/A	43 (82.7%)
Biotechnology	11 (7.6%)	N/A	9 (17.3%)
Company size by number of employees			
2-49	19 (36.5%)	N/A	18 (34.6%)
50-99	10 (19.2%)	N/A	12 (23.1%)
100-249	14 (26.9%)	N/A	12 (23.1%)
250 +	9 (17.3%)	N/A	10 (19.2%)
Educators			
All educators	70 (48.3%)	17	N/A
2-year	34 (23.4%)	10	N/A
2-year manufacturing	18 (12.4%)	N/A	N/A
2-year biotechnology	8 (5.5%)	N/A	N/A
2-year career advisors	8 (5.5%)	N/A	N/A
4-year	36 (24.8%)	7	N/A
4-year biotechnology	17 (11.7%)	N/A	N/A
4-year manufacturing	11 (7.6%)	N/A	N/A
4-year career advisors	8 (5.5%)	N/A	N/A

Data Collection

Three researchers conducted all data collection. Prior to conducting fieldwork, the study team participated in in-depth training with the research protocols that included practice interviews and real-time feedback on interviewer performance and general data collection procedures. The appropriate institutional review procedures for human subjects research was secured prior to the collection of these data.

Secondary documents. To identify the size, scope, and key characteristics of the fields of higher education, industry, and related entities, we reviewed documents such as institutional websites, newspaper articles, and third-party reports. These documents were collected throughout the duration of the study and were based on focused analyses of specific institutions (e.g., UW–Madison) or industries (e.g., biotechnology) as well as a weekly scan of news items related to the "skills gap."

Semi-structured interviews. A semi-structured interview protocol was designed for this study that included 10 to 13 questions, depending upon the respondents' position (i.e., educator or employer). While all respondents were asked each of the questions, a semi-structured protocol allowed for interviewers to pursue unanticipated emergent lines of inquiry. Interviews were conducted in person or over the telephone, and were audio recorded. Additionally, 18 interviews included more than one respondent in which case each participant was asked every question from the protocol. Each interview took approximately 45 minutes.

The interview protocol included a freelist exercise and open-ended questions. Freelist exercises explore cultural domains or determine the terms or phrases that individuals use to refer to a specific conceptual sphere (Weller & Romney, 1988). Each respondent was asked to provide, in single words or short phrases, the skills that immediately came to mind that were necessary for people's success in the manufacturing or the biotechnology industry. In interviews involving more than one person, we allowed them to perform the freelist together, although we kept their lists separate for analysis. Following the freelist exercise, respondents were asked several open-ended questions. Questions for educators included "How, if at all, are these skillsets integrated into your program?" and, "How would you characterize lines of communication, if any, among your program and local companies?" Questions for employers included "What are your thoughts on the applicant pool in regard to valuable skillsets?" "Can you describe the training programs available in your company?" and, "What skills are non-negotiable in terms of things you cannot train people on?"

Before conducting the analysis we reviewed transcripts to ensure respondents provided useable data, especially for the freelist. Data for 30 respondents were not included in the analysis because they provided information in unusable form (e.g., answers in paragraph form instead of single words or short phrases), resulting in a final count of 115 freelists for analysis. Then, because respondents listed terms that could be considered closely related but were in fact phrased differently (e.g., work ethic, hard worker, dependable worker), a process of standardizing the terms was necessary (Quinlan, 2005). For this step, two analysts reviewed the raw data independently to develop separate lists of standardized terms, whereupon both lists were compared, another round of independent coding ensued, and a final list developed by comparing the results (Miles, Huberman, & Saldaña, 2014). The final code list included 94 terms, and each respondent's freelist data were updated using these terms in preparation for data analysis.

Data Analysis

To analyze these data we utilized three different methods: (1) document analysis to identify and describe the characteristics and inter-relations of fields implicated in our study, (2) salience analysis of terms from the freelist exercise to identify valued cultural capital, and (3) thematic analysis of text from interview transcripts to describe how educators and employers actively cultivate these valued forms of cultural capital are as well as how field relations might influence this cultivation.

Document analysis to identify field characteristics. Our analysis of secondary documents entailed identifying key characteristics of the fields of higher education, biotechnology, manufacturing, and related state governance units in Wisconsin. Documents included institutional and government agency websites, reports issued by government and non-profit entities (e.g., Sullivan, 2012) and related media and scholarly accounts of the key fields at play during our study. Field characteristics we sought out included the missions of postsecondary institutions, interactions with one another via legislation, competition or collaboration, and so on. The analysis also sought to identify how state actors influenced field composition and relations among the higher education, biotechnology, and manufacturing fields. Finally, documents were analyzed to identify the outlines of the skills gap frame and its relationship to public policy.

Saliency analysis of freelist data. Freelist data were analyzed using ANTHROPAC software (Borgatti, 1996) to identify the types of cultural capital most valued by respondents. The primary output of the analysis was term salience, which is a measure that reflects the average percentile rank of a particular term across all respondent lists while weighting terms by the order each respondent reported them (Smith & Borgatti, 1997). Salience is a commonly used metric in cognitive anthropology because it implies that a term reflects a shared cultural domain, and represents psychologically relevant information for group members (Romney & D'Andrade, 1964). Salience is computed as:

$$s_j = 1 \frac{r_j 1}{n1}$$

$$s_j = \frac{n r_j}{n1}$$

Where r_j = position of item j in the list, and n = number of items per list (see Smith, 1993). To calculate the overall saliency index, the average sj across all respondents is calculated. The freelist analysis was conducted for respondents in different fields (e.g., educators and employers) and sub-fields (e.g., manufacturing educators and employers) within the sample, and then for respondents reporting different types of inter-field relations (i.e., no relations and some relations). For the latter analysis, relations were defined by any social or programmatic interactions with persons and/or organizations from a different field (i.e., education or industry).

Thematic analysis of interview transcripts. All transcribed interviews were entered into NVivo qualitative software for analysis. We then created a coding scheme to segment the data

into more manageable units (Chi, 1997). We inductively developed codes based on ideas from the text (i.e., open coding) to name a new code. Examples of codes included "valued cultural capital," "how educators cultivate cultural capital," and "teaching practices." One analyst created an initial code list and the team (i.e., the three authors) deliberated on this list and altered it based on group discussions. Two analysts then applied the code list to 10% of the transcripts, compared their results to one another, and updated the codes to ensure inter-rater agreement. The final code list included nine categories and 27 codes that were then applied to the entire dataset.

Then, reports were run in NVivo for selected codes (e.g., valued cultural capital), and the resulting text fragments were analyzed using inductive thematic analysis techniques. This step involved another open-coding process whereby analysts reviewed the raw data, made margin notes about important details or incidents related to the topic under consideration, and/or noted incidents where ideas or events were repeated across respondents (Miles et al., 2014; Ryan & Bernard, 2003). Then, upon encountering that detail in later text fragments, analysts compared each successive instance of a code to previous instances to confirm or alter the code/definition of that code (i.e., the constant comparative method) (Glaser & Strauss, 1967). One analyst took the lead for developing a code list for each of the four research questions, with two others reviewing 10% of the raw data from that category to independently derive their own codes. After group meetings where disagreements were discussed and codes revised to increase inter-rater agreement, the lead analyst then repeated the aforementioned code list development process by creating a final set of codes that integrated interpretations across all raters.

With this code list, we then systematically reviewed the data and assigned codes to each reference or incidence of that idea, event, or reference across the dataset. As a reliability check throughout the coding process we met every other week to re-calibrate our coding (i.e., independently coding text and comparing results) and to address any questions. This process resulted in an extensive database from which it was possible to identify frequency counts for the number of respondents reporting each code. Additionally, analysts identified "meta" themes that represented patterns across individual codes then they discussed the themes extensively using examples of raw data to illustrate emergent patterns. Finally, the analysts used documents and relevant coding results (e.g., cross-field relations) to determine whether field relations were unconnected, dependent, or inter-dependent (Fligstein & McAdam, 2012), and how these relations influenced teaching, training, or related practices salient to the development of student or employee cultural capital.

Limitations to the Study

Several limitations should be considered when interpreting the evidence we report in this paper. First, the analysis is a descriptive report of field characteristics and thus did not include a thorough accounting of power dynamics and contestation over resources among various parties, as is common among research informed by field theory. Second, the relatively small and self-selected nature of the sample renders the generalizability of the results to the larger population of educators and employers in Wisconsin and/or in the selected fields untenable. Third, the freelist question posed to respondents did not specify an occupational category as a referent (e.g., entry-

level or professional), which means that different respondents could have been thinking of different types of jobs when answering. Further, because the freelist technique requires standardizing unique respondent terms, important variation between individual terms and ideas may be lost. Fourth, our reliance on self-reported behaviors, and the lack of independent verification means that it is possible that the specific teaching, training, and hiring behaviors described by respondents are not consistent with actual behaviors. Finally, these data do not include the perspectives of those who have a unique and important perspective on the issues addressed in this paper—that of students and employees.

Results

In this section we report the results from our study in four parts. First, we describe the characteristics of the postsecondary and industrial fields that were operational during our study. Second, we discuss the types of embodied cultural capital (i.e., skills, knowledge and abilities) that educators and employers considered valuable. Third, we discuss the classroom teaching and workplace training practices used to cultivate these valued forms of cultural capital. Finally, we discuss the different types of cross-field relations identified in our fieldwork and how, they influenced the cultivation of students' cultural and social capital. Collectively, these data provide an account of education-industry dynamics that reveals a more complex and multi-dimensional situation than that suggested by the skills gap narrative.

1. Status of Field Characteristics

Recall that fields—or structured social spaces in which organizations and individuals occupy particular positions based on their accumulation of capital—are not monolithic sectors but instead comprise numerous sub-fields nested within one another (Fligstein & McAdam, 2012). Thus, in analyzing characteristics of fields salient to higher education-industry dynamics in Wisconsin during our study, we first examined the smaller fields that comprise "higher education" and "industry," and we now suggest these monikers are less than useful given the myriad distinctions to be made regarding sub-groups within these larger fields.
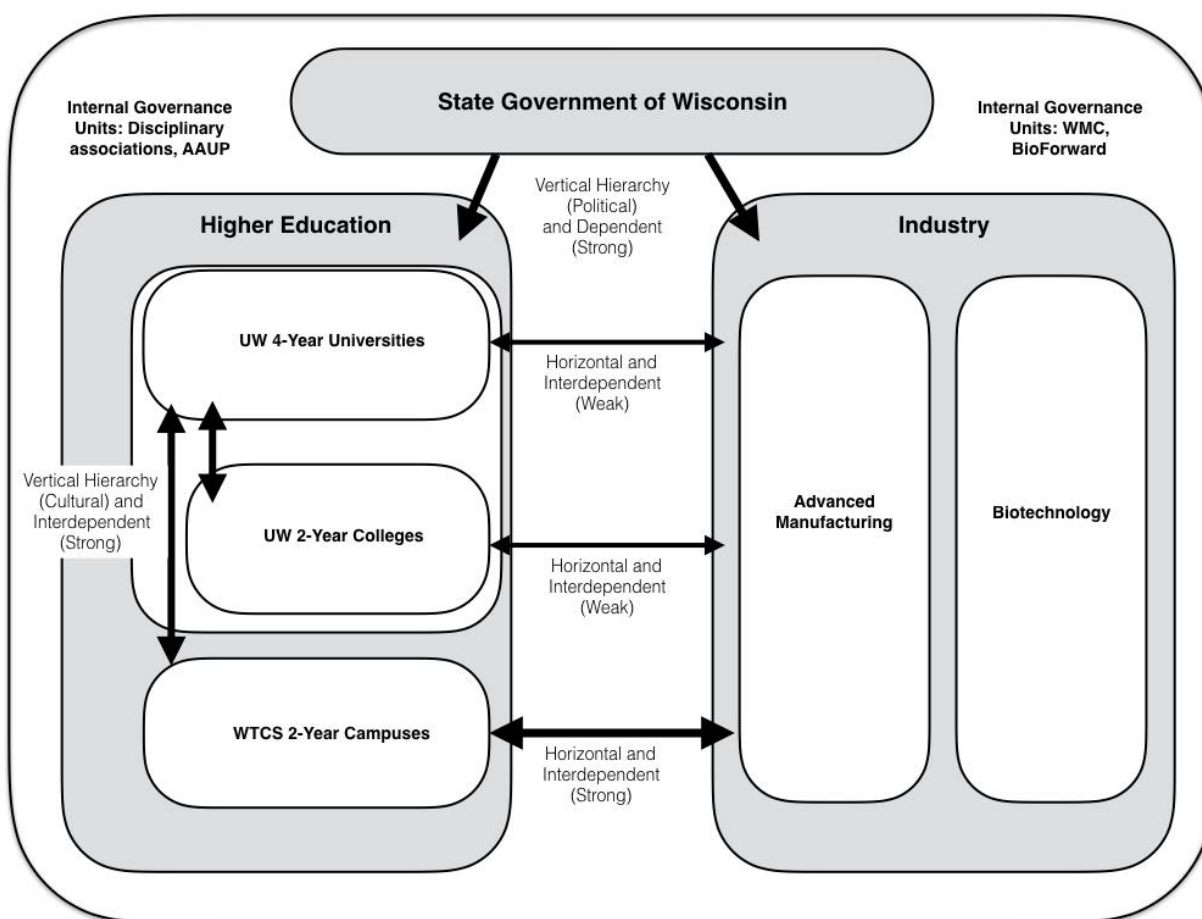
One of the more important distinguishing characteristics among organizations in the higher educational field is institution type and mission, both of which determine colleges or university's position within the broader field of higher education as well as the nature of its relations (or lack thereof) with industry. The first sub-field of higher education is that of the UW System, whose varied mission includes focus on developing human resources, discovering knowledge, and applying this knowledge beyond campus boundaries. Furthermore, the UW System mission states unequivocally that, "basic to every purpose of the UW System is the search for truth" (UW System, 2016). Thus, interactions with industry and the cultivation of the state's workforce and business community are a small part of a broader, more multi-faceted institutional mission. The UW System comprises a sub-field of 13 four-year universities and another sub-field of 13 two-year colleges, the latter primarily serving as a transfer system to the universities. The 4-year university sub-field includes two doctoral granting institutions that are also designated research universities (UW–Madison and UW–Milwaukee), as well as comprehensive institutions that

offer Master's and bachelor's degrees. Another higher educational sub-field is that of WTCS, which comprises 16 technical colleges and numerous outreach facilities throughout the state. The technical college system's mission is to provide occupational education for advancement in the workforce, access to basic education for those otherwise unable to attend college, and foster economic development (WTCS, 2016a). The system's campuses offer 300 programs that award 2-year associate degrees, 1- and 2-year technical diplomas and shorter-term technical diplomas, and act as transfer institutions for students moving on to 4-year universities in the UW System.

These characteristics of the UW System and the WTCS fields collectively affect their positions within the larger field of Wisconsin higher education. For this analysis, we especially focus on the strength of relations (strong or weak), their directionality (vertical, horizontal), and nature of relations (interdependent, dependent, independent) (Fligstein & McAdam, 2012). In terms of field inter-relations, the technical college system and UW System's 2- and 4-year colleges and universities can be viewed as vertically related in the cultural hierarchy of the postsecondary field based on their classifications (e.g., R1—doctoral university, highest research activity) (Carnegie Classifications of Institutions of Higher Education, 2016), as well as having an interdependent relationship given the flow of transfer students from one to the other, specifically from WTCS and 2-year colleges to the 4-year universities (Fligstein & McAdam, 2012). All higher education fields, importantly, also function in subordinate roles to the state field, operating in dependent relationships where critical resources (i.e., funding) are required from state appropriations (see Figure 1) and in which the state exerts regulatory oversight over public education.

Figure 1. **Wisconsin Higher Education and Industry Fields**

Furthermore, the sub-fields have differential links—conceptually and practically—to the industrial field based on their institutional missions and the nature of their academic programming. The mandate of WTCS, for instance, requires it to focus on vocational education and programs necessarily maintain close ties to the business world, whereas the UW System's 2- and 4-year college mission is focused less on job training and more on research, comprehensive education, and public service. Still, all sub-fields of higher education and industry have something of an interdependent relationship with one another. Industry fields rely on higher education to prepare its workforce, while higher education fields rely on industry to hire graduates and therefore maintain institutional credibility and prestige (see Bourdieu, 1998).

Next, as with the broad field of higher education it is necessary to consider "industry" as comprising sub-fields, particularly the sectors of advanced manufacturing and biotechnology. While the manufacturing field has declined from its heyday in the mid-20th century in Wisconsin it still remains a major employer and contributor to the state's economy. Indeed, the field is the second largest employer in the state with 471,400 persons in May 2016, just behind the trade, transportation, and utilities sector (547,400) (U.S. Bureau of Labor Statistics, 2016). Biotechnology is a newer sub-field in the state and is part of a rapidly growing group of

industries in the broader category of technology, engineering, and professional services. Ultimately, both biotechnology and manufacturing should be viewed as their own sub-fields— which in this case are largely independent from one another with little interaction or shared resources. However, both function in a vertical, subordinate role to the state where they are subject to considerable regulatory oversight.

Finally, we must consider what Fligstein and McAdam (2012) call internal governance units, or entities that work to maintain the power and dominance of certain parties within a field. These can be independent entities that represent the interests of ruling elites, whether they are university professors or CEOs. For the educational fields, some internal governance units include disciplinary associations or the faculty senates of individual universities, though both had little to no involvement in education-industry dynamics during our fieldwork. In contrast, the Wisconsin Manufacturers and Commerce is arguably the largest and most influential business lobby in the state. Its representatives actively promoted the skills gap frame to state policymakers, who were ultimately receptive to these ideas and concerns (e.g., Wisconsin Manufacturers and Commerce, 2012). While the biotechnology industry has a professional association called BioForward, during our fieldwork it was not directly involved in discussions about a skills gap at the level of the Wisconsin Manufacturers and Commerce.

These inter-related fields and sub-fields that characterize higher education and industry in Wisconsin thus represent the context in which educators and employers value particular competencies, and how educators reproduce competencies in the classroom and employers reward workers for using them.

2. Forms of Cultural Capital Considered Valuable by Educators and Employers

The forms of cultural capital respondents considered essential for employee success encompassed a range of concepts including specific forms of disciplinary knowledge (e.g., molecular biology), skills (e.g., ability to use math), and personal aptitudes (e.g., communication). Thus, respondents did not just think about success in the labor market solely in terms of the oft-used notion of "skills," particularly those of a technical nature, or as synonymous with occupational categories (e.g., nursing, financial analyst) which is an approach used in some skills-gap reports (Competitive Wisconsin, 2012). Instead, the more multi-faceted view of valuable workplace competencies that we found is similar to frameworks such as the U.S. Department of Labor's O*Net or the National Research Council's 21st century competencies.

Results are reported from the freelist exercise for the 115 respondents who provided useable data, with detailed discussion provided for the seven most valuable forms of cultural capital across the sample. Results are reported for the employers (Table 2) and for the educators (Table 3) alongside results for the entire sample for comparative purposes. Additionally, some illustrative quotes from interviews are included to expand upon the results. Recall that salience reflects both the average frequency with which a term was reported across respondent lists as well as the order in which it was reported. Terms with higher salience represent the kinds of embodied cultural capital respondents viewed as having greater value within particular fields.

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Table 2. **Freelist salience results (total and employers)**

Total sample (n=115)		All employers (n=66)		Manufacturing (n=59)		Biotechnology (n=7)	
Term	Salience	Term	Salience	Term	Salience	Term	Salience
Technical ability	0.348	Work ethic	0.350	Work ethic	0.388	Experience	0.345
Work ethic	0.310	Technical ability	0.322	Technical ability	0.342	Lifelong learning	0.301
Technical knowledge	0.259	Technical knowledge	0.275	Technical knowledge	0.302	Technical ability	0.227
Problem-solving	0.180	Lifelong learning	0.171	Lifelong learning	0.144	Communication	0.226
Communication	0.153	Problem-solving	0.141	Problem-solving	0.132	Problem-solving	0.182
Teamwork	0.149	Communication	0.130	Adaptable	0.132	Work ethic	0.163
Lifelong learning	0.142	Adaptable	0.125	Interpersonal	0.112	Detail oriented	0.153
Innovative	0.105	Self-motivated	0.116	Attitude	0.112	Self-motivated	0.150
Detail-oriented	0.101	Interpersonal	0.109	Teamwork	0.112	Background	0.149
Self-motivated	0.099	Teamwork	0.107	Communication	0.111	Technical knowledge	0.141
Adaptable	0.098	Experience	0.107	Self-motivated	0.108	Educational. background	0.114

Table 3. **Freelist salience results (total and educators)**

Total sample (n=115)		All educators (n=49)		2-year educators (n=26)		4-year educators (n=23)	
Term	Salience	Term	Salience	Term	Salience	Term	Salience
Technical ability	0.348	Technical ability	0.381	Technical ability	0.365	Technical ability	0.398
Work ethic	0.310	Work ethic	0.257	Problem-solving	0.285	Technical knowledge	0.258
Technical knowledge	0.259	Technical knowledge	0.238	Work ethic	0.257	Work ethic	0.256
Problem-solving	0.180	Problem-solving	0.232	Teamwork	0.254	Innovative	0.199
Communication	0.153	Teamwork	0.204	Technical knowledge	0.221	Detail-oriented	0.179
Teamwork	0.149	Communication	0.183	Communication	0.221	Teamwork	0.148
Lifelong learning	0.142	Critical thinking	0.156	Critical thinking	0.181	Communication	0.141
Innovative	0.105	Innovative	0.154	Lifelong learning	0.118	Hands-on	0.130
Detail-oriented	0.101	Detail-oriented	0.145	Troubleshoot	0.117	Critical thinking	0.126
Self-motivated	0.099	Lifelong learning	0.103	Detail-oriented	0.115	Adaptable	0.098
Adaptable	0.098	Troubleshoot	0.099	Innovative	0.114	Self-motivated	0.088

Technical ability. The most salient type of embodied cultural capital for the entire sample was technical ability (0.348). For employers technical ability was the second most salient term (0.322) and the most salient term for all educators (0.381). Some of the specific terms reported by respondents that were subsumed under this category included "mechanical aptitude," "computer skills," "technology skills," and "read blueprints." These terms highlight the importance of using specialized knowledge to perform specific tasks in the workplace.

Work ethic. The second most valuable type of embodied cultural capital across the sample was work ethic (0.310). Considered the most valuable competency for employers (0.350) and the second most valuable type for educators (0.257), work ethic clearly plays a defining role in how respondents think about and define success in their fields. Specific terms used to describe work ethic included "dependable," "punctual," "reliable," "hard work," "dedication," and "work ethic." Thus, for our respondents work ethic referred to basic aspects of working life (e.g., showing up for work on time) as well as the manner in which employees approached their companies and jobs. Additionally, respondents emphasized that work ethic values or aptitudes were not only acquired from formal education, but also family, places of worship, and the socio-cultural environment in which people grow up.

Technical knowledge. Technical knowledge was the third most valuable form of embodied cultural capital for all respondents (0.259), employers (0.275), and educators (0.238). The term technical knowledge differs from technical ability in that it refers to the acquisition of domain-specific content (i.e., knowing about something) instead of the ability to apply knowledge to inform task performance (i.e., being able to do something). More specific terms subsumed under the phrase included "math," "engineering principles," or "biology."

Problem-solving. Problem-solving was the fourth most important form of embodied cultural capital reported by the entire sample (0.180) and for educators (0.232), whereas for employers it was the fifth most important term (0.141). Specific terms integrated into this category included "problem-solving," "systematic problem-solving," "analytical," and "analytic thinking." A common theme among these references was the ability to quickly and accurately assess a situation and select the most optimal solution.

Communication. Communication was the fifth most valuable form of embodied cultural capital that all respondents felt important (0.153), with employers (0.130) and educators (0.183) having similar salience scores for the term and both reporting communication as their sixth most salient term. The specific terms subsumed into this category included "able to communicate," "writing," "verbal," and "interpersonal communication," which highlights that different forms of communication are considered vital for workplace success. "The ability to compose and write scientific thoughts in an intelligent way is critical," said a biotechnology employer, reflecting a common view on the importance of professional writing skills.

Teamwork. Teamwork was the sixth most valuable form of embodied cultural capital reported by our study respondents (0.149). For employers, teamwork was the 10th most salient

term (0.107, tied with experience), and for educators it was the fifth most salient (0.204). Teamwork encompassed discrete terms such as "team player," "team-oriented," "collaborative," and "work with a group," and was repeatedly linked to the increasing amount of project- or team-based work in corporate settings. "You can't do it alone," one manufacturing employer explained. "Normally in manufacturing you have to work together with people on your line, so you want to be team oriented."

Lifelong learning. Finally, lifelong learning was the seventh most valuable term mentioned across the sample (0.142), with employers reporting it as the fourth most salient term (0.171), and educators reporting it as the 10th most salient term (0.103). Lifelong learning included terms such as "continual learning," "willing to learn," "lifelong learning," and "ability to learn." This competency was often discussed in relation to the continually changing nature of technology, science, and workplace procedures that students would need to deal with throughout their careers.

3a. How Educators Cultivate Cultural Capital via Teaching

Next we report findings regarding how these varied forms of cultural capital are cultivated in practice via classroom teaching and workplace training. Examining these processes is important because as Bourdieu (1986, p.48) points out, unlike money or credentials, embodied cultural capital cannot be "transmitted instantaneously"—instead, it is cultivated through an intensive process of assimilation that takes time and effort. While acquisition of certain types of competencies takes place throughout one's life in multiple venues (e.g., home, online, sports), learners gain many of them via formal instruction or modeling in the classroom or at work. In particular, there is a particular focus on a specific type of teaching, known as "active learning" where students are actively engaged in constructing their own knowledge of a topic instead of passively receiving information, in cultivating the aforementioned 21st century competencies that encompass varied types of knowledge, skills and abilities (Pellegrino & Hilton, 2012).

First, we report the teaching methods reported by educators, who discussed how they cultivated valued forms of cultural capital via their classroom teaching. In answering the interview questions, respondents often first described a particular competency (e.g., critical thinking) and then specific instructional techniques that they regularly used to cultivate it among their students. In reporting the data (see Table 4) we follow this convention. Following these data on classroom teaching, we report two recurrent themes that we identified in the interview data regarding curriculum and instruction: the distinction between education and training, and the importance of multi-disciplinary programming.

Table 4. **How educators cultivate valued forms of cultural capital in the classroom**

Competency and teaching method	Description	Number of educators (number of institutions)
Critical thinking and problem-solving		
Creative problem-solving	Teaching specific problem-solving methods that students can use creatively to unravel problems	17 (11)
Linking abstract to concrete	Connecting concepts taught in class with students' lives	14 (11)
Teaching research	Projects aimed at using experiments, library resources, data analysis, and reasoning	11 (5)
Communication		
Graded oral presentations	Graded oral presentations in front of class	19 (11)
Written assignments	Graded writing assignments	17 (7)
Practicing "employability skills"	Lessons on communicative physicality, dress, and behavior in job search	6 (4)
Teamwork		
Tacit teamwork-oriented tasks	Asking students to work in pairs or small groups on content-related exercises in or outside of class	22 (12)
Explicit teamwork-oriented instruction	Explicit instruction on strategies for working in teams	4 (2)
Work ethic		
Grade-based attendance and preparation	Grade-based attendance policies requiring students to be in class the minute it begins	13 (7)
Instructor directed self-reflection	Asking students to consider their own learning, effort, motivation, and work ethic in and outside classroom	12 (5)
Demanding curricula	Requiring students to be flexible with their time and work hard to pass the course or program	5 (3)

Teaching methods for critical thinking and problem-solving. While distinct constructs in the literature (e.g., Pellegrino & Hilton, 2012) and in our freelist data, respondents frequently spoke of critical thinking and problem-solving skills as closely related and even indistinguishable when it came to classroom instruction. For instance, a 2-year technical college electronics instructor spoke about the importance of constantly seeking solutions in the face of complex electrical repair situations:

> (It's good) if there's a little pain in what you're doing, (where) you run into some problems and have to back up and try another route and back up and try another route— you remember that. A lot of it is just thinking through, what is the procedure, and that is critical thinking.

For this instructor, critical thinking is an approach to problem-solving that involved persistently re-visiting the problem, considering different approaches, testing and rejecting them, and trying again until a solution is found. This approach is not dissimilar to the types of solution paths required in the workplace, where ill-defined problems are predominant (e.g., Jonassen, Strobel, & Lee, 2006).

Among the educators who explicitly linked the cultivation of critical thinking and problem-solving with their classroom teaching, three specific methods were discussed. Seventeen instructors asked students to get out of their routines and use creativity as they solved problems for different projects and assignments. Specific teaching methods included giving students open-ended assignments in which there are multiple "answers" to encourage what is known as divergent thinking. Another technique was problem-based learning, a widely used method that involves students working in small groups to solve real-world problems by gathering information, evaluating possible solutions, and selecting the most optimal solution path (Hmelo-Silver, 2004). Next, 14 educators linked abstract concepts to "real-world" scenarios that students may encounter in the workplace or their own lives. "We try to get them to see where mathematics can help them do the job, whether it be electrical or hydraulic," an industrial maintenance instructor observed. Finally, 11 educators focused on teaching students to be good researchers, an aptitude they associated with critically evaluating information, using data to make informed decisions, and in generally developing a "habit of mind" that scientists regularly use in their work.

Teaching methods for communication. Many educators also referred to oral and written communication as a form of embodied cultural capital that they tried to cultivate in students. The most commonly used method of teaching communication skills, reported by 19 educators was graded oral presentations. While most educators described their presentation requirements as typical in-class presentations, a few described other approaches such as requiring students to present on the same material twice, once for an expert audience and another to non-experts. Next, 17 educators reported using graded written assignments to cultivate writing skills, through required papers or self-reflections. Some underlined the importance of careful guidance on such assignments, while others reported they purposefully tried to foster more student independence by not providing any guidelines. Finally, six educators reported that they sought to foster what several called "employability skills" via class-based work. These competencies include résumé writing, interviewing, personal grooming, eye contact, and handshake etiquette that were viewed as important yet often overlooked forms of cultural capital highly valued in the workplace.

Teaching methods for teamwork. Several educators also felt that the ability to work in teams and collaborate with a variety of people was a crucial form of embodied cultural capital to foster in their students. One mechanical engineering instructor even argued that teamwork was one of the most important skills students could gain from their formal education. Twenty-nine educators spoke to methods they use to foster teamwork competencies, including explicit instruction on how to be a good team leader and member. Twenty-two educators described techniques centered on *tacit* teamwork-oriented instruction, or methods through which students

are assigned to work on content-related tasks in groups of two or more during class. An important aspect of teamwork instruction is group composition, and some instructors deliberately grouped students to ensure that peers of different ability levels, personality, and background were forced to work together.

Teaching methods for work ethic. Finally, several educators reported that they used techniques for helping students cultivate a sense of dedication, self-sufficiency and hard work. Thirteen educators reported fostering work ethic through grading policies that require students to be in class on time and have tools, books, and other materials ready at the start of class. Others enforced rules for maintaining sharp tools and clean work areas. Twelve instructors described directly asking students to consider their own learning, effort, or motivation in and outside the classroom, and how that was influencing their success (or lack thereof) in college. A few instructors also said they routinely asked students to consider the importance of diligence, hard work, and preparation for success not only in academics but also in their lives and careers.

Critical themes related to teaching and training. In addition to describing how they taught valued competencies in the classroom, respondents repeatedly discussed two topics that are salient to teaching and training. First, several respondents distinguished between education, where core principles of a discipline are conveyed in a manner that facilitates transfer, and training, where the goal is to convey procedural knowledge related to specific machines or tasks. One technical college instructor explained his preference for the former approach from a pragmatic perspective, stating that, "There's no way that we can train everybody on every piece of equipment," he said— instead concentrating on what he considered to be education—"So we're looking at giving them fundamental skills that can be adapted to whatever the situation is."

Second, the issue of a diversified curriculum that incorporated arts, humanities and STEM courses was regularly discussed. While many educators in technical fields strive to integrate 21st century competencies into their curricula, some of these programs rely on courses such as English or history to teach students communication and problem-solving skills. This practice allows these instructors of technical skills to direct their limited contact hours on technical coursework. As a technical college instructor in an electronics course said, "I rely on those general education instructors to help me with those soft skills, especially communication." Furthermore, several instructors in 4-year universities emphasized the important role traditional liberal arts training provides for their students. In these cases, courses in disciplines such as English or history were viewed as cultivating critical thinking and problem-solving competencies that complemented students' training in the STEM disciplines. Despite the common misunderstanding of the liberal arts tradition as being solely based on the arts and humanities, the term "liberal arts" refers to a coherent program of education across the disciplines (Neem, 2016; Roth, 2015).

3b. How Employers Cultivate Cultural Capital via Workplace Training

We also asked employers about their approach to cultivating valued cultural capital through workplace training and professional development. First, we report the different types of training

programs within their companies that are used to further cultivate valued competencies. Then, we discuss the finding that employers also screen for "cultural fit" between their local organizational cultures and applicant attributes. This process of similarity matching on the basis of cultural attributes has only recently been addressed in the literature on hiring (Rivera, 2012), and this paper represents among the first instances of similarity matching for cultural fit being discussed in terms of the skills gap narrative. Of particular import to public policy is that many of the criteria used to ascertain applicant fit centered on personality traits and other characteristics unrelated to educational credentials or technical expertise (see Table 5).

Table 5. **How employers cultivate valued forms of cultural capital**

Employer training practices	Hiring and training activities	Number of# employers (number of companies)
Training		
Informal	New employees shadowing more experienced employees on the shop floor or in the laboratory to learn technical skills	23 (22)
Formal	Programs in interpersonal skills, teamwork, and conflict-resolution to help employees better get along with another	9 (8)
Screening during hiring		
In-person interviews	Analysis of applicant attributes during interview	42 (35)
Résumé and background	Review of official application documents	30 (27)
Temp to hire	Standard probationary periods of 60, 90, or 180 days to judge applicant work ethic, technical, and interpersonal skills and competencies in actual industry environment	11 (10)
Applicant attributes considered during screening		
Interpersonal competencies	Communication and teamwork competencies, able to work in team, and communicate well with others	27 (21)
Attitude	Demeanor, outlook on life, eagerness to learn	24 (20)
Personality	Specific personality types (e.g., people person) that match organization	22 (21)
Rural upbringing	Seeking "farm kids" with strong work ethic, values, problem-solving competencies	10 (9)

Employer training practices. Several employers spoke to directly cultivating employee cultural capital through on-the-job training. The training programs available for employees included informal on-the-job "shadowing" or more formalized courses and/or programs. The most common approach (23 employers) to workplace training was an informal "shadowing" model, which involved new employees following more experienced employees, watching how work was done, asking questions, and engaging in hands-on learning. A much smaller number of employers (nine) reported using formal training initiatives that involved enrolling staff in

external training programs offered by local educational institutions, consultants, trade associations, or equipment manufacturers. While most outsourced these functions, two employers had developed rather complex suites of company-specific "modules" with classes for employee orientation and professional development. These sessions give months-long instruction on technical skills and knowledge with simultaneous "shadowing."

Screening for fit with organizational culture. However, the procedure most commonly discussed by employers regarding cultivation of cultural capital did not refer at all to training. Instead, employers viewed hiring as a way to "screen" for people who already had desirable competencies, or at least appeared promising in those areas. The central idea behind the screening process is "fit with the organizational culture," whether the applicant's disposition appeared to be compatible with company expectations, practices, and traditions. As one manufacturing executive said, "When we recruit, we recruit more for culture fit, personality, those types of things, and then the technical pieces we'll teach them."

How was an applicant's fit with the organizational culture ascertained? Forty-two employers talked about the in-person interview as the primary way that they screened applicants for the embodied cultural capital they found valuable. This stage is where even the best technical preparation cannot "save" an applicant who demonstrates poor skills in other areas, particularly communication and collaboration. As one biotechnology employer noted, "We've seen people who are just absolutely perfect on paper, and they could do the job, but (it is clear that they are) just not going to get along with the team (because) they were rude throughout the interview process." Thirty employers reported using applicants' résumés as the first indicator of whether they represented a good fit with the company.

The next question was: What precisely were employers looking for to make this assessment regarding cultural fit? Twenty-seven employers looked to interpersonal competencies such as appearing to be a team-oriented person and/or having good communication skills. In particular, employers highlighted the team-based nature of their companies, with one manufacturing supervisor saying that they did not want someone who was all about "me me me me me," because "We are a 'we' place, so the football Randy Mosses of the world or Terrell Owens of the world would not be successful here." Some employers view attitude as the most important marker of culture fit, with one claiming that her company hired for "attitude, attitude, attitude, and attitude" alone, while others claimed that they hired for "attitude, intellect, and ethics" in that order. One employer referred to being concerned that a particularly quiet person might not be a good fit for his company because "oh my gosh that poor [guy], although he has a good attitude, would just get stepped on." Finally, 10 employers mentioned rural upbringing as a desirable characteristic in job applicants that could signal a good fit with the company. Specifically, respondents mentioned "farm kids" as particularly desirable not only because of their purported strong sense of work ethic and problem solving competencies, but also because they embodied desirable "internal values." Among these 10 employers, other desirable backgrounds included applicants from the military or those with parents who were business-owners or blue-collar workers were also seen as embodying desirable cultural capital.

4. Examining Education-industry Field Relations and Their Impacts on Cultural Capital

In this final set of results we report the types of relations that respondents described existing between and among fields and sub-fields, and whether these relations contributed to the development of students' and employees' capital. In describing different types of field relations, we focus on structural, programmatic linkages between and among fields (i.e., structural alignment), as well as the correspondence of ideas and values between individuals within fields (i.e., ideational alignment), and ways in which both forms of field relations affected student and employee acquisition of cultural and social capital.

Characteristics of cross-field relations. First, we report whether relations existed at all between educators and employers, which is the basic prerequisite for field relations and the sharing of capital. Out of the entire sample of 115 employers and educators, 19 respondents (13%) had no contacts or communications with the other field. Specifically, eight educators had no contacts with industry and 11 employers had no contacts with colleges or universities in their field. The lack of cross-field relations was due to reasons including lack of time, interest, or unreciprocated efforts to establish relations. For instance, a human resources manager at a manufacturing company said, "They (local educators) talked about being on the board or the advisory committee at Madison College, and I expressed interest, but there was really no follow up, which is disheartening." Another company mentioned that they had no need or desire to contact their local college or university, because they hired through a temporary agency and online job postings, and felt no need to become involved in curricular planning or internship programs.

While such an absence of cross-field relations represents a lack of social interactions and pathways for sharing resources such as information, knowledge, or contacts between fields, this does not mean that unconnected fields are never influenced by disruptions or activities in other, seemingly disparate fields (Fligstein & McAdam, 2012). Ultimately, however, the fact that 87% of the respondents in this study reported some form of communication or collaboration with partners in other fields indicates that the basic ingredients for sharing capital appears to exist in many cases. The next question is: What are the specific types of cross-field relations at work, and how (if at all) do they impact students' acquisition of cultural and social capital?

Types of cross-field relations and their impacts on cultural capital. Next, we report the specific cross-field collaborations discussed by study participants: curriculum and program advising, work experience and career pathway programs, career counseling and related services, and industry clusters (see Table 6 below).

Table 6. **Cross-field collaborations and impacts on cultivation of cultural capital**

Type of cross-field collaboration	Impacts	Number of educators (number of institutions)	Number of employers (number of companies)
Curriculum and program advising			
Curriculum advisory boards	Educators and employers share information and resources; students gain access to these resources via coursework	33 (12)	13 (11)
Employees attend programs at local college/university	Employee develops new competencies	14 (10)	19 (17)
Curricular co-construction	Students gain workplace-relevant cultural capital via coursework grounded in real-world situations and problems	7 (6)	1 (1)
Workplace training programs designed by local educators	Employee develops new competencies; company acquires new training program	0	1 (1)
Career services			
Work-based learning programs: internships	Students gain extensive social (i.e., new contacts/networks) and cultural capital specific to workplace/industry	32 (15)	17 (15)
Work-based learning programs: apprenticeships	Students gain extensive social (i.e., new contacts/networks) and cultural capital specific to workplace/industry	0	9 (9)
Work-based learning programs: co-op programs	Students gain extensive social (i.e., new contacts/networks) and cultural capital specific to workplace/industry	4 (3)	10 (7)
Field trips to workplace sites	Students gain limited social and cultural capital specific to workplace/industry	10 (9)	8 (7)
Classroom visits from employers	Students gain limited social and cultural capital specific to workplace/industry	5 (5)	11 (10)
Career fairs	Students gain access to social capital (i.e., new contacts/networks); employers gain access to student and educator networks	10 (7)	7 (7)
Job readiness programs	Students gain workplace-specific cultural capital (e.g., résumé writing, interviewing)	5 (3)	3 (3)
Industry clusters/workforce development boards			
Industry-based collaborations focused on new programs	Provides educators and employers with structured venue for sharing resources and designing new programs/initiatives	8 (7)	5 (5)

Curriculum and program advising. The first form of cross-field relations pertains to efforts to inform and develop new programs and course curricula educational and workplace settings. For example, one manufacturing company developed an internal "university" as a result of a collaborative design process between the company and a local technical college, which resulted in a module-based online training program and a lasting relationship with the college. Another, more common example of curriculum-related collaborations included advisory boards that included representatives from host educational institutions and local industry. Within the WTCS these advisory boards are required for all academic programs, whereas in the UW System they are not, except in the case of some engineering programs where they are not required but are practically universal (Genheimer & Shehab, 2009). Most boards met at least twice a year, where participants reviewed programs, developed new curricula, and shared information about developments in industry and educational practice. One educator at a 2-year technical college described this process by saying, "We're going to our constituencies and getting their opinions."

Several respondents also described engaging in collaborative efforts to design course curricula and/or specific learning activities. In some cases these collaborations were limited to students contacting local employers to gain industry-specific advice and insights on course projects (e.g., senior design projects in engineering courses), whereas in other cases local businesses provided ideas for semester-long undergraduate research projects. For instance, at one UW campus a biology professor canvassed local businesses and policymakers for real-world problems that they wanted to see studied. These problems were then taken up by students as part of their research project, and results were presented to these "clients" at the end of the semester. In both cases, employers provided input into the learning activities in which students subsequently engaged, such that the academic material was imbued with "real-world" concerns. As a result, students gained some knowledge (i.e., cultural capital) that would be valued in the workplace via their participation in their academic coursework.

Career counseling services. Another type of cross-field effort that affected the cultivation of students' cultural capital is that of career counseling services. These include career centers housed in both 2- and 4-year colleges and universities, though the size, funding level, and breadth of services offered across institutions varied considerably. For example, one large, urban WTCS campus had a career center with multiple staff persons, an extensive offering of workshops (e.g., résumé writing) and coordinated internship programs. In contrast, a WTCS campus in a small city had a career center with fewer resources. At the 4-year level the provision of these services often varied by discipline. At UW–Madison, for instance, the College of Engineering had long offered a cross-departmental career services, whereas the College of Letters and Science had only established a robust set of College-wide career services in 2013. In each of these cases, however, students were offered services that could enhance their social capital via up-to-date labor market information and new contacts with employers, and cultural capital through employment-related workshops.

Career services also served as the organizational units that coordinated an important form of cross-field relations—that of work-based learning programs that included internships,

apprenticeships, and co-op programs that served as a bridge across organizational boundaries. Programs that provided multiple opportunities for students to experience workplace settings over the course of a semester, year, or longer include internships, apprenticeships, and cooperative learning arrangements. In each of these cases, campuses placed students in local businesses as part of their academic programs, with varying degrees of on-the-job supervision and integration of workplace programs with academic coursework. The experiences led to the cultivation of students' cultural capital in terms of competencies that would be required in the workplace, as well as their social capital (i.e., networks and contacts). Perhaps most importantly, these programs involve long-term socialization into a new community of professionals where students cultivate forms of cultural capital that are immediately valued and rewarded in the labor market (Lave, 2011).

Other programs provided students with a more limited exposure to the world of work. A commonly reported example was industry tours or field trips, where instructors took entire classes to visit businesses to tour facilities, speak with employers and current employees, to generally learn about local job opportunities, and to obtain a realistic impression of real-world workplaces. While students gained valuable insights from these experiences, employers recruited promising students and strengthen ties with instructors in their disciplines.

Industry cluster/workforce development boards. Finally, respondents reported that third-party organizations such as industry clusters or alliances, local or state Chambers of Commerce, or government-sponsored workforce development boards provided venues for local educators and employers to meet and discuss regional or industry-specific workforce development issues. In some cases these were mandated by federal (e.g., WIOA) or state policy, such that boards comprising policymakers, employers, and educators were required to convene and discuss job- and skills-related issues. In other cases these initiatives took a more active role in developing new programs, such as the Manufacturer Career Partnership in the Milwaukee area that worked with technical schools to develop and expand programs in the skilled trades. Ultimately, these third-party organizations created structured spaces for employers and educators to share information, network, and work on issues or programs that were of mutual interest.

Influence of cross-field relations on how educators value cultural capital. Finally, we compare the freelist data of educators with and without any relations with industry in order to scrutinize the assumption that limited programmatic "alignment" leads to educators who lack insights about industry needs. In other words, this analysis examines the degree to which ideational alignment exists between educators and employers in regard to valued cultural capital. For this analysis we compared the free-list data between two groups of educators: those with and those without reported connections to industry, to ascertain whether proximity or close relations had an impact on educators' valuing (or not) similar workplace competencies as employers. Recall that policies such as WIOA and WFF, as well as much of the skills gap rhetoric, is based on the notion that the absence of such programmatic ties or structural alignment leads to educational programming that is inadequately attuned to the needs of the business community (Business Higher Education Forum, 2011; Sullivan, 2012). Our data indicate the situation is not

so simple, and that similarities and differences exist among groups of educators based on their degree of connection with industry.

For example, connected and unconnected groups of educators recognize the importance of technical ability (with 0.373 and 0.376 salience scores, respectively) and work ethic (0.216 and 0.250) – two competencies highly valued by employers. However, connected and unconnected educators differ in regards to their valuation of other forms of cultural capital. The connected group valued technical knowledge (0.275) as highly as employers (0.275), whereas the unconnected group assigned a lower value to this competency (0.131). Additionally, the unconnected group more highly valued competencies such as communication, innovation, and critical thinking that ranked relatively low on employer's free-lists. That said, the educators who were closely linked to industry also reported competencies that were not highly valued by employers such as teamwork, being detail oriented, and critical thinking. Interestingly, employers also valued a competency that neither group of educators ranked highly: lifelong learning.

These results indicate that there may indeed be instances where educational professionals could benefit from becoming more attuned to employer needs (e.g., importance of lifelong learning) as they develop and teach programs and individual courses. At the same time, employers may benefit from learning about educators' sense of valued cultural capital (e.g., innovation, teamwork, critical thinking) in order to develop an awareness of and vocabulary for different types of competencies that professional educators value. Additionally, given employers' desire for "lifelong learners," which is a term that is difficult to operationally define or link to specific competencies, it is possible that employers and educators are talking about similar competencies but with different language.

Table 7 shows the level of connection educators had with industry employers.

Table 7. **Freelist salience results: Educators' degree of linkage with industry**					
All employers (n=66)		**Educators linked to employers (n=34)**		**Educators not linked to employers (n=7)**	
Term	**Salience**	**Term**	**Salience**	**Term**	**Salience**
Work ethic	0.350	Technical ability	0.373	Technical ability	0.376
Technical ability	0.322	Problem-solving	0.276	Communication	0.286
Technical knowledge	0.275	Technical knowledge	0.275	Innovative	0.286
Lifelong learning	0.171	Work ethic	0.216	Work ethic	0.250
Problem-solving	0.141	Teamwork	0.215	Critical thinking	0.238
Communication	0.130	Detail oriented	0.161	Detail oriented	0.207
Adaptable	0.125	Critical thinking	0.161	Teamwork	0.179
Self-motivated	0.116	Communication	0.146	Observational skills	0.143
Interpersonal	0.109	Innovative	0.145	Ask questions	0.133
Teamwork	0.107	Troubleshooting	0.094	Technical knowledge	0.131

Discussion

In this paper we document the perceptions, experiences, and practices of business owners and professional educators that lay behind the rhetoric of the skills gap in Wisconsin. Ultimately, we conclude the skills gap narrative presents an overly simplistic and inaccurate accounting of the complex forces that shape the dynamics among higher education, the labor market, and society writ large. Advocates frame and advance an uncomplicated picture of the world wherein sluggish economic growth is simply due to an inadequate educational system that fails to properly prepare students for the world of work, with little attention to the role that other parties may be playing in shaping students' cultural and social capital as well as the job opportunities that they may (or may not) have upon graduation. For instance, as the author of the influential report *The Road Ahead,* Tim Sullivan, noted, "I've said this before and I'll say it again: We don't have a jobs crisis in Milwaukee, we have an education crisis" (Richards, 2011).

Based on the evidence reported in this paper, however, we conclude that this diagnosis is off the mark. In the course of our research, we certainly found that some aspects of the skills gap narrative do indeed appear to be true: Some employers are struggling with finding skilled workers (ManpowerGroup, 2015; Wisconsin Manufacturers and Commerce, 2013); some postsecondary educators could provide more opportunities for experiential education (President's Council of Advisors on Science and Technology, 2012); many colleges and universities are not adequately supporting students' transitions into the world of work (Selingo, 2016); and, shortages in specific occupations such as nursing professionals are occurring in certain regions (Giffi, Dollar, Drew, McNelly, Carrick, & Gangula, 2015; Wisconsin Center for Nursing, 2013).

The problem is, these phenomena are only part of the story, and mask considerable complexities and caveats that should be acknowledged and incorporated into a more comprehensive and systems-oriented debate about the future of higher education and its role in society and workforce development: How skills are not just "skills" but complex compendia of competencies that act as a social currency in the labor market. How carefully designed opportunities for active, engaged learning are an essential component for cultivating these competencies. How employers' hiring and workplace training practices are part of the problem as well as the solution. How multiple forms of cross-field collaborations play critical roles in cultivating students' social and cultural capital. And finally, how the state—through massive and recurring budget cuts to public higher education—is undermining the systems that support and enable teachers' professional development, and students' academic and career services.

Recall that our goal in this paper was not to prove or disprove the technical existence of a skills gap, a task we leave to our labor economist colleagues. Instead, we sought to discern whether skills-gap-inspired policies adequately (and accurately) reflect the situation on the ground and target the correct leverage points in what many observers agree to be a postsecondary sector that is undergoing considerable changes and disruptions. This distinction is important because the skills gap is not merely rhetoric relegated to the back pages of unread reports, but instead is an idea that has taken hold in statehouses around the U.S. and even the White House, shaping policymakers' thinking about how the country should educate college students, and train

the current and future workforce. Thus, the question that we asked in conducting this study was whether developing higher education and workforce development policies based on the idea of a skills gap was desirable and defensible.

Clearly, the answer to this question is no. Through policies such as WIOA and WFF, the skills gap is informing silver bullet solutions reliant on "re-aligning" higher education through creating and expanding programs in high-demand occupations—a technical, programmatic solution to a problem that is rooted in socio-cultural, economic and pedagogic situations. Ultimately, in its overlooking the critical role that teaching and learning across the disciplines plays in cultivating students' competencies—whether in traditional academic courses, workplace training, or online certificate programs—the skills gap idea threatens to undermine the shared interests of job seekers, the business community, and society itself for a generation of students with 21st century competencies.

In the remainder of this paper we discuss the key findings of our study in the context of a forward-looking analysis for how policymakers can begin to craft a more comprehensive approach. At the heart of this analysis is the contention that a field theory perspective sheds important light on these issues, by viewing "skills" as a form of cultural capital that are reproduced in the classroom and "cashed in" via hiring in the labor market, all the while operating in contentious, political spaces where actors and institutions vie for resources and influence. Until and unless the issues implicated by the skills gap narrative are viewed in such a critical and multi-dimensional manner, we contend that it is difficult to imagine progress being made in ways that truly benefit the collective, rather than the needs of the few.

Skills are Not Just "Skills": 21st Century Competencies as the Valued Cultural Capital in Education and the Labor Market

On the widespread concern about the types of skills employers need to grow their businesses and spur employment, our findings were clear. Employers, if they had to imagine a composite "ideal" employee, envisioned a hard-working individual with appropriate technical training (knowledge as well as the ability to apply this knowledge), solid problem-solving skills, and the abilities to communicate well, work in teams, and to continually learn new things. These are the habits of mind that people in the business community hopes that students are acquiring through their upbringing and in high school and college. Thus to talk about "skills" without delving into precisely what is meant by that term, assuming that they refer to entire occupations (e.g., welders or computer programmers) or are simply technical aptitudes (Competitive Wisconsin Inc., 2012; Sullivan, 2012), fails to reflect the complexity of the competencies employers need. Instead, it is more accurate to speak about an assemblage of competencies that collectively result in certain ways of thinking or habits of mind that individuals exhibit in the workplace.

Consequently, the continued use of such a reductionist and inaccurate account by skills gap advocates is surprising because it contradicts the actual needs of the business community. In addition, more nuanced conceptualizations of desirable competencies abound, such that a continued reliance on ill-defined notions of "skills" is indefensible. For instance, the O*Net

occupational data system de-composes jobs into distinct knowledge, skills, abilities, and work styles required for optimal performance, the National Research Council's 21st century competency framework outlines critical cognitive, inter-personal, and intra-personal competencies (Pellegrino & Hilton, 2012), the Partnership for 21st Century Learning (2016) specifies the different core subjects, learning and innovation skills, information and technology skills, and life skills all students should acquire in their schooling, and the German conception of occupations themselves (i.e., Beruf) encompasses discipline-specific theoretical knowledge (i.e., Wissen) *and* practical skills (i.e., Konnen) (Hoffman, 2011). Research on the importance of what labor economists call "non-cognitive skills" such as conscientiousness has also shown that people with these competencies are less likely to fail to graduate from high school and college, smoke, go to jail, or get a low-paying job (Heckman & Kautz, 2012). Lindqvist & Vestman (2011) also contend that non-cognitive abilities more strongly predict lower level distribution earnings, labor force participation, and unskilled worker wages than cognitive abilities. It is clear that what employers truly want in terms of employee competencies cannot be distilled down to a single term (i.e., skills), or provided simply by expanding high-demand programs alone (Business Higher Education Forum, 2011; Sullivan, 2012).

Besides overlooking the multi-dimensionality of valued skillsets, the skills gap argument falls short in ignoring how many of these valued competencies are not simply technical knowledge or abilities in nursing, software programming, or welding, but instead refer to aptitudes that are acquired throughout one's upbringing, and shaped by socio-cultural influences such as parents and peers. For instance, respondents highly valued work ethic, which was discussed in relation to traits such as personal initiative, perseverance, and delayed gratification. Scholarly work on the notion of a work ethic, which goes back to Weber's (1905) interpretation that for some hard work and material success were signs of spiritual salvation, emphasizes the critical role that socialization into specific cultural contexts plays in shaping a person's sense of work ethic (Miller, Woehr, & Hudspeth, 2002). Another example of how a sole focus on technical competencies is inconsistent with the skillsets employers desire is what some call "lifelong learning." In speaking about this topic, respondents referred not only to the motivation to learn but also the ability to self-monitor and identify when additional education is needed, to employ effective study strategies, and especially the flexibility to regularly change jobs and tasks. In fact, the ability to learn was considered "foundational" by employers in a 1990 study (Carnevale et al., 1990), and as technology continues to alter the nature of work and society itself, many employers view lifelong learning as a central feature of one's employability.

But it is not just employers who view a diversified range of competencies as essential for students' success. Professional educators and learning scientists have long advocated for schools to not focus on rote memorization of facts or the acquisition of procedural knowledge without also ensuring that these competencies were grounded in authentic social and disciplinary settings (Bransford, Brown, & Cocking, 1999; Resnick, 1987), which is remarkably similar to the rationale and intent behind traditional and modern approaches to apprenticeship training (Lave, 2011; Palincsar & Brown, 1984). In addition, advocates of the liberal arts tradition argue that an in-depth, multi-disciplinary education cultivates the diverse competencies captured by the notion

of non-cognitive or 21st century competencies (e.g., Roth, 2015). As a result, we contend that the types of competencies that employers, researchers, educators, and liberal arts advocates desire for students are not dissimilar, and that the common ground among these disparate parties needs to be made more evident in debates about the future of higher education and workforce development policy. Perhaps more problematic, however, is the fact that the skills gap narrative pays little attention to the specific processes by which learners acquire these competencies—that is, teaching and learning—in favor of advocating for a technical solution based on new programs or alternative credentials in high-demand occupations.

**Centrality of Experiential Learning and Supporting Educators
for Reproducing Valued Cultural Capital**

Now that we know which competencies many employers and educators desire for college graduates to acquire during their education, the question becomes how to effectively teach these competencies. Before considering the technical aspect of instructional design, however, we return to field theory to examine a larger issue—that teaching itself is not simply the conveyance of facts and technical acumen but instead is the process whereby certain ways of thinking and habits of mind (i.e., cultural capital) is reproduced from generation to generation. When describing these processes of reproducing teachers, parents, and mentors abilities and dispositions, Bourdieu's (1986) use of terms such as "inscription" and "acquisition" to highlight the slow, subtle, and immersive manner in which social groups reproduce these norms. Further, this process is not asocial but involves the initiation and enculturation into specific communities of practice, whether they be welders or programmers (Lave & Wenger, 1991). So cultivating 21st century competencies is no simple matter to be quickly solved simply by enrolling in two-week boot camps or a single course. Instead, as a technical college instructor observed, this process takes months and years of immersion in a cogent and organized sequence of courses—"Learning the field of electrical repair takes time, and there's no shortcut to it." Such an insight transforms the thinking about cultivating "skills" from a simple technical, programmatic problem that can be solved with a digital badge in critical thinking to one that involves sophisticated approaches to instructional design in which the learner is immersed in a discipline-specific curriculum for an extended period of time.

However, skills gap advocates pay little attention to matters of curriculum and/or instruction, instead focusing on the disciplines and programs that they feel should be taught (e.g., welding instead of philosophy) (Sullivan, 2012). When matters of instruction are mentioned, it is largely in reference to approaches such as apprenticeships and vocational education, based on the idea that more hands-on teaching techniques are preferable to abstract "book" learning rampant in general education and liberal arts programs (Sorensen & Flaherty, 2015). While on the right track, these references rarely address specific aspects of the craft of teaching itself.

Such an oversight is highly problematic because creating integrated experiential learning opportunities is no easy task, largely due to the classic problem in the learning sciences of "transfer," or the goal to have learners apply knowledge acquired in one setting to a problem or situation in another (Pellegrino & Hilton, 2012). Fostering transfer is not a simple matter of

converting a lecture to a hands-on activity, or shifting program requirements from the arts and humanities to STEM fields. Instead, it entails the instructor embedding fundamental principles of a field within specific and authentic settings, such that learners develop what is called "situation specific forms of competence" (Bransford, Brown, & Cocking, 1999; Pellegrino & Hilton, 2012). Thus, instead of teachers solely transmitting context-independent knowledge, they and their universities must give students need opportunities to master and practice fundamental theory and concepts, and then actively construct representations of their newfound knowledge to new situations, ideally through interaction with their peers (Chi & Wylie, 2014). Numerous examples of specific instructional methods that embody these principles exist in the literature, including problem-based learning (Walker, Leary, Hmelo-Silver, & Ertmer, 2015) and peer instruction (Crouch & Mazur, 2001) and cognitive apprenticeship (Dennen, 2004), to name but a few.

However, widespread adoption of these teaching methods has yet to occur. While several educators in our study reported using some of these methods, there remains considerable room for improvement. For instance, national surveys indicate that small group work was regularly used by 57% of faculty and inquiry-based instruction by 46% (Eagan et al., 2014), and our own research indicates that nine out of 56 (9%) faculty persist in lecturing for 40 minutes or longer at a time (Hora, 2015). These data highlight that while many instructors report using active learning techniques, there remains a sizable population who do not. This situation is unsurprising, given that most graduate programs do not include instruction in teaching, most higher education jobs do not provide teaching-focused professional development, and that higher education's promotional systems are commonly based on research output as opposed to teaching performance.

Furthermore, in arguing for more attention to be paid to teaching and learning in the context of skills-related debates, we are not privileging any one instructional modality over another. That is, we are not suggesting that the only venue for effective learning is face-to-face instruction in traditional 2- or 4-year programs. Indeed, alternative modes of teaching such as educational videogames (Steinkuehler, Squire, & Barab, 2012) and online courses (Bowen, Chingos, Lack, & Nygren, 2014) are a growing and important part of the educational landscape (Kamenetz, 2010). What we are less convinced about, however, is the notion that the modular approach to education and training, as exemplified by the alternative credentialing movement and those advocating for an "un-bundling" of higher education, is superior to face-to-face courses in traditional degree programs. While much of our skepticism is grounded in our respondents' observations that effectively learning disciplinary habits of mind takes time and a coherent, inter-connected set of courses and field experiences, we are also concerned that little research demonstrates that employers favor skills-based credentials over traditional degrees (i.e., signaling), a claim made by those advancing the unbundling argument (Craig, 2015; Selingo, 2016). Instead, we argue that educators and policymakers should pay more attention to ensuring that all postsecondary courses, whether they are in traditional four-year bachelor's programs or online boot-camps, integrate principles of experiential, active learning (Chi & Wylie, 2014) and of effective instructional design where student learning outcomes are articulated and aligned with activities and assessments (Wiggins & McTighe, 1998).

So how do colleges and universities cultivate highly skilled professional instructors—regardless of whether they teach online, in a traditional classroom, or in a workplace training program? Many institutions and the federal government, particularly in its efforts to encourage active learning in undergraduate STEM programs (President's Council of Advisors on Science and Technology, 2012), are addressing this pressing issue. No magic bullet exists to transform higher education into an active learning paradise. Myriad organizational, individual, and cultural factors intersect to inhibit faculty from changing how they plan and teach their courses. Yet the higher education field is beginning to identify key leverage points that shape instructional behaviors in postsecondary institutions, such as class size and curricular artifacts (Henderson & Dancy, 2007; Hora, 2016), and to find that a systemic approach to reform is necessary instead of top-down mandates for change (Austin, 2011). Further, insights from the K-12 sector should also be considered, where evidence shows that countries with high-performing educational systems support teachers through competitive salaries, extensive training and professional development, built-in time during the school day for teacher-planning, and considerable autonomy in decision-making (e.g., Darling-Hammond, Wei, & Andree, 2010).

Employer's Role in Exacerbating Skills Problems: Hiring and Training

Of course, this conversation about skills and teaching highlights another important question: In speaking of cultivating 21st century competencies, should we only be talking about how educators need to change their practice? Based on the evidence reported in this paper, where only nine (12%) of employers in the study reported offering formal training, and 23 (31%) offered informal training, and that the ManpowerGroup (2015) has found that only one in five employers around the world invested in their own employees, it is clear that if we consider learning to be a lifelong process that does not stop in one's early 20s, then employers need to be considered as responsible for skills development as their higher education counterparts.

However, purveyors of the skills gap narrative single out higher education as the primary, if not the sole, entity that needs to change and be held responsible for the cultivation of students' skillsets. For example, policies such as the WIOA and WFF, while organizing consortia of educators and employers to discuss matters of education and training, focus on altering educational programming such as apprenticeships, newly expanded programs, and career pathway programs, with no mention of how to encourage, incentivize, or even mandate that employers expand and/or enhance their own initiatives. When workplace training is discussed in these policies, it is in the context of using taxpayer funds to create new programs, such as the $15 million initiative that is a cornerstone of the WFF legislation. While these investments are important, the question remains: Once the public monies dry up, will employers continue to provide opportunities for their staff to learn and grow throughout their careers?

Another important finding of this study pertains to hiring, and the predominance of using "fit" with the organizational culture as a screen during the hiring process. In other words, an applicant's educational credentials, work experience, and technical acumen may not be enough to get her or him a job, which runs counter to the dominant skills gap narrative that assumes

employment for those with the "right" credential. Instead, employers preemptively screen out applicants who lack the traits and competencies that are desirable within a given company based on a hiring manager's evaluation of whether they fit the company culture. While research shows that this process often centers on applicants' hobbies and personas outside of the workplace (Rivera, 2012), our data highlight the fact that subtle features of body language and interpersonal competencies also play a role. One human resources manager at a manufacturing firm, for instance, described the importance of a person's physical disposition to hiring. "If somebody comes in here for an interview… [and they're] wearing a baseball cap backwards, and they're sitting back like this talking to me," he said, affecting a pronounced slouch in his chair as he spoke, "that body language is, they disqualify themselves in my mind almost immediately."

It is understandable that hiring managers employ such tactics given the considerable investments in time and money that hiring represents (Spence, 1973), and research on person-organization fit also demonstrates how a good match between company and staff leads to increased job satisfaction and productivity (Chapman et al., 2005; Kristof-Brown & Billsberry, 2012). However, the cultural reproduction of skills and competencies in the workplace is done less through training and more through the initial screening process during recruitment and hiring. Aside from highlighting the subjective nature of hiring, this critical acknowledgment underscores that even with the "right" credentials from a program in a high-demand field, the hiring process can come down to idiosyncratic evaluations by individual recruiters or managers. Such a process, of course, opens the door for excluding certain individuals or groups from the workplace, because they do not demonstrate desired personality traits or hobbies. In field theory terms, forms of valued cultural capital that employers or hiring managers deem admirable or not in certain applicants can often be influenced by gendered, racialized, or class-oriented norms (e.g., Carter, 2003; Dumais, 2002; McLeod, 2005). Given evidence the hiring process can be an important site for discrimination and exclusion (Kmec & Skaggs, 2014; Kang, DeCelles, Tilcsik, & Jun, 2016), discussions about education, skills, and jobs need to acknowledge the important role that hiring plays in exacerbating skills problems, whether through enacting overly stringent criteria for that perfect candidate (Cappelli, 2015) or by discriminating against applicants whom those in charge of hiring believe will not fit the organizational culture.

The Elephant in the Room: The Role of Wisconsin's State Government

One the key insights from this study about education-industry relations is that no college, university, or company functions within a closed system, immune to shocks and influences that may emanate from the marketplace, the wider economy, or state and national governments (Bourdieu, 1998; Naidoo, 2004). Instead, bounded social fields operate within a broader arena of power where other fields collaborate and compete with one another (Emirbayer & Johnson, 2008). In such an environment, fields are not static. Instead, they experience periods of stability and contention as different organizations and state actors interact in what Fligstein and McAdam (2012) called a "routine, rolling turbulence" (p. 19).

These ideas are salient here because the field of higher education in Wisconsin was highly contested during the time we were conducting research (2013-2015). Wisconsin's Governor

Walker and the Legislature embarked in 2011 on an ambitious program to reshape the state's higher educational system largely to meet their vision of workforce needs. These changes included proposing performance-based funding for WTCS (e.g., Schmid & Herzog, 2015), training programs in "high-demand" occupations, restructuring the UW System's governance model via "reform" of tenure protections, and a tuition freeze for the UW System in the name of affordability. In addition, officials enacted substantial budget cuts to the WTCS, the UW System, and the state's K-12 system (Savidge, 2015; Strauss, 2015). The $250 million cut in the 2015-2017 biennial state budget had real impacts on UW campuses. For example a $63 million cut to UW-Madison eliminated student online course support services and reduced student advising services, prompting the office of undergraduate advising to increase by 15% the number of students assigned to each advisor. A $2.1 million cut to UW–Parkside led to spending down reserves and creating a $2 million structural deficit, cutting course sections, and increasing course loads for instructional staff to four courses/semester (Wisconsin Center for the Advancement of Postsecondary Education, 2015).

While acting in the name of efficiency and accountability, what lawmakers failed to recognize is that cuts and reductions that harm student support services and quality of their classroom experiences is not conducive to meeting the goal of providing high-quality educational experiences for students, much less creating a more highly skilled workforce. To their credit, skills gap advocates have placed student employability and career pathways at the center of debates about the future of higher education and considerations of workforce development policy. However, in focusing on austerity and accountability as the guiding principle of reforming the postsecondary sector, and on programmatic solutions to the employability problem, policymakers and leaders are undermining the educational apparatus that supports high-quality learning opportunities for students. Indeed, without a state and federal government focused on supporting teaching and learning at every college and university campus, it is hard to imagine public higher education effectively providing students with 21st century competencies in ways that they can and should.

Furthermore, some public higher education advocates, including several educators *and* employers in our study, felt the Wisconsin government's motivations for enacting budget cuts and other reforms were grounded in an ideological belief that colleges and universities had become, as one backer of reform put it, "elite bastions of liberal academics that do not prepare students for work and are a burden on taxpayers" (Bosman, 2015). Indeed, one of the dynamics we observed during our fieldwork was that those in power were attempting to re-shape the very logic and underlying rationale operative within a given field—that is, the combined research, teaching, and service-oriented mission of 4-year universities—with the mission of another field (i.e., 2-year technical colleges) (Fligstein & McAdam, 2012). This attempt was most evident in the unsuccessful attempt by Governor Walker to revise the mission of the UW System by striking out the phrases "search for truth" and "improve the human condition" with "meet the state's workforce needs" (Strauss, 2015). While the mission of the UW System remains unchanged, political and budgetary winds clearly are pushing higher education, especially at public 4-year colleges and universities, to increasingly adopt positions and practices that

emphasize student employability and technical training in high-demand occupations. Whether such a complete re-orientation of the types of cultural capital valued within the field of higher education takes place, we do now that a narrowly defined conception of skills and education as embodied by the skills gap idea will ultimately fail to meet the long-term needs of students, employers, and Wisconsin's economy.

Toward a Systemic Account of Higher Education-Industry Dynamics

Many challenges face higher education and its relationship to the labor market: the continuing importance of postsecondary education for lifetime earnings but its rising price-tag, an aging workforce that presages shortages in certain fields, alternative credentialing and continuing challenges to traditional funding models for public institutions. But to connect these dots and conclude, as skills gap advocates have done, that a failing higher education sector with too many students seeking liberal arts degrees at four-year institutions is the primary factor to blame for sluggish economic growth—is simply not supported by the evidence. While a number of thoughtful public/private approaches carefully consider the kinds of career pathways that can help all kinds of students succeed (e.g., Miner, 2016), most policy and rhetoric ignores the systemic and multi-faceted nature of the problems facing college students, our society, and the economy. Too often, such oversimplification leads to stopgap solutions—like guiding students towards short training or boot camp programs so their skills are "aligned" with the immediate needs of businesses—that do not fix the longer term problem. Indeed, once we acknowledge that there is an overwhelming need across society for more than just technical skills, we should carefully consider which types of credential and education can help meet those needs.

Instead, a far greater array of factors influences student competencies and career trajectories, employer hiring difficulties, and the state of regional and national economies than simply an over-production of French literature or film studies majors. Expanding programs in high-demand fields, exploring the prospects of instructional technologies for education and training, and ensuring that all high school students are provided with accurate information about career prospects in all fields *are* important. However, such a focus on programs as exemplified by policies such as the WIOA and WFF as well as industry groups' demands that educators more closely "align" of education to skills overlooks the heart of the matter: what learners actually do inside of classroom, boot-camp, or training program. Instead, we argue that the central policy focus needs to be on ensuring that students are provided with learning opportunities that enable them to become well-rounded experts in a field that will not only get them that first job but also their 10th job far into the future. Consequently, the evidence indicates that the quality of teaching, and students' subsequent acquisition of 21st century competencies, should be the central issue—and not only in higher education but in workplace training over the life course. The issue for policymakers and educational leaders then becomes how to build systems around the instructional core, or the programs, procedures, and funding mechanisms that will enhance faculty and workplace trainers' abilities to effectively teach and train the full repertoire of valued competencies within specific disciplinary contexts.

Why a focus on systems, and not simply on providing more training for individual teachers and trainers? Systems-oriented thinking has become commonplace in fields as diverse as atmospheric science (Lorenz, 1963), diffusion of social innovations (Macy & Willer, 2002), and health disparities (Diez Roux, 2011), largely based on the recognition that linear, input-output models for thinking about the natural and social world has proven to be inaccurate and ineffective. In the field of education, which has a long history of reform efforts aimed at "magic bullet" types of solutions aimed at unilaterally solving the problems facing public schools such as teacher quality (Tyack & Cuban, 1995). As a result, scholars have increasingly adopted systems frameworks for studying issues such as data driven decision-making (Coburn & Turner, 2012), how policies interact with local educators' cognitive frameworks and local practices (Spillane, Reiser, & Reimer, 2002), how to transform community colleges to provide comprehensive and systematic "guided pathways" for students (Bailey, Jaggars, & Jenkins, 2015), and how to improve teachers' knowledge and use of high-impact instructional practices (Austin, 2011; Putnam & Borko, 2000).

We argue that a similar, systems-oriented approach is equally warranted when thinking about the issues implicated by the notion of a skills gap—employer hiring challenges, the changing labor market, the employability of college graduates, and traditional notions of postsecondary curriculum and instruction. In practice, this approach means taking the central issue of facilitating students' acquisition of 21st century competencies, and identifying those policies and programs that would best allow this to happen. However, it is not enough to simply enact new policies and programs, but to do so in a way that addresses the not inconsiderable disjuncture between and among different fields and sub-fields implicated in these issues.

For instance, consider that 2-year colleges, 4-year universities, biotechnology companies, and manufacturing firms each represent distinct social fields —with their own logics, positions, operations, and valued cultural capital—such that the social and cultural gaps between them may make transitions (and translations) from one field to another difficult. Thus, the issue becomes one of identifying the factors that best: (a) support teachers and trainers in their professional development, and (b) act to bridge the cultural and programmatic divides between and among fields such that resources can be more effectively shared and students' transitions from school to work made smoother.

To identify these factors we took the evidence reported in this paper regarding some of the critical factors shaping higher education-workforce relations (e.g., teaching and training, hiring practices, and cross-field partnerships), and combined it with results from similar analyses of cross-sector collaborations (e.g., Gonzalez et al., 2015). With these data in hand, we then conducted a causal network analysis to identify those factors implicated in supporting teachers in their work, cross-field relations, and student transitions (Dettmer, 2007; Miles et al., 2014). In placing teaching and learning at the center of the analysis, and in complicating the notion of "alignment" to encompass structural and ideational ties, we depart from conventional analyses of the relations between the education and industry sectors. Collectively, we call the systems supporting effective teaching and learning the "skills infrastructure" that provides an alternative
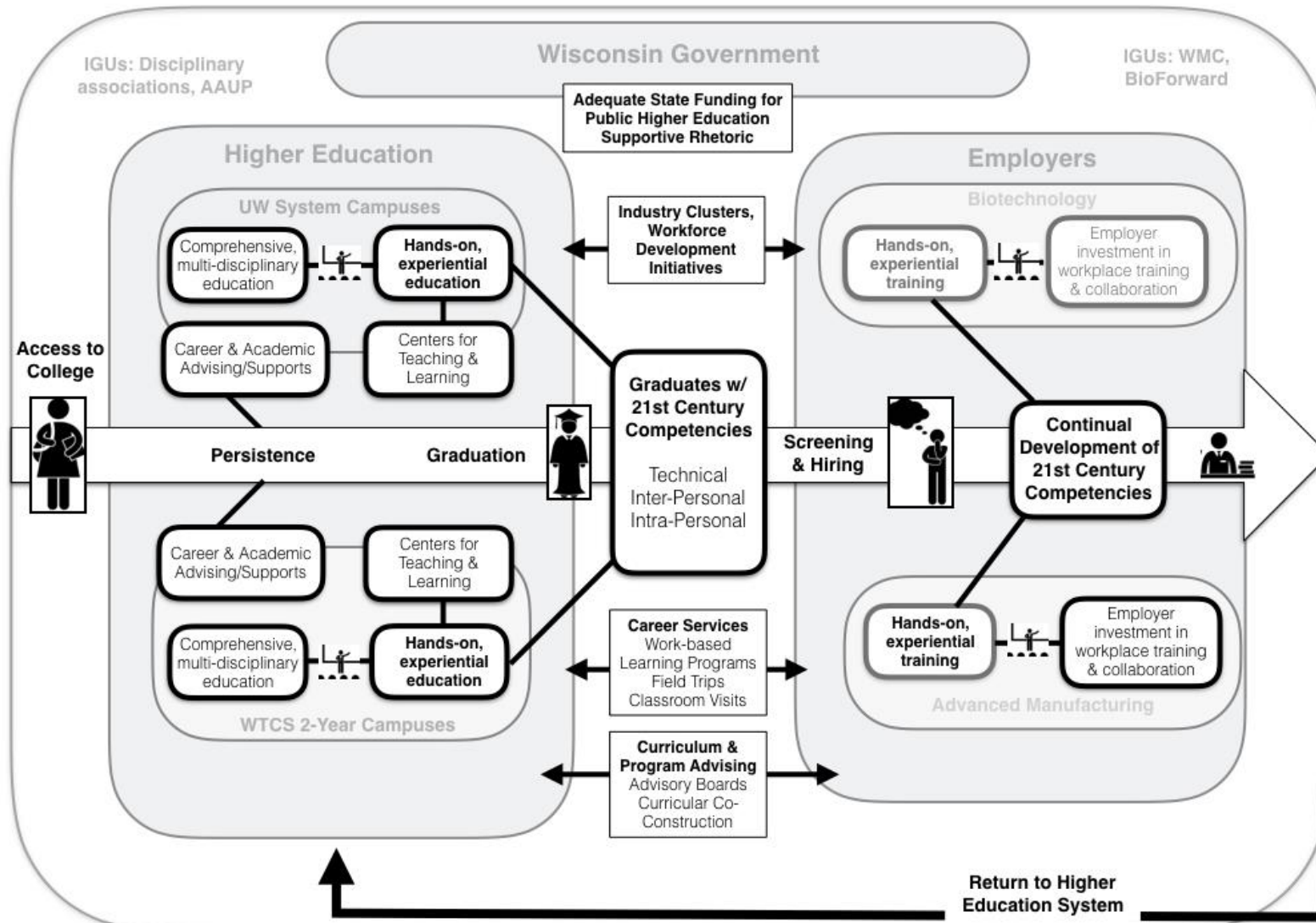
way of diagnosing and thinking about the issues facing higher education and the labor market (see Figure 2).

As noted above, we are placing high-quality teaching and learning at the center of our analysis, based on evidence that the acquisition of 21st century competencies will help students succeed in school, life, and work (Pellegrino & Hilton, 2012). Further reinforcing the merits of focusing on teaching and learning is the notion that providing students with these competencies will achieve multiple goals: meeting workforce needs, developing students' intellectual capabilities over the long-term, and preparing an educated citizenry ready to participate in society. Besides the importance of inquiry-based experiential education, we highlight the importance of multi-disciplinary education in cultivating a diverse repertoire of competencies, an element several of our respondents noted, as did advocates of the liberal arts tradition (Roth, 2015) and employers (Anders, 2015; McNutt, 2014; Segran, 2014). Again, the issue is less about the venue (e.g., 2- or 4-year institution) or modality (e.g., online or face-to-face instruction), but more on the importance of multi-disciplinary, experiential education in which a student is immersed in a new disciplinary context so he or she can acquire new habits of mind, skills, knowledge, and abilities.

The factors that support such approaches to teaching and training include campus-based centers for teaching and learning, as well as employers committed to investing in training opportunities for their employees. Cross-field collaborations can facilitate the cultivation of students' social and cultural capital via curriculum advising and curricular co-construction, as well as bridge programs (e.g., internships) that provide opportunities for students to integrate authentic, workplace learning into their education. Additionally, educators can provide technical assistance for developing workplace training programs, or they can provide training itself. Finally, each of these programs and policies unfolds in specific contexts, where state governments and other entities (e.g., internal governance units such as disciplinary associations) influence how the fields of higher education and industry function alone and in partnership. Altogether, these disparate yet inter-related factors constitute the critical features of a skills infrastructure that, if supported by policymakers, employers, and educational leaders, represents a promising approach to meeting the needs of the workforce, students, and society itself.

Though the macro approach utilized here necessarily forces us to consider skills issues at a broad level, we believe a systems-oriented approach focusing on these key leverage points—all of which are closely associated in the research literature with high quality teaching, learning and student advising—ultimately allows us to reframe the skills gap debate from a simple, unidimensional discussion centered on economic utility to one centered on the kind of classroom work that seeks to improve student opportunity. Such micro-level interactions and experiences, of course, are where broader movements are made or broken. As such, future research should build on our approach to look more closely at the experiential features of key skill infrastructure factors—from small-group work in technical college classrooms to career guidance office interactions.

Figure 2. **Skills Infrastructure to Support Effective Teaching and Learning**

Note: Hands on, experiential education as part of robust curricula
can take place in face-to-face, online, and blended environments.

Conclusions

Our findings have considerable implications for researchers and policymakers engaged in envisioning the future of higher education and its relationship to the workforce. First, this study highlights areas of inquiry that scholars should pursue. For instance, how employers actually perceive the value of alternative credentials (e.g., certificates from boot camps) when screening and hiring applicants, as well as the potential that hiring for "culture fit" leads to discriminatory policies, are both areas requiring further empirical research. Second, expanding research on higher education-industry dynamics to additional states and industries to ascertain whether the data reported in this paper are similar to or different from educators and employers in different venues and fields is an obvious next step. Since these issues affect national debates about the purpose of higher education in other countries such as Japan (Obe, 2015) and China (Chan, 2015), conducting cross-national comparative studies would be an interesting research angle. Third, as we have noted elsewhere (Benbow & Hora, 2016), a close examination of the kinds of power relationships embedded in the skills gap narrative, as well as wider discussions of skills themselves, would be a valuable contribution. Finally, we see a need to better understand how individual faculty members, workplace trainers, and students interpret and then pursue courses of action within their specific situations and contexts, a research project best conducted using techniques such as field ethnography, agent-based modeling, or naturalistic decision-making.

We close with a set of policy recommendations that we suggest represents a more effective and comprehensive response to skills-related issues than a sole reliance on new courses in high-demand fields or career pathway programs. In advancing these recommendations, we do so with a focus not only on ensuring that college graduates obtain jobs, but that the purpose of higher education is also to cultivate in students a moral and intellectual maturity that will enable them to be educated and engaged members of society. As we have shown, providing an education that inculcates competencies that lead to these goals are not incompatible with vocational aims, and indeed, they may be one and the same. Thus, to be educated in the 21sst century does not appear to be a situation where one has to choose vocational aims or broad-based education. Instead being educated is "both/and" as some claim as part of the "new vocationalism" argument (Stokes, 2015; Symes & McIntyre, 2000). As Benson (1997) argued over 20 years ago, the integration of vocational and academic preparation, along with employers willing to invest in training, was essential to provide students and workers with the competencies they would need to thrive in the 21st century economy.

Ultimately, we offer these recommendations with an eye toward jobs, learning, and the role of education in serving the public good. If we as a society wish to produce and maintain an engaged electorate conversant in critical issues of the day (e.g., climate change, global terrorism, racism), then it is even more essential to resist the narrowing of the curriculum and myopic focus on education as job training that was evident in Wisconsin during our field work (Cramer, 2016). The following six recommendations represent but a starting point in re-framing the debate from one of a skills gap to one of ensuring that all students and workers have access to high-quality

learning opportunities throughout their careers that will benefit them, the workforce, and society at large.

1. Ensure that all students have access to experiential learning opportunities by investing in paid, mandatory training for all faculty and campus centers for teaching and learning.

Given the importance of hands-on, experiential learning for cultivating 21st century competencies, all faculty must have rigorous training in learning theory and instructional design. Yet at the present time, to obtain a job in many colleges and universities no formal training in teaching is required, in contrast to K-12 teachers who undergo extensive training via coursework and field-teaching. Exceptions to this rule in Wisconsin include the WTCS, which is dictated by state statute to require new instructors to take courses on assessment, teaching methods, and course design (WTCS, 2016b). At the very least we argue that postsecondary institutions provide paid, mandatory training on these topics as part of the orientation process for new hires. We are not arguing that lecturing has no role to play in the college classroom (Hora, 2015). Instead, continuous periods of verbal exposition, which is often the default mode of instruction for postsecondary instructors, should be avoided, with lectures kept to shorter periods and used to introduce other learning activities (Schwartz & Bransford, 1998).

Besides offering and requiring training as part of orientation, a more in-depth solution to the predicament of faculty not being trained how to teach involves embedding pedagogical training in graduate education (Pfund et al., 2012), and to provide ongoing opportunities for professional growth via campus centers for teaching and learning. These centers, which are sometimes the first to be cut in times of fiscal crisis, typically offer workshops, one-on-one mentoring, and resources for faculty seeking to improve their teaching. Policymakers should ensure that every 2- and 4-year college and university have adequate funding to create and/or provide continuing support for such centers. With support for high-quality teaching and learning coming from multiple constituencies, including STEM educators, learning scientists, instructional technologists, professional educators, learning game designers, and now those active in workforce development, policymakers now have ample rationale for ensuring that postsecondary faculty are well-trained professional teachers.

2. Provide adequate funding to sustain high-quality career and academic advising services

Access to high quality career and academic advising is similarly important for students to succeed in college and to make informed decisions about their careers, and policymakers should allocate adequate funding to support these campus services. First, they should recognize that not all students enter college with adequate knowledge about how to study effectively, with many relying on low-impact practices such as re-reading highlighted text (Dunlosky, Rawson, Marsh, Nathan, & Willingham, 2015). Second, career counseling services need to be available for students as they consider high stakes academic and career decisions, particularly for those enrolled in programs that do not have tight connections to specific occupations (e.g., biology majors as opposed to nursing students) (Moodie, Wheelahan, Fredman, & Bexley, 2015). These services should provide students not only with information about potential earnings and labor

market projections, but also resources for securing apprenticeship, internship, or co-op opportunities, workshops on résumé writing and interviewing, and one-on-one counseling. In particular, given the importance of the interviewing process for ascertaining "culture fit," providing tips and strategies for how to best navigate the job interview may be particularly valuable. To make these services a reality, however, policymakers and institutional leaders need to allocate sufficient funds to establish and maintain career services on all college campuses.

3. Maintain cross-disciplinary general education while also emphasizing marketable technical competencies

As the postsecondary education sector engages in a period of and re-invention and disruption, spurred by public and policymaker distrust, developments in instructional technology, and declining state support, policymakers and educational leaders must maintain the long-standing tradition of cross-disciplinary general education that forms the curricular foundation of many 2- and 4-year institutions. In the context of skills-related concerns addressed in this paper, general education plays a critical role because certain disciplines (e.g., arts and humanities) are particularly well-suited to cultivating inter-personal and critical thinking competencies. As a technical college instructor we interviewed said, "I rely on those general education instructors to help me with those soft skills, especially communication." Furthermore, in his proposal for the University of Virginia, Thomas Jefferson highlighted the importance of cross-disciplinary education (e.g. science, art, agriculture, and business) because it would "develop the reasoning faculties of our youth, enlarge their minds, cultivate their morals" while working to "harmonize and promote the interests of agriculture, manufactures and commerce" (Jefferson, 1818). Thus, the short-sighted assault on the liberal arts in general, and the arts and humanities in particular as being irrelevant to 21st century society and the labor market (e.g., Sorenson & Flaherty, 2015) must cease in favor of the recognition that they do have a role to play in both vocational education and the liberal arts tradition.

That said, higher education cannot ignore the labor market outcomes of its students, due to rising student debt and the fact that 85% of college freshmen state that getting a good job is a very important reason for attending college (Eagan et al., 2016). In response, some institutions are partnering with coding boot-camps to provide graduates with immediately marketable skillsets (Joselow, 2016), while others are embracing digital badges, competency based learning, and modularized curricular structures (Georgetown University, 2016). In the case of Georgetown University (2016), however, such innovations revolve around a liberal arts core, based on the notion a false dichotomy exists between an education that focuses on job preparation and holistic, liberal education. Ultimately, we contend that policymakers and postsecondary leaders, in following Jefferson's cross-disciplinary educational approach, will need to continue to emphasize technical, job-ready skills with the merits of general education.

4. Encourage, incentivize or mandate high-quality workplace training

In this study we found surprisingly little workplace training underway, whether formal (12% of companies) or informal (31%) opportunities for employees to acquire new credentials or

skillsets. These data are consistent with results from ManpowerGroup (2015) where only one in five employers invested in workplace training, and labor economists have argued that until and unless more employers take training seriously, it is hard to imagine skills development taking place over the life course (Benson, 1997; Cappelli, 2015). However, purveyors of the skills gap narrative single out higher education as the primary, if not the sole, entity that needs to change and be held responsible for the cultivation of students' skillsets.

Instead, policymakers must explore ways to encourage, incentivize, or even mandate that employers expand and/or enhance their own initiatives. While policies such as WFF provide grants to employers for this purpose, the long-term viability of employers continuing training programs beyond the expiration of these grants is an open question — setting aside the debate about whether public monies should even be spent on corporate training (Cappelli, 2015). In addition, we believe the quality of workplace training programs and the expertise of the professionals who run them should be significant factors in educational policy decisions as well. With these tenets in mind, the provision of purposefully designed, evidence-based curricula—in house or not, with the help of professional educators—would improve employee skills markedly, as would clearly delineated opportunities for workers to supplement their college or university education while they are employed.

5. Foster a broader range of equitable cross-field partnerships to support students' acquisition of 21st century competencies

While current skills-related initiatives focused on alignment between higher education and the workforce, we contend that the reliance on career pathway programs, internships, and expansion of academic courses in high-demand fields is an overly narrow response. As we found in our study, these initiatives are important in supporting the skills infrastructure, but ignore other forms of collaboration that address the fundamental issue of teaching and learning. These include the co-development of course curricula where employers offer authentic, real-world problems that are then used in the classroom, or workplace training programs designed by professional educators for use in a company. In these cases, the respective expertise of both parties are utilized in an equitable manner to improve teaching and training programs, but in a manner where the provider of the program maintains autonomy.

Policymakers should facilitate the development of cross-field partnerships such as these, along with existing initiatives such as career pathways and internship programs, but with a re-framing of the "problem" of skills development that views educators and employers as the source of solutions and challenges. Policies such as the WIOA and WFF have been shaped by the skills gap narrative, which places blame solely on educators and workers for economic underperformance, while ignoring the role that the industrial sector plays. Collaborative efforts and future policy, therefore, need to begin with the assumption that educators and employers both have roles to play in efforts to better prepare students for the workforce, as well as for lives of civic participation, broadmindedness, and lifelong learning.

6. Reject skills gap narrative

We conclude our analysis with a simple appeal to those invested in a robust economy, renowned institutions of higher education, and a vibrant democracy: Discard the skills gap narrative, particularly as it has been promoted and practiced in Wisconsin. The one-dimensional version of education that this narrative represents is counterproductive to its purported goals and myopic in its insistence that students can be prepared for only one part of their endlessly variable futures. Instead, we look to the educational work of Charles Van Hise and Thomas Jefferson, for instance, who spoke of colleges and universities with the ability to foster economic growth, inspire young minds, and, above all, impart a culture of critical inquiry and civic responsibility.

The coming decades will present a host of challenges to the generation of children who are only now entering school. For those adults currently in positions of power and influence, failing to ensure that an educational system is in place that will cultivate 21 century competencies in all these students constitutes nothing less than a failure of immense proportions. Will these children look back on this period with pride, much as we look back on the Progressive era and the beginnings of the Wisconsin Idea, or will they look with regret, disappointed that we did not have the insight and creativity to build a public higher education system that would be the envy of the world? Ultimately, our scholarship and our work should engender the public to build educational institutions that will give us the ability to recognize the difference.

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