

Contemporary Labor Market Information in Postsecondary Contexts

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Abstract

Postsecondary institutions have for decades relied on traditional sources of labor market information (LMI) to advance their missions. However, in recent years, colleges and universities have at times turned to contemporary LMI to help develop programs, counsel students into careers, and communicate returns on investment to stakeholders. Contemporary LMI firms draw from hundreds of millions of web-based job postings and social profiles to power subscription-based software products and applications. This report summarizes the key players in this emerging sector and the products they offer. It also presents a range of use cases across the postsecondary landscape, from community colleges to four-year colleges to online-only providers. Based on use cases, contemporary LMI appears to provide value for targeted initiatives that need to align with labor market dynamics. However, licensing costs—which are not sufficiently transparent—may represent barriers to entry. Stakeholders should continue to monitor use cases and consider ways to democratize the availability of contemporary LMI.

Keywords: colleges, universities, labor market information

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Executive Summary

For decades, postsecondary institutions have relied on traditional sources of labor market information (LMI) in order to inform program development, counsel students into careers, and report returns on investment to various stakeholders. Traditional LMI represents an important data source: it is reliably sourced through government agencies, consistently reported over predictable intervals, and familiar to the myriad institutional stakeholders who use it to communicate the postsecondary mission of preparing students for future careers. However, it is not necessarily timely, geographically relevant, or inclusive of emerging jobs and skills across the wider labor market. In response to these and other limitations, contemporary LMI firms have collected enormous quantities of data from across the internet—as well as from traditional LMI sources—to help postsecondary institutions (and other clients) meet their human capital, financial, and strategic priorities.

Contemporary LMI firms, most notably Burning Glass Technologies (BGT) and Emsi, synthesize a wide range of data sources to create subscription-based products for colleges and universities willing to pay for them. At the heart of each firm's suite of products is a proprietary database consisting of more than one hundred million job postings “scraped” from tens of thousands of corporate and industry websites. By extracting metadata from these postings—e.g., location, education requirements, in-demand skills—contemporary LMI firms can offer real-time data points unavailable through traditional sources. Subscribers can use these product offerings to align proposed degree programs with local labor market demand, recommend skill sets to students who are developing their career plans, or justify program expansion to financial gatekeepers. The lagged and coarse nature of traditional LMI renders such activities difficult, if not impossible, for postsecondary stakeholders hoping to leverage current labor market dynamics.

To better understand how colleges and universities use contemporary LMI, I undertook a review of publicly available sources. These sources included case studies and research reports published by LMI firms, webinars, reporting from industry groups, academic literature, newspapers and magazines, and university websites. This report is organized into three main parts: (1) information about prominent LMI firms (the supply side), (2) information about postsecondary

institutions that consume LMI services (the demand side), and (3) a discussion of the evolution from traditional to contemporary LMI and corresponding strengths and weaknesses of each.

Main findings:

- When it comes to marketing products and services to postsecondary customers, BGT and Emsi dominate. Other firms are making inroads. LinkedIn has partnered with the National Labor Exchange (NLx) to drive applicants to state workforce agency job postings, while Handshake connects students and employers through its mobile app. But only BGT and Emsi maintain product suites that can power data-driven decision making at the institutional level.
- Contemporary LMI represents a relatively small sample of total global postings and does not include real information on earnings or wages. Rather, each firm's web scraping algorithm collects suggested or posted salary ranges, which serve as proxies for the kinds of coarse averages provided by traditional LMI sources, such as the Bureau of Labor Statistics.
- Postsecondary institutions appear to use contemporary LMI to inform program development more so than for other activities, such as guidance or ROI reporting. This is true for four-year colleges, community colleges, and institutions offering exclusively online programming.
- Firms do not publicly disclose costs and fees. All firms reviewed for this report request that potential clients connect directly to discuss their interests. I was not able to track down fee structures after repeated inquiries to various firms. The best public information is nearly a decade old: Jobs for the Future once reported that firms like BGT charged anywhere from \$5,000 to \$10,000 for annual subscriptions, but additional details were unavailable.
- Case studies published by BGT, Emsi, and others represent success stories. Less well known are cases that are not celebrated because they did not help institutions achieve strategic goals.

Even if costs have doubled since JFF’s reporting nearly a decade ago, contemporary LMI services appear to offer value across a number of dimensions. First, real-time data that reflects local labor market dynamics can help institutions whittle down multiple program ideas to a manageable few. This makes it easier for planners to deliver targeted ideas to financial gatekeepers in less time. Second, many testimonials remarked how products from BGT and Emsi considerably reduced data collection efforts. Third, each firm’s skills inventory may represent one of the most significant value propositions for career planning offices. Both BGT and Emsi maintain databases of tens of thousands of skills that are linked to job postings and local labor market conditions. Students can identify in-demand skills from their career interests or identify job opportunities from their established skills. Finally, institutions are increasingly incorporating an application program interface (API) into existing technology infrastructure in order to directly draw from contemporary LMI firms’ massive databases.

Despite the benefits, two potential concerns emerged. The first concerns cost. Given the wide variation in discretionary funding—brought into stark relief during the pandemic—postsecondary institutions need transparent information about the costs associated with adopting contemporary LMI platforms. LMI firms claim that the costs of their products and services vary widely depending on scope and scale, but institutions should have public information regarding the barriers to entry. If annual subscription fees estimated in the tens of thousands of dollars represents a barrier to entry, philanthropic stakeholders should consider developing a consortium devoted to developing comparable data sources.

A second reason for concern is the fluid nature of ownership across LMI firms. While BGT and Emsi operated as independent entities for extended stretches, both were acquired in recent years—BGT by the private equity firm KKR and Emsi by the Strada Education Network. This does not necessarily imply that colleges investing in contemporary LMI infrastructure will experience uncertainty. But it does suggest that with changes in ownership come corresponding changes in leadership structure, costs, and strategic direction. To increase the likelihood that contemporary LMI is reliably offered, the demand side should pursue a non-profit or public-private consortia that would render contemporary LMI a public good. The National Labor Exchange represents a non-profit initiative designed to replicate some of the activities of for-profit LMI firms. However,

it is unclear the extent to which NLx reaches postsecondary stakeholders. Similarly, a 2009 grant effort funded through the American Reinvestment and Recovery act was narrowly targeted and insufficiently funded. Thus, challenges in both the private and public sectors are likely to persist.

Contemporary LMI is not perfect—but neither is its traditional counterpart. The most reasonable path forward for postsecondary stakeholders is to identify institutional activities that can benefit most from real-time LMI. This review suggests that program development, career counseling, and fiscal accountability reporting are reasonable places to start.

1 Introduction

Nearly a half century ago, economist and three-time college president Howard Bowen described the individual goals of higher education as cognitive, emotional, and practical (Bowen, 1977). He noted that a by-product of these three core educational goals was “facilitating appropriate career choice and placement” (p. 28). Bowen’s insight may have preceded the contemporary “career readiness” era, but his perspective was prescient, as he identified the supports universities deployed then—and now—to help students become career ready: counseling and guidance, relationship brokering, and credentialing (among many others). While Bowen drew largely on economic history, philosophy, and his own anecdotes in arguing for the university’s role in supporting students, he likely could not envision how contemporary labor market information (LMI) would dramatically enhance these core supports.

Today, career counselors can use LMI to map student skills to local employers demanding those skills. University faculty can identify for their students in which industries alumni have had the most promising employment prospects or earned the highest wages. And university presidents and deans can launch new certificate programs based on labor market demand for these credentials. These approaches to helping students are made possible through the development of real-time LMI solutions pioneered by private providers that use web-scraping technologies and proprietary algorithms to scour the internet for labor market data. Such sources of data are generally distinct from those provided through the interstate State Wage Interchange System (SWIS) and its predecessors, the Bureau of Labor Statistics (BLS), and various U.S. Census sources. One such private provider, Burning Glass Technologies (BGT), refers to its products as powered by “real-time labor market information/data” and distinguishes its data from government agency sources, which it calls “traditional survey-based labor market data.” BGT’s primary competitor in this space, Emsi, categorizes its proprietary data and government sources similarly. While private vendors each approach collecting, analyzing, and disseminating contemporary LMI differently, common inputs tend to emerge among them. These include job boards, resume data, corporate websites, and social media profile characteristics. Moreover, these firms do not appear to use unemployment insurance (UI), wage, or earnings data. Rather,

they scrape the internet for inputs using bots, and then deploy predictive algorithms to estimate outcomes. Firms like BGT and Emsi scrape information from a relatively small universe of total postings and profiles, so any estimate represents a sample (it is unclear whether these samples are random or non-random) of the broader population. This may represent one of the largest shortcomings of these products (see Section 4 for more on limitations). In the end, however, these firms have created a number of innovative software products that are specifically marketed to institutions of higher education (IHEs).¹ BGT and Emsi, in particular, have even launched products to help institutions navigate the devastation to universities wrought by the Covid-19 pandemic.

Postsecondary institutions appear increasingly drawn to these firms' products. For this report, I reviewed dozens of case studies,² scores of news articles, and vendor-generated research reports to describe data and products of these private vendors and the motivations colleges have for implementing them. Recent case studies demonstrate how institutions are drawn to real-time LMI so that they can potentially bolster outcomes for their students. Such outcomes include skill development, employment, and wages. But colleges and universities also leverage these data in order to drive enrollment—maintenance and growth of which is linked to various funding formulae. They do this through the development of slick dashboards that are powered by vendors' application program interfaces (APIs). These dashboards can be family-, student-, or trustee-facing, where inputs and outputs are customized for specific stakeholder groups. Moreover, IHEs enlist private providers to help them make economic arguments for institutional impacts. For example, both BGT and Emsi provide versions of an “economic impact report” that university leaders publicize to local, regional, and national stakeholders in order to demonstrate economic added value. Such value statements can range from tens to hundreds of millions of dollars and are sometimes publicized with to great fanfare. I summarize a cross section of these cases to provide a broad perspective of how IHEs have used various sources of private LMI. I also include a spreadsheet (<https://bit.ly/3mZLEOD>) that itemizes recent use cases.

To shed light on this emerging landscape of contemporary LMI services and use cases, I

¹Throughout this document, I will use the terms “institutions of higher education”, “postsecondary institutions”, “colleges”, and “universities” interchangeably

²See <https://bit.ly/3mZLEOD> for a spreadsheet of recent cases.

divide this report into three sections that correspond to core research questions prioritized by the Bill and Melinda Gates Foundation (BMGF) and the Kresge Foundation, whose generous financial support makes this research possible:

1. What services do private providers offer, and what data sources underpin their services? (Section 2)
2. Who are the target audiences for their services? What are the use cases? (Section 3)
3. What are strengths and limitations of the provided services and of the underlying data on which they provide these services? (Section 4)

When referring to providers, I will generally use the phrase “supply side.” In this context, I describe key products, how they are marketed to colleges and universities, and relative costs. When referring to IHEs, nonprofits, and workforce development organizations, I use the phrase “demand side.” In this context, I describe how postsecondary institutions use next-generation LMI and highlight recent and relevant case studies that illustrate a range of approaches. I place particular emphasis on cases arising in states where Kresge’s Boosting Opportunities for Social and Economic Mobility for Families (BOOST) initiative operates.³

³These states are Connecticut, Maryland, New York, Oregon, and Wisconsin.

2 Supply-side services and data products

As I suggest in the introduction, the contemporary LMI landscape appears to be dominated by two private providers: Burning Glass Technologies (BGT) and Emsi (also known as Economic Modeling, Inc.). To be sure, a few additional firms dabble in the collection, distribution, and sale of certain forms of LMI. These firms include LinkedIn and Indeed. LinkedIn is known for its omnipresent social networking site for both job seekers and employers. The closest LinkedIn comes to competing with BGT or Emsi is through its “Economic Graph” product. In recent years, LinkedIn and the National Labor Exchange have entered into a noteworthy partnership designed to boost job applicant traffic to workforce agencies’ job postings. Indeed’s business model is distinct from LinkedIn in that it is a public-facing job posting aggregator—the type of website that BGT or Emsi might scrape with its proprietary bots. However, at least in the case of Emsi, the leading firms appear to abide by stipulations from LinkedIn and Indeed that firms not scrape metadata from their postings. Indeed’s “Hiring Lab” could potentially serve the needs of IHEs as well. I discuss Economic Graph and Hiring Lab in more detail in this section. Handshake represents a relative newcomer focused on connecting employees—specifically, college students—and employers through its mobile app. While BGT, Emsi and others market products to a range of industries in addition to higher education, Handshake works squarely in the postsecondary sector. Handshake doesn’t have a suite of products that leverages contemporary labor market information, but it does seem to occupy a space between BGT and Emsi on one hand and LinkedIn and Indeed on the other. It does this by directly marketing to postsecondary stakeholders—specifically career offices and students—in ways similar to BGT and Emsi.

This section proceeds by summarizing features of BGT, Emsi, LinkedIn, Handshake, and Indeed.

2.1 Burning Glass Technologies

Burning Glass Technologies (BGT), founded in 1999,⁴ uses bots to scrape job posting information across more than 45,000 online sources. The firm claims that its proprietary scraping algorithm allows it to collect information on more than 3.4 million current openings. Through scanning, BGT is able to collect at least 70 data elements, including job title and occupation, employer and industry, technical skills, foundational skills, certifications, educational requirements, experience levels, and salaries.⁵ It uses a proprietary natural-language technology to read active job description and home in on the skills and qualifications sought by employers. The full process—from raw data to reporting—is driven by four key processes: (1) capturing job market data, (2) tagging and structuring these data, (3) using a proprietary taxonomy in order to enable comparisons, and (4) drawing conclusions in order to provide clients with insights. A key feature of its approach is that it takes broad occupational areas—for example, those listed in O*NET⁶—and uses its process to generate “BGT Occupations,” which are broken down further into “BGT Specialized Occupations.”

Burning Glass markets to educational institutions (e.g., colleges and universities), businesses (e.g., human resources departments), government (e.g., employment and economic development offices), and recruiting managers across different industries. Depending on its target audience, it promotes different sets of products. The firm promotes three core products to IHEs: Labor Insight, Program Insight, and Career Insight. It also promotes Labor Insight to government clients. Across business, government, and recruiters, BGT markets two separate products: LENS and its application program interface (API). It also markets NOVA to business and Job Pulse to recruiters. Table 1 summarizes these products and target audiences. The company also has its own research/policy division, through which it publishes multiple reports with a diverse set of partners spanning education (e.g., Excel In Ed, Harvard Business School, Project Lead the Way), business (e.g., CapitalOne, IBM, Oracle, Unreal Engine), government (e.g., The

⁴The private equity firm acquired BGT for an undisclosed sum in 2019 (?).

⁵Source: Company webinar.

⁶O*NET is considered the primary source of information about U.S.-based occupations. The O*NET database contains details on hundreds of and occupation-specific descriptions. To learn more, see <https://www.onetonline.org/help/onet>.

Royal Society, UK DCMS), and economic development (e.g., BHEF, CIT, National Network, Strada Institute, U.S. Chamber of Commerce Foundation).

Table 1: Burning Glass Technologies’ products and target markets

	Education	Business	Government	Recruiters
Labor Insight	✓	✓	✓	
Program Insight	✓			
Career Insight	✓			
NOVA		✓		
Lens Suite		✓	✓	
Burning Glass API			✓	✓
Job Pulse				✓

Note: Checks indicate products that are actively marketed to sectors on the company’s website and do not imply that other services are not also marketed. Source: <https://www.burning-glass.com>.

2.1.1 Data Sources Underpinning Services.

Burning Glass does not provide public-facing, detailed information about its processes or sources of data. Generally, the details are included in the appendix of one of its research products. At a high level, the company describes its own view on the benefits and limitations of different types of data. For example, it notes on its data FAQ page that compared with government sources, BGT’s “fresh data is especially important in market areas experiencing rapid change” and “can be much more specific, reflecting how jobs differ within and across sectors and geographies.” The firm is careful to note that the differences between contemporary and traditional LMI “isn’t a question of better or worse,” but “a matter of big picture versus small picture”—emphasizing that discerning clients should use both.⁷ In general, unlike Emsi, which identifies all of its sources in a fairly transparent manner, Burning Glass reveals far less. It notes that it scans more than 45,000 sources of job posting information, which includes roughly 3.4 million unique postings. I detail below the data underpinning the core products that BGT markets to IHEs.

Job Postings. BGT first identifies which company websites (currently estimated at more than 40,000) it will target for collecting job posting data. It then deploys its “spider” technology—

⁷Source: <https://www.burning-glass.com/about/faq>.

effectively a programmed, tested, and activated bot—which regularly visits company websites for updated job posting information. The spider increasingly visits websites that post more frequent updates. After collection, BGT stores, extracts, and codes relevant data elements, which include job title, employer, salary, number of openings, job type, skills demanded, skill clusters, educational requirements, desired certifications, experience, and any number of job-related activities that accompany the listing. After scraping job postings, BGT uses a combination of machine learning methods and expert-generated rules to assign codes to occupations and skills in order to group job postings within occupations (e.g., using O*NET or the UK’s Standard Occupational Classification(SOC)). Since roughly 80% of global job postings are duplicates, BGT takes special care to de-duplicate postings ([Nania et al., 2019](#)).

Skills Taxonomies. At the heart of BGTs taxonomy of skills (numbering 30,000) are the actual skills listed by employers in their job listings. The taxonomy allows the firm to create customized reports to track skill demand across geographies, industries, or skill classification, among other attributes. For example, by classifying a particular skill’s importance and then estimating the frequency with which it appears in job postings, BGT is able to show IHEs how highly demanded taught skills are actually sought by employers ([Burning Glass Technologies, 2015](#)). In the United Kingdom, for example, BGT maps scraped data to the Standard Occupational Classification (SOC) Hierarchy, which is defined by the Office for National Statistics. This hierarchy ranges from “managers, directors, and senior officials” at Major Group 1 to “skilled trades and occupations” at Major Group 5 to “elementary occupations” at Major Group 9—the lowest rung of the hierarchy. In a report commissioned by the UK Department for Digital, Culture, Media and Sport (DCMS), BGT used its mapping procedure to rank the demand for digital skills across UK nations and occupational classifications ([Nania et al., 2019](#)).⁸

⁸Recent academic papers have leveraged BGT’s database of skills in order to model or empirically test how the demand for skills shifts in response to large economic shocks ([Hershbein and Kahn, 2017](#)) or correlates with external factors unrelated to job postings, such as firm performance ([Deming and Kahn, 2017](#)).

2.1.2 Products and Services

Below, I summarize the three services Burning Glass promotes to institutions of higher education. Section 3 provides select examples of how institutions use these services.

Labor Insight. As Table 1 highlights, Labor Insight appears to be BGT’s flagship product that it promotes to the widest cross-section of clients. The product “provides job market data to enable the identification of opportunities for training programs, closer alignment of education and training initiatives with employer demand, and improved site selection and recruiting decisions.” Many of the use cases that I summarize in Section 3 show clearly how various IHEs use Labor Insight for these and similar purposes. BGT—quite intentionally, it appears—points potential clients and interested parties to case studies⁹ and webinars¹⁰ to explore the nuts and bolts of Labor Insight. For potential education clients, the company does suggest that the product will help “[i]ncrease enrollment and foster student success.” More specifically, the platform empowers IHEs to:

1. Conduct job market analysis at the macro and micro level;
2. Explore career outcomes associated with programs of study;
3. Guide curriculum decisions for innovative and specialized training and degree programs;
4. Identify local opportunities for partnership and investment; and
5. Track and understand graduate career pathways.

Use cases provide additional details about how IHE stakeholders might perform the above tasks. But one can imagine individuals at any level of university leadership down through teaching or counseling staff using Labor Insight dashboards to communicate employment data, skills, or pathways to trustees, students, and parents.

⁹All case studies can be found at <https://www.burning-glass.com/case-studies>.

¹⁰For an example, see <https://try.burning-glass.com/build-better-workforce-program-portfolio>.

Program Insight. Program Insight helps subscribers “[l]everage career, competition, and institution data to monitor the health of your entire portfolio, evaluate current & planned programs, and uncover new opportunities.” This product is designed to help subscribers monitor data on careers, competition, and compensation related to program offerings. In this case, we are thinking about academic programs and majors, for example. The product is also designed to help administrators select from among a suite of products they hope to launch, such as industry certifications or certificates. We see this in a few Emsi cases (e.g., University of Florida and College of Marin) but not yet in a BGT case.

Program Insight has three core features:

1. Demographic data—e.g., age, gender, education level, plus regional information on jobs and skills; designed to help customers (1) improve workforce planning strategies and community outreach, (2) design programs tailored to regional needs, and (3) foresee and prevent upcoming job gaps.
2. Occupation data—identify skills required for regional labor markets and compensation associated with skills; designed to help customers (1) teach marketable skills, (2) identify jobs and regions based on demand, and (3) enhance curricula to add new and in-demand skills. Also promotes digging deeper within occupations to identify competitors, improve talent planning, and improve advisement. Includes a competitor benchmarking feature.
3. Job identification—help students identify jobs that align with taught skills; designed to help customers (1) identify opportunities for displaced workers, (2) help students explore new job types, and (3) find transfer opportunities.

Career Insight. BGT promotes Career Insight on its “Education” segment page along with Labor Insight and Program Insight. Launched in 2019, Career Insight is targeted to prospective and current college enrollees. Prospective enrollees can use the mobile app to determine how well a particular university and its programs might prepare that student for careers. And current enrollees can use the app to identify careers based on skills, interests, and major. The Career Insight mobile app appears to be a subscription-only offering, as it is not available for download

in the Apple App Store. In all, the app looks a lot like Career Coach, an Emsi product. To date, no BGT cases discussed the use of Career Insight, while many Emsi cases did discuss use cases for Career Coach.

Applied Research. The core of BGT’s education-based operations consists of licensing services to colleges and universities. The company also actively produces original research briefs in collaboration with firms across a wide range of sectors. The goal of this research is to demonstrate through case studies how BGT’s proprietary data can strengthen investments in skills, programs, and training. The bulleted list below summarizes BGT’s applied research that is marketed directly to postsecondary institutions.

- *Bad Bets: The High Cost of Failing Programs* (Bittle et al., 2020)—Year after year, colleges and universities launch new academic programs, but according to BGT data, too few students are receiving degrees from these recently-launched programs. Since new programs are expensive to operate—roughly \$2 million over four years—universities have to cover the costs of these programs. *Bad Bets* concludes that larger institutions are better at covering the costs of new programs and conferring a sufficient number of graduates to justify these programs. Four-year public colleges and community colleges have the lowest rates of new program non-conferral than their for-profit counterparts. Faculty salaries constitute by far the greatest costs associated with new programs. BGT’s recommendations in this report align with its core services, namely using labor market data to understand the skills employers demand and the characteristics of incoming students.
- *The Permanent Detour: Underemployment’s Long-Term Effects on the Careers of College Grads* (Taska et al., 2018)—This report explores the extent to which underemployment represents a persistent challenge for recent college graduates, and which industry sectors are best able to weather the phenomenon. The main findings rely on BGT’s massive database of resumes to track aggregate career trajectories across college majors and industry sectors. *The Permanent Detour* concludes that recent graduates—especially males—who start out in jobs that match their education level are less likely to become or remain

underemployed. This is particularly true for STEM majors.

- *Saving the Liberal Arts: Making the Bachelor’s Degree a Better Path to Labor Market Success* (Schneider and Sigelman, 2018)—As colleges invest to align skill-based programming with employer demand, what value should we place on the liberal arts degree? Pooling information from nearly 4 million resumes, this report argues that “non-specialized” liberal arts majors are well-positioned to compete for more than a third of all job openings designed for new bachelor’s degree recipients. However, liberal arts majors should continue to develop their skills. They can do this by aligning majors and skills (one example cited is for English majors to boost their marketability by developing “account management skills”) that BGT data suggest results in employment and earnings premiums.

2.1.3 Fees

Burning Glass did not return repeated inquiries about product costs. The only publicly available cost information I could find generalized fees across different LMI products. In 2012, Jobs for the Future (JFF) released a report that summarized offerings and fee structures for three prominent providers—BGT among them. About BGT, JFF wrote specifically that “cost [is] determined by [the] number of users or products” and, more generally:

“The vendors surveyed or researched make their products and services available on a subscription basis, with customers paying a monthly or annual fee. In JFF’s assessment of the market, we found that these subscription costs are often negotiable; community colleges, workforce boards, and other customers may want to negotiate group rates rather than single-use agreements. The fees for products and services can be found on the company websites; however, fees for custom research or data are not posted. The cost of a one-year license may range from \$5,000 to \$10,000, depending on the number of users or data-access level” (Dorrer and Milfort, 2012, p. 6).

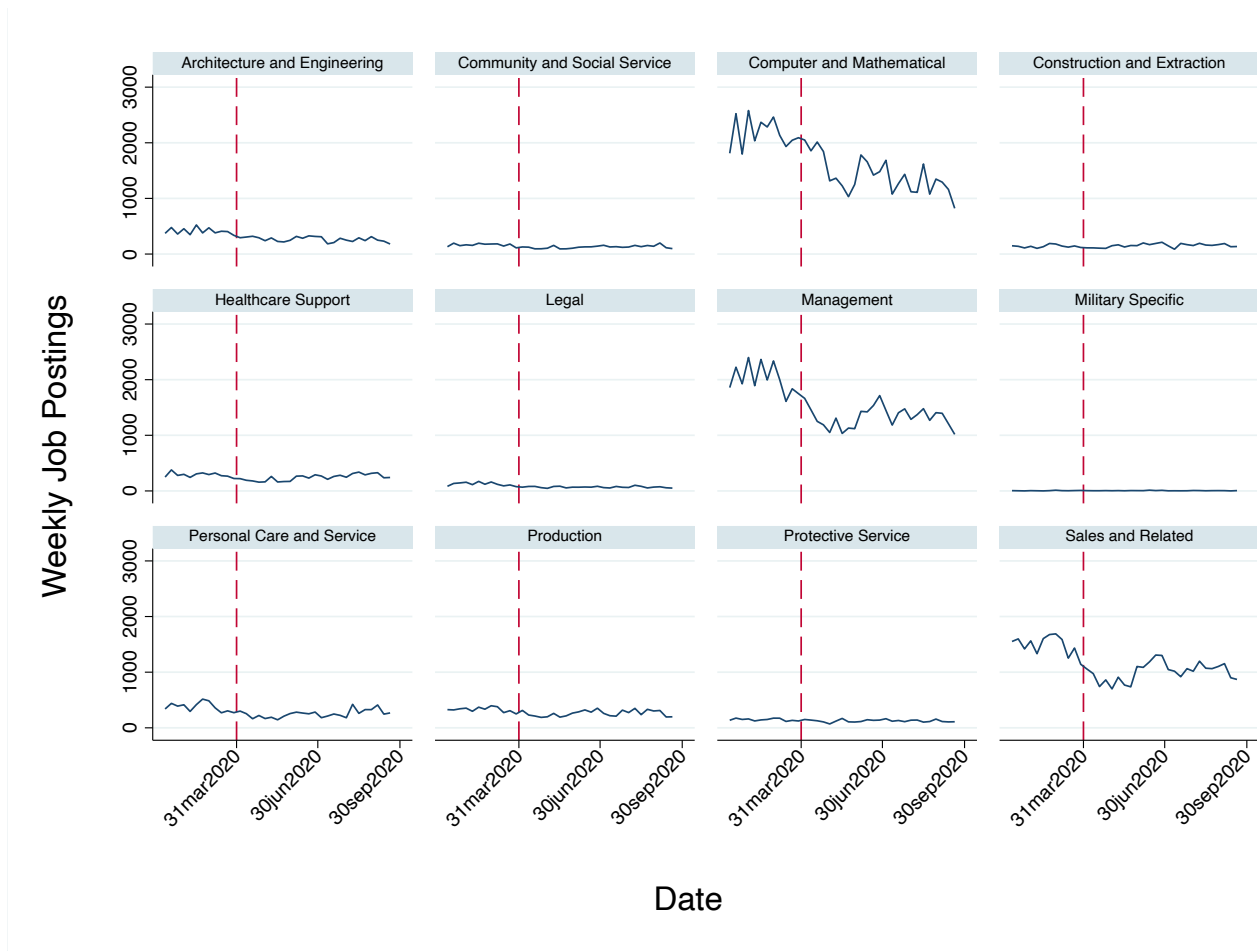
Neither BGT nor any other LMI firm currently posts any costs on their website, as Dorrer and Milfort (2012) reported was the case nearly a decade ago. Inflation alone increases the

quoted costs by roughly 13%, though the actual costs are presumably higher given customer growth and the introduction of many new product offerings.

2.1.4 Covid-19 response

To provide customers and researchers with a national perspective of labor demand responses to Covid-19, BGT released limited, aggregate labor market data for six nations: United States, Canada, United Kingdom, Australia, New Zealand, and Singapore. Colleges and universities, especially those who don't currently subscribe to premium BGT services, might find the U.S. release informative. For example, the U.S. data contain weekly job postings for two dozen occupational groups in the largest 100 or so metropolitan statistical areas. Using these data, administrators from a university based in the Seattle metropolitan area, could plot job posting trends across dozens of BLS occupational groups, marking the time around the first quarter of 2020 when shutdowns began (See, for example, [Figure 1](#)).

Figure 1: Weekly Job Postings in Select Occupations, Seattle-Tacoma-Bellevue, WA Metropolitan Area, Jan 1, 2020 to Sept 19, 2020



Source: Author plots based on Burning Glass data.

BGT also published “Filling the Lifeboats,” which concludes that certain jobs, even in the midst of the pandemic, can serve as so-called “lifeboats” in that they provide relatively easy access to the labor market given their minimal training requirements. Such jobs include stock clerks and order fillers, personal care aides, computer network support specialists, and business operations specialists. The report speculates that that such jobs may serve as promising jobs from which to transition into more stable and higher paying roles in an economic recovery (Burning Glass Technologies, 2020). At the same time, such jobs may be limited in number. Separate BGT reporting notes that jobs that require higher levels of education have been less impacted by Covid-19. For example, during the early days of the pandemic, the decline in job postings requiring a high school diploma were down more than 50%, while those requiring

master's or doctoral degrees were down less than 50%.¹¹ The implications for postsecondary institutions are not immediately clear, though given uncertainty surrounding recovery, such data points might lead job market advisors to encourage graduating seniors to remain enrolled or pursue an advanced degree. Finally, BGT has also reported on how demand for certain alternative education credentials has changed—and could further change given projections—in response to the pandemic (Vankudre and O'Kane, 2020).

¹¹See <https://www.burning-glass.com/jobs-demand-less-education-take-bigger-hit-pandemic-job-postings>.

2.2 Emsi

Emsi is likely the oldest provider of private labor market data that serves educational institutions. The company was founded in 2001 with the launch of its Economic Impact Study (EIS) product, which many postsecondary institutions use today to financially justify program development, targeted recruitment, and student guidance—among other activities. Emsi followed EIS with Analyst in 2003, Career Coach in 2008, and Alumni Outcomes in 2017. Emsi was recently acquired by the nonprofit Strada, whose CEO justified the acquisition because “improving the exchange of information and insights between consumers, educators, employers and workforce leaders is a core focus of Strada’s work . . . Emsi’s expertise and services sit at the heart of our mission” (Fain, 2018).¹²

2.2.1 Data Sources Underpinning Services

Emsi products are underpinned by similar data elements collected by BGT. These include government sources, millions of job postings, online profiles and resumes, wage data collected from government agencies, Emsi’s proprietary “profiles,” and international sources that appear as aggregated as government sources. On its Knowledge Base webpage,¹³ the company lists at least 40 separate data sources that underpin its products. It also provides data release notes, a fairly exhaustive glossary, and an FAQ that goes beyond short answer responses to elaborate in 27 separate blog posts. The company lists 11 primary sources, which I summarize below and also display in Figure 2, which is an image captured from the company’s website.

U.S. Department of Commerce. The Department of Commerce is an executive agency concerned with economic growth and has 11 offices/bureaus. Emsi collects data from two agencies within Commerce: (1) Bureau of Economic Analysis (BEA) and (2) U.S. Census Bureau. BEA data runs include State Personal Income / Local Area Personal Income (SPI/LPI), Make & Use Tables (MUTs), National Income and Product Accounts (NIPA), and Gross Domestic

¹²Strada was formerly United Student Aid Funds (USA Funds) and began rebranding and restructuring in 2013. In addition to Emsi, the nonprofit includes among its portfolio nonprofits and companies InsideTrack, DXtera Institute, Education at Work, Roadtrip Nation, Student Connections and the Council for Adult and Experiential Learning (Fain, 2017, 2018).

¹³See <https://kb.emsidata.com>

Product by State (GSP). Census data runs include the American Community Survey (ACS), County Business Patterns (CBP), ZIP Code Business Patterns (ZBP), Nonemployer Statistics (NES), Current Population Survey (CPS), State and Local Finances (Census of Government, CoG), Population Estimates (PopEst), Origin-Destination Employment Statistics (LODES), and Quarterly Workforce Indicators (QWI). ACS data, for example, are used to produce educational attainment statistics by demographics (e.g., race/ethnicity and gender), which Emsi pulls from two current years of microdata.

U.S. Department of Labor. The Department of labor is an executive agency concerned with the economic health of workers, working conditions, and benefits. Emsi collects data from three sources within Labor: (1) Bureau of Labor Statistics (BLS), (2) Employment and Training Administration (ETA),¹⁴ and (3) Wage and Hour Division (WHD). BLS data runs include Quarterly Census of Employment and Wages (QCEW),¹⁵ National Ind/Occ Employment Matrix (NIOEM), Employment Projections Tables (EP), and Consumer Expenditure Survey (CEX), and the Occupational Employment Statistics (OES). The OES dataset includes the particularly relevant Standard Occupation Classification (SOC) structure, which is used in products like Analyst in order to report links between postsecondary programs—organized through the Classification of Instructional Programs (CIP)—and relevant labor markets. ETA notably includes the Occupational Information Network (O*NET) online database, which “describes occupations in terms of the knowledge, skills, and abilities required as well as how the work is performed in terms of tasks, work activities, and other descriptors.”¹⁶ Emsi uses both SOC and O*NET occupation codes for its products. The main difference is that O*NET includes more occupations (1,016 versus 867) and does not include job counts or earnings data. Both classifications would tell subscribers which percentage of occupation holders has an Associate’s, Master’s, or Bachelor’s degree.

¹⁴The ETA contracted with Mathematica (Berk et al., 2012; Laird et al., 2012) to evaluate the 2009 American Recovery and Reinvestment Act (ARRA) investment in LMI, a \$50 million grant that I summarize in Section 4.

¹⁵Since QCEW data do not include the railroad industry, Emsi supplements this BLS pull with data from the Railroad Retirement Board (RRB). This is why it is included as a separate entry in Figure 2.

¹⁶Source: <https://www.dol.gov/agencies/eta/onet>

U.S. Department of Education. The Department of Education is an executive agency concerned with promoting student achievement in the pursuit of equity, global competitiveness, and overall excellence. Emsi collects data from the National Center for Education Statistics (NCES), which is located within Education’s Institute of Education Sciences (IES). Emsi appears to pull education from two primary NCES sources: (1) the Common Core of Data (CCD) survey for elementary and secondary data and (2) the Integrated Postsecondary Education Data System (IPEDS) Survey for postsecondary data.

For the purposes of this report, IPEDS data are particularly relevant. IPEDS includes information on completions, staffing, finances, cost of attendance, and financial aid for all postsecondary institutions participating in the federal student aid program. As such, non-participants are not required to report. Emsi is particularly concerned with using IPEDS data to estimate completion rates by program and demographic profile. In addition, Emsi uses the Classification of Instructional Programs (CIP) taxonomy to generate its “program-to-occupation” crosswalks, which are instrumental for highlighting the extent to which the supply and demand of certain occupations varies by geographical footprint. Occupational data are drawn from the Standard Occupation Classification (SOC), which classifies workers into 867 “detailed” occupations, 459 “broad” occupations, 98 “minor groups,” and 23 “major groups.”¹⁷ The CIP-SOC crosswalk is perhaps most useful for Analyst clients (see below). IPEDS data are comprehensive in scope and enable comparisons by institution, but are self-reported, lagged by a year, and do not include information on non-traditional programs, including online offerings.

U.S. Department of Health and Human Services. HHS is an executive agency concerned with protecting the health and services of Americans. Emsi pulls data from the National Center for Health Statistics (NCHS), which is located within the Centers for Disease Control and Prevention (CDC), an agency of HHS. Emsi specifically pulls birth and mortality rates from NCHS and uses these data to model population counts and growth (i.e., addition using birth and subtraction using mortality).

¹⁷These SOC counts differ slightly from those posted on Emsi’s website and reflect the counts published on the O*NET-SOC Taxonomy website (<https://www.onetcenter.org/taxonomy.html>).

Private sources. Emsi subscribes to DatabaseUSA to supplement its information about businesses, which it presumably uses to confirm existing job postings metadata or impute missing information during enhancement. While Emsi doesn't go into great detail about how it uses this vendor, Emsi likely subscribes to its "Business Database," which includes a range of indicators for more than 14 million businesses. These include geographic indicators, business type, Standard Industrial Classification (SIC) and North American Industry Classification System (NAICS), sales volume, and firm size.

Job Postings. Emsi scrapes data from more than 100,000 websites (seemingly twice as many as BGT) to collect postings from more than 1.5 million companies. The company uses a machine learning approach (e.g., a "trained" algorithm) to deduplicate postings even if duplicate postings are not identical. Emsi does this for each posting as well as over time to ensure that an expired posting is not appearing in its data as a new one. A posting is considered expired when none of its postings over time is active, yet postings are reintroduced if a new, similar posting occurs within six weeks after expiration. Emsi "enriches" postings by assigning additional information based on machine learning text analysis. For example, the company will assign a formal firm name, required education level, employment type (part- or full-time), required experience, salary, desired skills, and whether remote work is possible—all based on analyzing keywords in the posting. Frequently it's clear how the metadata field will be populated, but sometimes Emsi's machine learning algorithms make assumptions about an imputation. Still, the company believes its approach results in job postings metadata capture and imputation that is highly accurate.

From the data assigned to job postings, Emsi creates formal analytic indicators called Job Posting Analytics (JPA). For example, JPA Education Level categorizes whether a firm's desired education level is preferred, required, or negotiable, and how many different attainment levels might align with these preferences. Another example, JPA Minimum Experience Required, would let subscribers know precise baseline years required or ranges of years.

Social Profiles. According to Emsi, "Profiles are scraped from publicly available information from the web, third-party resume databases and job boards, the recruiting industry, opt-in data

from employers and applicant tracking systems, sales and marketing CRM databases, and various consumer/identity databases.” The company does not provide additional information about its approach to scraping social profiles. Emsi does note, however, that it has aggregated more than 100 million U.S.-based and 400 million global social profiles to power the company’s Workforce Insight product. While this product appears to be promoted across Emsi’s five business units, its postsecondary application includes identifying the geographic movement of university alumni (assuming alma mater is included in social profiles).

Other sources. Emsi uses data from the U.S. Postal Service and Oak Ridge National Laboratory to refine its geographic indicators. It also uses a wide range of state-level sources to add more granularity to information that comes through federal sources.

Figure 2: Emsi's U.S. Data Sources



U.S. DEPARTMENT OF COMMERCE

Bureau of Economic Analysis

State Personal Income and Employment (SPI)
 Local Area Personal Income and Employment (LPI)
 National Income and Product Accounts (NIPA)
 Annual Input-Output (I-O) Accounts
 Benchmark Input-Output (I-O) Accounts
 GDP by State

U.S. Census Bureau

American Community Survey (ACS)
 County Business Patterns (CBP)
 ZIP Code Business Patterns (ZBP)
 Nonemployer Statistics (NES)
 Quarterly Workforce Indicators (QWI)
 OnTheMap (OTM)
 TIGER/Line File (with additions by DM Solutions Group)
 Population Estimates
 U.S. National and State Population Projections
 Census 2000 & 2010 Summary Files
 Census of Government – State and Local
 Government Finances by State
 Journey-to-Work (JtW)
 Consumer Expenditures Survey (CEX)
 Current Population Survey (CPS)
 Commodity Flow Survey (CFS)



U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICE

National Center for Health Statistics
 Health, United States



U.S. DEPARTMENT OF LABOR

Bureau of Labor Statistics

Quarterly Census of Employment and Wages (QCEW)
 Current Employment Statistics (CES)
 Local Area Unemployment Statistics (LAUS)
 National Industry–Occupation Employment Matrix (NIOEM, 10-year, current/projected)
 Occupational Employment Statistics (OES)
 Occupational Education and Training Projections

Employment and Training Administration (ETA)

Characteristics of the Insured Unemployed (CIU)
 National O*NET Consortium, O*NET Production Database

Wage and Hour Division

Minimum Wage Laws in the States



OAK RIDGE NATIONAL LABORATORY

County-to-County Distance Matrix (Skim Tree)



U.S. DEPARTMENT OF EDUCATION

National Center for Education Statistics

Integrated Postsecondary Education Data System (IPEDS)
 Office of Educational Research and Improvement for the CIP – SOC crosswalk, Classification of Instructional Programs Crosswalk to Standard Occupational Classification
 Common Core of Data



U.S. RAILROAD RETIREMENT BOARD

Annual Railroad Retirement Act and Railroad Unemployment Insurance Act Statistical Tables



U.S. POSTAL SERVICE

Address Information Systems (AIS) Products, Delivery Statistics
 USPS Delivery Statistics
 USPS City State Product

PRIVATE SOURCES

DatabaseUSA.com
 Creators of the Finest Databases Since 1972



STATE SOURCES

In addition to our federal sources, we use state-level industry projections produced by all 50 states.

JOB POSTINGS

Our job posting analytics are scraped from the web, aggregated, and restructured into a single dataset. We scrape tens of thousands of sites to compile our job posting data. On a given month, this consists of scraping between 6-8 million unique active postings from more than 90,000 companies.

SOCIAL PROFILES

Profiles are scraped from publicly available information from the web, third-party resume databases and job boards, the recruiting industry, opt-in data from employers and applicant tracking systems, sales and marketing CRM databases, and various consumer/identity databases.

Source: <https://www.economicmodeling.com/data-sources>

2.2.2 Products and Services

Table 2 summarizes Emsi target markets and core products it promotes to each.

Table 2: Emsi products and target markets

	Higher Education	Enterprise & Staffing	Economic Development	Workforce Development	Real Estate
Analyst	✓				
Career Coach	✓			✓	
GoRecruit	✓				
Alumni Outcomes	✓				
Economic Impact Study	✓				
Skills Match*	✓				
Resume Optimizer*	✓				
Diversity Snapshot*	✓				
Skillabi	✓				
Talent Analyst		✓			
Emsi Global		✓			
University Recruiting		✓			
Developer			✓	✓	✓
Advanced Analytics			✓	✓	
Business Engage			✓		
Emsi API			✓	✓	

Note: Checks indicate products that are actively marketed to sectors on the company’s website and do not imply that other services are not also marketed. An * indicates products or features that were promoted through recent webinars or other promotional materials. It remains unclear whether they are merely features in existing products or new products altogether. Source: <https://www.economicmodeling.com>.

Analyst. This product uses labor market data to develop programs and refine them to meet the needs of local businesses; Includes industries, occupations, job postings, skills, programs, and demographics; includes Program Demand Gap Analysis (PDGA), which may also be called Program Alignment.

Career Coach. IHEs use Career Coach to introduce students to data-driven programs and careers; students can create profiles and complete self-assessments. The product uses CIP-to-O*NET crosswalks to connect programs and careers.¹⁸ Clients can explore careers using the

¹⁸CIP is Classification of Instructional Programs (<https://nces.ed.gov/ipeds/cipcode/resources.aspx>).

product internally or integrate it into existing platforms as a user-facing app.¹⁹

GoRecruit. GoRecruit is designed to show recruits how well alumni are doing in the job market in order to motivate them to matriculate. The product includes employing companies, occupations, job outlooks for alumni, skills listed in alumni profiles, geographic distribution, job titles, percentage working in field of study, and average salaries.

Alumni Outcomes. This product promotes institutional success stories by highlighting alumni achievement in ways that alumni surveys and phone calls can't necessarily accomplish (due to poor telephone response rates or responses that suffer from social desirability bias).

Economic Impact Study (EIS). IHE leadership members, in particular, use the EIS to unpack an institution's return on investment (ROI), especially when the time comes to defend program proposals or claim credit for program successes. The EIS includes two parts: (1) Economic Impact Analysis and (2) Investment Analysis.

Skills Match. Skills Match is designed to serve adult and lifelong learners by (1) collecting inventory of skills, (2) matching to potential careers, (3) discovering which institutional programs are best fit for them, and (4) help with job placement. Skills Match is powered by Emsi's Skills Library, which—like BGT's skills library—includes roughly 30,000 skill. Figure 3 displays the type of information available for individual skills (e.g., related skills, job postings, demand by company, job posting trends, and live job postings).

¹⁹For an example of how colleges can integrate this product, see Lee College's Career Coach site: <https://lee.emsicc.com>.

Figure 3: Emsi Skills Library Example (Gamification)



Gamification

KS1246K6YCP1HY2RSGFC

Gamification is the application of game-design elements and game principles in non-game contexts. It can also be defined as a set of activities and processes to solve problems by using or applying the characteristics of game elements. Gamification commonly employs game design elements to improv...

[Read more on Wikipedia →](#)

Have feedback on this skill? Let us know.

Related Skills (How does Emsi define a skill?)

Adobe Captivate

Camtasia Studio

Instructional Design

Job Postings Data

Top Job Titles		Top Companies Posting	
Title	6-Month Postings	Company	6-Month Postings
Software Application Development Engineers	572	Oracle Corporation	1,507
Instructional Designers	331	Computer Task Group, Incorporated	215
Product Applications Managers	252	Deloitte LLP	94
Application Developers	233	Amazon.com, Inc.	88
Software Application Developers	214	Capital One Financial Corporation	36

Job Postings Trend



↔ Job Postings

Live Job Postings

Salesforce Marketing Cloud Consultant

Jacksonville, FL

5 days ago

Marketing Analyst

Tech Inc

Westlake Village, CA

6 days ago

Event Facilitator

Keep Truckin, Inc.

San Francisco, CA

6 days ago

Source: <https://skills.emsidata.com/skills/KS1246K6YCP1HY2RSGFC>

Resume Optimizer. Resume Optimizer is designed for students to evaluate the relevance of their skills in the labor market of interest. This product was first presented at a 2020 Emsi College Recruiting webinar. (Note: this product resembles Skills Match along a number of dimensions.)

Diversity Snapshot. This product presents diversity data benchmarks and statistics across different universities (also presented at the 2020 Emsi College Recruiting webinar)

Skillabi. From the vendor’s 2/17/21 news release: “We translate your course content (learning outcomes, syllabi, etc.) into work-relevant skills that are recognized and valued by employers. This translation (i.e., skillification) enables a direct apples-to-apples comparison of the skills taught at your institution and the skills sought by employers (and the learners who want to work for them).”

Emsi Skills API. In the education space, Emsi’s API is used to (1) connect student interests to programs and careers, (2) generate career data on program pages, and (3) push data to internal dashboards and provide data points for research reports.

Emsi’s API appears to be a potentially attractive product for higher education administrators.²⁰ By implementing an API, users can effectively draw from the same data sources they might already use in products like Analyst and Career Coach. If university IT staff have the technical skills to implement an API, they can pull data from Emsi’s servers and use it to populate the university’s own custom dashboards, for example. The company identifies three API use cases (Doyle, 2019):

1. Connect student interests to programs and careers. This approach helps students browse careers by salaries, education required, and in-demand skills. It is generally used after students complete an interest assessment.
2. Post career data on program pages. This is generally used to market programs to potential enrollees or as a way to encourage current students to persist in a relevant program.

²⁰API technical documentation: <https://api.emsidata.com/apis/skills>.

3. Internal dashboards and research. This feature is designed for decision-makers who share internal metrics with various audiences or who require data to bolster financial arguments.

Applied Research. Like BGT, Emsi maintains a library of research reports that, beyond case studies, highlight broader insights that related to its products and the data these products both use and generate. Reports typically conclude with a product pitch. The bulleted list below summarizes some of Emsi’s applied research that relates to postsecondary institutions.

- *Overcoming Barriers to Enrollment With Data (5 Strategies)* ([Verougstraete, 2021](#))—This report identifies emergent themes related to enrollment during the Covid era and strategies for leveraging these themes. The key themes include students questioning higher education’s return on investment (ROI) and students demanding higher quality career supports. The five recommended strategies are to (1) embed real-time LMI on program pages, (2) align student career interest with academic programs, (3) help students identify skill gaps and bridge them, (4) publicize employment outcomes for actual graduates, and (5) discuss programming in terms of ROI. The report closes by arguing that Emsi data can help IHEs navigate enrollment challenges and optimize these strategies.
- *Degrees at Work: Examining the serendipitous outcomes of diverse degrees* ([Coffey et al., 2019](#))—This report aims to connect college major and labor market outcomes by examining graduates’ first few jobs after college. The analysis uses millions of professional profiles to show how majors from six disciplines navigate the labor market. Main findings: language and philosophy majors tend to start and remain in the education sector; social sciences majors and business majors are most likely to start and remain in sales; communications majors tend to start in marketing and end up in journalism or public relations; engineering majors and information technology majors are most likely to start and continue working in their designated fields. The report also provides details on how skills and wages are distributed along the early career pipeline. The paper concludes that seemingly irrational career paths—based on college major, at least—make more sense in the context of skill development and wage demand.

- *Robot-Ready: Human Skills for the Future of Work* (Weise et al., 2018)—This report leverages 106 million social and professional profiles, Strada survey results, and administrative data (e.g., IPEDS, ACS, and OES) to argue that while the future of work will demand “hard” skills (e.g., STEM), colleges should not emphasize them at the expense of “human” skills (e.g., those associated with the liberal arts). IHEs are not adjusting to this juxtaposition of these two skill sets and as a result, programs are “out of step with the changing needs of the economy.” Liberal arts graduates tend to have skill sets that are highly sought after in the labor market and colleges should work harder to cultivate “human” skills that include leadership, communication, and problem solving. In doing so, graduates will have success in an emerging marketplace that demands, for example, “agile and resilient thinkers who have a handle on digital literacies—basic technical skills like data analysis and digital fluency.”²¹
- *How Your School Affects Where You Live* (Sentz et al., 2018)—Emsi and the Wall Street Journal²² partnered to analyze more than 100 million resumes to build a database of student migration patterns based on school type. The report concludes that community college graduates stay closer to home, state university graduates tend to stay within state lines, and graduates of elite colleges travel the farthest—700 miles on average, and typically to large cities. As one might expect, graduates of schools that offer the majority of classes virtually live across the U.S. The report also found that more than 60% of graduates in five states—California, Florida, Georgia, Texas, and Washington—remained in those states. New Hampshire, Rhode Island, Vermont, West Virginia, and Wyoming retained the smallest percentages of graduates. Emsi highlights the Alumni Outcomes product for stakeholders interested in conducting similar analyses for their institutions.

²¹The Emsi case for Saddleback College <https://www.economicmodeling.com/2019/05/30/saddleback-college-proves-gainful-employment-of-liberal-arts-grads> provides evidence that community college graduates from a liberal arts program have sufficient skills to enter the labor market in lieu of transfer.

²²See WSJ’s *Where Graduates Move After College* for an early iteration of this analysis (<https://www.wsj.com/graphics/where-graduates-move-after-college>).

2.2.3 Fees

Emsi does not provide fee structures on its website or in promotional materials. The company did not respond to requests for product cost information.

Free products/services. Emsi highlights three products that are freely available. These are the Job Posting Dashboard (“Our free resource to help you navigate the economic impacts of COVID-19”), Resume Optimizer (“A skills-based solution to optimize your resume for the type of job that you want”), and the Emsi Skills Library (“A common language for people, education, and work”).

2.2.4 Covid-19 response

One key strategy Emsi has employed during the pandemic is to provide customized reports to community college administrators. The COVID-19 Program Response Report (PPR) addresses rolling 30-day job posting trends, how programs might respond to these trends, and a mapping of occupational indicators to aligned programs. The bread and butter of the Covid PPR are two proprietary indices: (1) the COVID Impact Index, and (2) the COVID Response Index. The Impact Index assesses changes in relevant job postings during the “pre-Covid” period (February) and the “Covid Impact Period” (March 15 to May 31, 2020). The Response Index compares postings during the “Covid Impact Period” and a third, “Covid Response Period” (June 1-present). Both indices are reported on an 11-point scale, where -5 represents a “very high decline” in postings with a change less than or equal to 100%, while a +5 represents “very high growth” in postings equal to or greater than 100%. These two extreme values bookend four separate values for growth or decline of varying severity, as well as a “no change” value. Figure 4 shows an example of a table provided in a Covid-19 PPR prepared for Idaho Community Colleges intended to provide a snapshot of the entire state. It shows Impact Index and Response Index values for 10 out of roughly 150 listed programs.

The company also promotes a more general “regional impact report” for colleges that covers many of the same indicators but does not link them directly to programs the way the PPR does. This more general report includes job posting activity, companies that have increased or

decreased postings, occupations with increasing or decreasing demand, in-demand skills, and the percentage of alumni working in occupations subject to a higher-than-average risk of disruption. Administrators can request this report free of charge.

Figure 4: Snapshot from a COVID-19 Program Response Report

CIP Code	Description	Weighted Average COVID Impact Index	Weighted Average COVID Response Index	Completions
40.0601	Geology/Earth Science, General	0.7	-5.0	5
01.0303	Aquaculture	-0.1	4.3	5
01.0199	Agricultural Business and Management, Other	-0.1	4.3	5
46.0415	Building Construction Technology	-0.9	-1.2	5
22.0001	Pre-Law Studies	-1.1	0.9	5
01.0000	Agriculture, General	-2.4	1.6	5
11.0101	Computer and Information Sciences, General	-3.0	-2.0	5
31.0505	Kinesiology and Exercise Science	0.0	0.0	4
01.0101	Agricultural Business and Management, General	0.0	5.0	4
45.0701	Geography	0.0	0.0	4

Source: “COVID-19 Program Response Report: Idaho Community Colleges (On the following region: Idaho)” (Emsi, 2020).

2.3 LinkedIn Economic Graph

LinkedIn does not appear to market its products and services directly to postsecondary institutions and nonprofits in ways similar to BGT or Emsi. The company’s Talent Solutions division—which appears to include the bulk of its products and services—markets mainly to human resources departments. Similarly, LinkedIn’s Business Solutions division, which includes four primary product areas—Hire, Market, Sell, and Learn—appear targeted to both HR departments and corporate leadership.²³ If LinkedIn does have a product that remotely resembles the suite of services marketed by BGT or Emsi, it is the LinkedIn Economic Graph. This idea—defined as “a digital representation of the global economy” (LinkedIn, 2016)—gained momentum following LinkedIn’s \$1.5 billion acquisition of online learning company Lynda.com in 2015. Today, the idea has morphed into a service that targets governments and NGOs to help them understand labor market dynamics. The Economic Graph team focuses on four major themes under its “Future of Work” umbrella: Emerging Technologies, Career Pathways, Entrepreneurship, and Global Economic Integration.

LinkedIn appears to be the only LMI firm that has partnered with the National Labor Exchange (NLx), an initiative of the National Association of State Workforce Agencies and DirectEmployers Association that collects job postings from USAjobs.gov and state workforce agency job banks.²⁴ NLx has posted more than 3 million such jobs to LinkedIn in an effort to boost job searches across workforce agencies via LinkedIn’s platform. At an NLx steering committee meeting in October 2018, the LinkedIn liaison reported that LinkedIn sent 2.4 million applications to NLx affiliates and that a higher proportion of NLx jobs on LinkedIn do not require a college degree (LinkedIn, 2018). The minutes also highlighted large boosts in social media traffic at the Minnesota Department of Employment and Economic Development, in particular. In a promotional brochure, Charlie Terrell, Director of the National Labor Exchange, NASWA

²³The closest reference I could find in LinkedIn’s documentation to its desire to serve the postsecondary education market appeared in its final annual 10-K filing before Microsoft acquired the company in 2016: “We believe our network’s ultimate potential is to develop the world’s first economic graph, a digital representation of the global economy. Manifesting this vision requires scaling across six key pillars: individuals in the workforce, companies, job opportunities, professional skills, higher education institutions, and professional knowledge” (LinkedIn, 2016).

²⁴For more information about the National Labor Exchange, see <https://usnlx.com>.

and WAPES representative, Americas, remarked that “LinkedIn and state workforce agencies share the same goal—connecting every person to economic opportunity. This partnership is helping us better deliver on that mission” (LinkedIn, 2018).

With respect to the array of products and services LinkedIn promotes, it’s not entirely clear how all the offerings under the “Workforce Data” umbrella align. These offerings are summarized below.

Data & Insights. The core product here appears to be research reports and dozens of postings on the affiliated blog.

Career Explorer. This product appears most similar to BGT’s Career Insight or Emsi’s Career Coach, but nowhere near as fully-featured or robust. The platform is hosted on GitHub and enables job seekers to save postings and identify opportunities that may overlap with user skills. Any particular job posting includes Skill Overlap and Skills to Build. It appears that both BGT and Emsi are much farther along in helping job seekers—in particular, students—identify skills gaps and relevant opportunities. On the other hand, this product appears free and reveals the exact number of postings available in any given city for any given occupational specialty. Like the skills APIs from other vendors, LinkedIn’s ballpark number of banked skills sits at 36,000.²⁵

Workforce Confidence Index. This index reports a “biweekly survey of LinkedIn members that measures how they feel about the job market, their financial statuses, and advancing their careers.” The index is currently limited to reports out of the U.S., Australia, India, and the UK.

LinkedIn Workforce Reports. This report provides information related to “hiring, skills, and migration trends in the US and India. Each report is divided into a national section with insights about big-picture trends, and a city section analyzing trends in 20 of the largest metro areas.”

²⁵LinkedIn hosts Career Explorer on GitHub: <https://linkedin.github.io/career-explorer>.

Skills Genome. In addition to BGT and Emsi, LinkedIn also maintains a database of skills called the Skills Genome, which presumably is used to power products like its Career Explorer.²⁶.

Labor market recovery tracker. This report is an index constructed from data sources drawn from the LinkedIn Labor Stress Index, Workforce Confidence Index, and job postings.

LinkedIn Labor Stress Index. This service “tracks the number of members who indicate on LinkedIn that they are out of work, actively seeking new jobs or signaling that they are open to new opportunities.”

²⁶See <https://engineering.linkedin.com/blog/2019/how-we-mapped-the-skills-genome-of-emerging-jobs>.

2.4 Handshake

Handshake is a relative newcomer to the networking space (founded in 2014) and appears to occupy terrain somewhere between LinkedIn and Indeed—but pursuing more advanced services that don’t yet include real-time LMI. In its promotional materials, Handshake calls itself “the number one site for college students to find jobs” (Handshake, 2020a). Students can create a profile—an .edu email is required—that is viewed by employers active in recruiting at relevant campuses. The company claims that more than 500,000 employers recruit and hire students from across 1,100 postsecondary institutions. Students create profiles on the Handshake app, which includes four primary modules: (1) Jobs (“Find internships and full-time jobs”), (2) Employers (“Discover the right company for you”), (3) Community (“Learn from alumni and students”), and (4) Events (“Register for events and career fairs”). The student-facing app also highlights jobs that are popular within one’s major, job postings that are going to expire soon, and—in the age of Covid-19—a schedule of virtual recruiting events. Employers can post jobs for free, but must subscribe to Handshake’s paid service (fees not publicly available) in order to unlock more than a dozen additional premium features.

The company actively promotes its services to college career centers, which suggests that it may one day compete with the likes of BGT and Emsi. Perhaps the most relevant system features and highlights designed for career centers include the ability within the app to capture students’ career interests, track career fair interest and attendance, and connect students with peers who share their interests (Handshake, 2020b). Section 3 summarizes a few case studies that Handshake highlights on its website. Handshake does not appear to have a suite of services comparable to that of Emsi or BGT, but the company does promote a “marketing toolkit” to career centers that showcases “how-to”s, including how to effectively use Handshake, how to promote career center activities, and how students can successfully promote themselves to prospective employers. I suspect the goal here is to eventually offer data analytic services to various postsecondary divisions—not limited to career centers. Of particular note is that Handshake highlights its value to enrollees of historically black colleges and universities (HBCUs) and Hispanic serving institutions (HSIs) (uncommon among other vendors) and community

colleges (fairly common). It's too early to tell whether Handshake will compete with Emsi or BGT, but the company's growing library of case studies, essays on data methodologies, and technical assistance suggests that it is closely following strategies employed by the more established firms.

2.4.1 Data Sources Underpinning Services

Bureau of Labor Statistics. Like BGT and Emsi, Handshake uses the BLS's SOC in order to create a "job roles" database.²⁷ Job roles consist of two columns of data: (1) the roughly 350 "job role groups" that Handshake staff have identified based in part on information collected from students and (2) the more than 8,000 specific job roles collected through the BLS's SOC taxonomy. Handshake promotes its job roles database to students, employers, and university partners. The company claims that a student's preferred job represents the strongest predictor of whether they apply for a certain job. Thus, university partners are encouraged to adopt Handshake's job roles lingo in order to boost the chances that career services staff help students find jobs—whether on or off campus—through the company's app. The company also wants students to internalize the language of job roles because when they search for jobs through Handshake's "career paths" module, they use job roles terms to identify their occupational area of interest.

²⁷The database is available for download in Handshake's Help Center: https://support.joinhandshake.com/hc/en-us/article_attachments/360042987774/Job_Role_Groups_in_Handshake_8.1.19.xlsx.

2.5 Indeed Hiring Lab

Indeed promotes itself as the world’s largest job search website with more than a quarter billion monthly visitors. The company appears to target both job seekers and employers. Seekers can freely access Indeed’s job portal and post their resumes. Employers can post jobs and search for resumes. Indeed—along with LinkedIn—have requested that firms like BGT and Emsi not scrape their websites for job postings, a request that at least Emsi publicly acknowledges.²⁸ Indeed’s Hiring Lab is an “international team of economists who provide insights that help drive the global labor market conversation.” More to the point, Hiring Lab appears to use its own job posting and resume data to derive insights about both job seekers and employers. In this regard, Indeed may have a comparative advantage over BGT and Emsi since it already has job postings data in-house. The lab’s core product appears to be publicly available reports, which number nearly 300 since 2016.

Like LinkedIn, the Hiring Lab does not appear to market any specific products to IHEs. However, some of its reporting does leverage internal Indeed data sources in order to shed light on labor market dynamics for college students and recent graduates. In this sense, Indeed’s reporting in some ways resembles BGT’s “Applied Research” reports or Emsi’s “Emsi Research” division. The following report summaries shed light on how Indeed uses its data to inform the sector:

- *Today’s Recent College Grads Prioritize Passion Over Pay* (Bunker, 2019)—Over a recent five-year period, recent college graduates were more likely to click on Indeed job postings that were categorized as jobs in the arts, design, entertainment, sports, and media. The results suggest that recent graduates may be gravitating away from traditional, higher-paying jobs—though the jobs increasingly in popularity still pay more than the median U.S. salary. This report displays how Indeed can use metrics like website clicks in ways that are not available to BGT or Emsi—thus enabling them to analyze certain job seeker behaviors.

²⁸According to Emsi, “[u]sers often ask about the absence of postings from LinkedIn and Indeed in Emsi’s job postings. Both sources have asked that their sites not be scraped for postings; therefore Emsi does not collect or display postings from either source.” (<https://kb.emsidata.com/methodology/job-posting-analytics-documentation>).

- *The Cities Attracting the Most College Graduates* ([Gimbel, 2018](#))—By leverage user search parameters, this report examines which metropolitan areas are best at attracting recent college graduates, focusing on the largest 50 metros. Large metros are best at attracting graduates, as well as poaching them from smaller metro areas. While large metros have more job postings, this report suggests that the success of larger metros is also a function of amenities, nightlife, and alumni networks. The main limitation of this report, compared with customized reports from BGT and Emsi, is its geographical coarseness.
- *High Demand, High Pay: 10 Opportunities for People Without College Degrees* ([Indeed, 2016](#))—Jobs that pay well and are fast growing are sometimes referred to as “opportunity jobs”—three-quarters of which go to individuals with at least a bachelor’s degree. But since 70% of Americans do not have a college degree, Indeed was interested in identifying complements to opportunity jobs. Using job posting data cross-referenced with federal occupational codes, the report identified high-paying, fast-growing jobs common for individuals without a degree. These jobs included commercial pilots, radiation therapists, and nuclear technicians. One could imagine that this information might be useful to community college stakeholders, whose graduates enter the workforce after earning an associate’s degree (assuming they do not transfer to a four-year institution). Still, insights like these do not appear targeted to IHEs and it is unclear whether Indeed has enhanced these types of analyses since publishing this report.

3 Demand-side use cases

This section summarizes a range of recent and relevant postsecondary use cases that include four-year institutions, community colleges, and online-only institutions. Four-year colleges appear to use contemporary LMI to develop new programs, boost enrollment, and promote economic impacts. Community colleges appear to use LMI for these same purposes, in addition to ensuring compliance with federal grant reporting requirements. The two online education providers were interested in mapping skills to course content in order to prioritize offerings. Some IHEs homed in on recruitment and used BGT or Emsi APIs to develop public-facing dashboards that highlighted data points that were of immediate interest to students and their families.

3.1 Use cases in BOOST states

A major motivation for this research was to learn how contemporary LMI firms partner with postsecondary institutions located in BOOST states. The Kresge Foundation’s Boosting Opportunities for Social and Economic Mobility (BOOST) initiative “strengthens partnerships between community colleges and human services nonprofits that connect people with low incomes in cities to critical human service supports and educational pathways that will help them climb the social and economic ladder. BOOST cities participate in a cohort-based learning community and seek to have impact at the program, organization and system level.”²⁹ In addition to its community college and nonprofit partners (see below), the initiative includes two strategic partners: Jobs for the Future and Equal Measure.

BOOST consists of seven partnerships across five states:

- Connecticut—In Hartford, Catholic Charities Archdiocese of Hartford is partnering with Capital Community College to provide academic supports, workforce services and social activities to 700 families at three family centers.
- Maryland—In Baltimore, the Center for Urban Families is working with BCCC to coordinate services for under- and unemployed fathers and their families and address barriers

²⁹To read more about the Kresge Foundation’s BOOST initiative, visit <https://kresge.org/initiative/boost>.

to social and economic mobility.

- New York—(1) In New York City, Onondaga Community College is working with PEACE to develop shared processes, jointly train staff and incorporate analysis on lifetime/springboard jobs in education and career advising and (2) in Queens, Commonpoint Queens is partnering with LaGuardia Community College to shift workforce development practices in the City University of New York system and at community providers.
- Oregon— In Portland, Portland Community College is partnering with Albina Head Start to expand career-focused education programs and holistic supports to more Early Head Start and Head Start parents.
- Wisconsin—(1) In Green Bay, Northeast Wisconsin Technical College is partnering with Forward Service Corp. to better support Green Bay residents accessing public assistance or the college’s basic needs supports and (2) Forward Service Corp. is partnering with Northeast Wisconsin Technical College to better support Green Bay residents accessing public assistance or the college’s basic needs supports.

Contemporary labor market firms have published a handful of case studies that highlight efforts in select BOOST states. They are summarized below.

3.1.1 Maryland

- *Prince George’s (MD) Community College (PGCC) partnered with Emsi in order to **identify skills gaps between programs offered and local employment demand.*** PGCC primarily uses Emsi’s Program Demand Gap Analysis (PDGA) to ensure that skills and competencies taught at college programs align with employment trajectories across the area—both in the county itself and surrounding regions. This information allows PGCC to promote different programs to different audiences in its marketing campaigns. For example, the PDGA showed that PGCC’s culinary arts program was a top-5 growth prospect, which reinforced the college’s decision to open its new Culinary Arts Center and enhanced an associated marketing campaign. Nassim Ebrahimi, associate vice

president for strategy, planning, and effectiveness at PGCC, leads this work.³⁰

- *University of Maryland Baltimore County (UMBC) partnered with Burning Glass in order to **identify new graduate program locations**.* UMBC’s Office of Professional Studies was considering whether to move a new program from Rockville to Baltimore, where enrollment might be stronger. Recognizing that a multitude of federal programs might help drive enrollment in the GIS program, UMBC considered Baltimore as a relatively safe relocation option, considering it was still in-state. However, BGT’s Labor Insight job postings data revealed that a considerable surplus of GIS-related jobs—more than 10% of the national total—originated in the Washington DC metro area. Compared with 1,200 postings in the DC area, Baltimore only had 97 relevant postings. Based on these job postings data, UMBC took the conservative step to keep the GIS program in Rockville and implement intensive courses options for commuter students. It also revised its marketing efforts to reach those industries placing the most ads, namely defense contractors and engineering firms. This effort was led by Christopher Steele, Interim VP for Professional Studies.³¹

3.1.2 New York

- *Rochester Institute of Technology partnered with Burning Glass 2019 to for **marketing purposes**.* RIT Online wanted to boost online graduate enrollments and believed that the best way to do this was to align labor market demand with career outcomes in a way that demonstrates return on investment. Thus, RIT Online effectively wanted to develop a data-driven marketing campaign to drive enrollment and used both Program Insight and Labor Insight to this end. In particular, RTI wanted to know whether three specific online programs—Business Analytics, Data, Science, and Applied Statistics—were sufficiently aligned. RTI Online followed a three step process: (1) identify and highlight skills demanded by employers for the three program areas under study, (2) identify those

³⁰Source: <https://www.economicmodeling.com/2018/07/02/prince-georges-community-college-uses-gap-analysis>

³¹Source: <https://www.burning-glass.com/labor-insight-case-study-university-maryland-baltimore-county>.
A more detailed account of the UMBC case is also available in Steele et al. (2013).

particular skills that offered salary premiums, and (3) show these data for adult learners and potential recruits. The school ultimately tailored a number of online programs to better align with labor market demand and trends. A noteworthy fact: RIT Online hired BGT after seeing its CEO, Matt Sigelman, speak at Association of Independent Technological Universities conference. The point person for this effort was RTI Online Director Thérèse Hannigan.³²

3.1.3 Wisconsin

- *University of Wisconsin Madison partnered with Burning Glass to **identify new opportunities for lifelong learners**.* UW Madison's Division of Continuing Studies wanted to measure the extent to which the university's 2020 strategic plan met the needs of lifelong learners. It wondered how it could develop programs and courses that serve lifelong learners and maximize enrollment while also aligning with labor market trends. UW Madison's current approach was to pull sources from BLS, NCES, and industry reports over 10-20 hours before analyzing the data for up to two weeks. By using Labor Insight, the division reduced research time and costs and in turn, developed new programs, adjusted costs, and enhanced branding. One major product that followed from BGT data was the development of a series of infographics that updated program-relevant data points, such as average salaries, job trajectories, and relevant skills. The partnership was led by David Giroux, who formerly directed the university's Division of Integrated Marketing Communications.³³

3.2 Community colleges

- *Coastline Community College partnered with Emsi to **conduct an Alumni Outcomes study**.* CCC wanted to overcome the limitations associated with collecting alumni data through phone and email surveys. It used Alumni Outcomes to match its graduate records against Emsi's 100 million online profiles, which resulted in a user-facing Tableau dash-

³²Source: <https://www.burning-glass.com/case-studies/labor-insight-case-study-rit>.

³³Source: <https://www.burning-glass.com/labor-insight-case-study-university-of-wisconsin-madison>.

board. The ultimate audiences included faculty who were interested in the longer term outcomes of their students and applicants who were interested in how alumni from programs of interest were faring in the labor market. CCC was particularly interested in highlighting employment- and wage-based equity gaps for its largely minoritized student body. Similar to peer institutions that use Emsi data for Perkins V compliance, CCC uses its data to help complete NSF and DOE grant applications. Aeron Zentner, Dean of Institutional Effectiveness, led the development of CCC's dashboards.³⁴

- *Columbus (OH) State Community College (CSCC) partnered with Emsi in 2018 in order to **close the manufacturing skills gaps with local employers***. CSCC's Modern Manufacturing Work Study program has emerged as a significant source of skilled labor for large regional employers like Honda. The CSCC team uses Emsi's Analyst program to forecast job growth trajectory and then use this information to refine the program's curriculum. In one such example, CSCC replaced welding with industrial sterilization in the curriculum when a large pharmaceutical company signaled its demand for the latter skill. The effort is led by Jeff Spain, supervisor of workforce innovation at CSCC.³⁵
- *Columbus (GA) Technical College (CTC) partnered with Emsi in 2019 in order to **market to stakeholders how CTC programs and graduates meet employer demand***. Jamie Loyd, VP of economic development for CTC, is often called to present data to business and communities across the Columbus region, especially as a county that borders Alabama. He uses Emsi's Analyst and Developer products to identify occupations relevant to local businesses and analyze the region's relative competitiveness.³⁶
- *Dallas County Community College District (DCCCD) partnered with Burning Glass to **revise old programs and create new ones***. DCCCD's Eastfield College (one of seven in the system) used federal Carl D. Perkins grant funding to purchase BGT's Labor Insight specifically for its Labor Market Intelligence Center (LMIC). LMIC enabled Eastfield to

³⁴Source: <https://www.economicmodeling.com/2020/10/07/coastline-college-alumni-outcomes>.

³⁵Source: <https://www.economicmodeling.com/2019/02/13/columbus-state-community-college-and-industry-partnership>. The CSCC case is also cited in Emsi's "Manufacturing is Not Dead" report (Saleh et al., 2018).

³⁶Source: <https://www.burning-glass.com/case-studies/labor-insight-case-study-dallas-county-community-college>.

pinpoint local labor market demand for skills, identify trends, and determine whether program requirements were relevant. In the end, Eastfield was able to justify course expansions to DCCCD leadership and form collaborations with various local industry partners.³⁷

- *Grand Rapids (MI) Community College (GRCC) partnered with Emsi to **measure the economic impact of non-credit bearing workforce development programs***. Non-credit bearing programs do not offer a convenient proxy for administrators to use in calculating return on investment. For credit-bearing courses that boost human capital, knowledge, and experience, administrators can simply count credits. But without credits, systems must be creative. For GRCC, Emsi used its data to estimate wages for graduates of non-credit bearing programs over the past three decades. This work led to a per “credit hour equivalent” (CHE) return of \$158. Adjusting for migration, retirement, and unemployment, Emsi found that alumni of GRCC’s non-credit programs contributed \$129 million to the Greater Grand Rapids economy and argues that the presence of GRCC, in part, leads to companies investing roughly \$300 million annually.³⁸
- *Illinois Eastern Community Colleges (IECC) partnered with Emsi to **prepare its Perkins V comprehensive local needs assessment (CLNA)***. As the June 2000 Perkins V application deadline approached and the pandemic was forcing IECC to pivot in a number of unexpected ways, IECC’s System Office was searching for new data sources to ensure compliance. The college system used Analyst to collect more relevant, geographic labor market data. Since IECC is north of Chicago, geographic snapshots tend to skew its data due to the inclusion of Chicago-area data. Emsi’s Analyst helped IECC collect more granular data in a dashboard format. Specifically, IECC used Analyst’s “occupation tables” to develop its own “CLNA emerging occupation table” and “CLNA growing occupation table” to use for submitting its Perkins V application. This effort was led by Brandon Wegner, Program Director of Institutional Assessment & Effectiveness at IECC.³⁹

³⁷Source: <https://www.burning-glass.com/case-studies/labor-insight-case-study-dallas-county-community-college/>

³⁸Source: <https://www.economicmodeling.com/2019/06/12/grcc-measures-non-credit-impact>.

³⁹Source: <https://www.economicmodeling.com/2020/11/10/perkins-v-and-the-clna-iecc-meets-new-requirements>.

- *Lee College (TX) partnered with Emsi in 2019 to **reduce the number of unnecessary credits earned by students on their way to degree attainment.*** Community college students typically earn a surplus of credits required for graduation, which can increase their time to degree and lead to misallocations of federal financial aid awards. Lee College used Emsi’s Career Coach as the backbone to its “Learning Frameworks” course—part of a larger quality enhancement plan (QEP)—which helps point students to relevant career paths. The course activities include Career Coach’s Career Assessment and results in student zeroing in on five potential pathways. Lee also uses Career Coach to inform its Guided Pathways initiative.⁴⁰
- *McLennan Community College (TX) partnered with Emsi to **ensure compliance with federal Perkins implementation.*** To do this, MCC conducted a Program Demand Gap Analysis (PDGA) and environmental scan to show how well its programs aligned with the local supply and demand for high-growth, high-wage. This work was a necessary component of MCC’s comprehensive local needs assessment, successful completion of which determined how much Perkins funding the college would receive. Specifically, the Emsi analyses compared program completers with job openings at MCC and peer institutions to help MCC determine which programs should be expanded and which should be retired or merged. Emsi also developed an economic impact study for MCC to share with donors, employers and industry groups to show how each graduate contributed nearly \$9,000 to the local economy.⁴¹
- *NorQuest College (Canada) partnered with Emsi to **develop new programs to address weak employment rates.*** NorQuest launched a new strategic plan, IMAGINE 2025, that proposed doubling student enrollment and accelerating program development. In order to successfully propose new programs in the province of Alberta, colleges and universities must use comprehensive labor market data to justify their selections to the Ministry of Advanced Education. NorQuest used Emsi’s Analyst program to identify the extent to which local employers demand the skills developed in the college’s proposed of-

⁴⁰Source: <https://www.economicmodeling.com/2019/09/03/lee-college-helps-students-set-goals-and-stay-on-t>.

⁴¹Source: <https://www.economicmodeling.com/2020/09/09/mcc-perkinsv>.

ferings. NorQuest build Analyst data into its 7-step “Fast Track” program development framework in order to accelerate proposals for 50 programs—21 of which it ultimately developed and 16 of which it launched before the pandemic struck. Angharad Hong Brown, NorQuest’s Manager of Program Development, led this effort.⁴²

- *Sierra Community College District (CA) partnered with Emsi in 2019 in order to **apply a data-driven equity lens to its Guided Pathways strategy**.* Sierra uses Emsi’s Career Coach product to help current and prospective students identify where they are on the college’s “career development continuum”—whether career exploration (undecided), career confirmation (somewhat decided), or career preparation (fully decided). The overarching goal was to relieve the burden of faculty and counselors and to empower students to identify potential programs of interest. Shannon Wells, Career & Transfer Connections Manager, is a point person for this effort and presented this initiative at Emsi’s 2019 user conference.⁴³
- *Waubensee Community College (IL) partnered with Emsi in 2018 in order to **align local labor market conditions with program offerings**.* To do this, WCC and Emsi conducted a Program Demand Gap Analysis (PDGA) to show the extent to which certificate and AA degree programs aligned with demand, growth, and wages. The PDGA convinced WCC to expand technology-based programs, paralegal training, and infrastructure for CTE programs. It also demonstrated that despite the high demand for occupational therapy in the region, it would be prohibitively expensive for WCC to currently offer the course given requirements from the main occupational therapy professional association. The initiative was led by Toni Ford, WCC’s CTE coordinator.⁴⁴

3.3 Four-year colleges

- *California Baptist University partnered with Burning Glass to **reduce declining enrollments and streamline/launch programs**.* CBU’s Division of Online & Professional

⁴²Source: <https://www.economicmodeling.com/2020/12/02/norquest-college-fast-tracks-program-development>.

⁴³Source: <https://www.economicmodeling.com/2019/10/14/sierra-college-career-coach>.

⁴⁴Source: <https://www.economicmodeling.com/2020/01/22/wcc>.

Studies (OPS) used Program Insight to reverse declining liberal arts enrollments by better aligning programs with labor market trends. It asked “Is program content (1) relevant and (2) does it produce in-demand skills?” It worked toward this goal using three strategies: (1) reduce time to review/audit programs, (2) align curricular content with labor market demand, and (3) launch new, “market-aligned” programs. This data-driven approach led it to reduce research burden through the use of a dashboard (from 4-12 months to weeks) and an increase in revenue by roughly \$5m over two years through the launch of 15 new programs. The effort also compelled CBU to merge its Public Relations and Communications programs and create a new Master’s degree in Strategic Communication. This effort was led by Dirk Davis, Associate Vice President of Academics.⁴⁵

- *California State University, Dominguez Hills (CSUDH) partnered with Emsi in 2020 in order to **help students identify relevant skills**..* CSUDH was an early adopter of Skills Match, which is powered by Emsi library of roughly 30,000 skills. The college developed an activity (see Figure 5 that helped students identify skills through Emsi’s Resume Optimizer. Students reviewed extracted skills and determined the extent to which they aligned with career goals. Students then entered relevant skills into Skills Match to identify careers, job trends, and live postings. Krystal Rawls, who works in CSUDH’s institutional research division, credits the skills library and related products with boosting student engagement.⁴⁶

⁴⁵Source: <https://www.burning-glass.com/case-studies/program-insight-case-study-cal-baptist>.

⁴⁶Source: <https://www.economicmodeling.com/2020/12/17/increasing-student-engagement-with-skillsmatch>.

Figure 5: CSUDH's Skills Development and Student Engagement Activity



STRATEGIC WORKFORCE PLANNING WITH SKILLS MATCH 101

This activity will allow you to explore degree programs and career opportunities while exposing you to skill language used by industry professionals. Skills Match is a planning tool which puts the power of informed decision-making at your fingertips.

Go to the CSUDH Skills Match page at csudh.emsiskills.com and watch the short video:

Skills Match Overview (1:50)

Follow these steps and create an account using your csudh.edu email address to save your results. Exploring 100+ Bombay competitors this is all you are required to do! Why stop here?

1. Your goals: Explore new career paths (5-15 minutes)
 2. Find opportunities based on your skills
 - a. Education
 - i. Select level (ex. BA)
 - ii. Select area (ex. Business, Mgt, Mkt)
 - iii. Select degree status (ex. In progress)
 - iv. Click button "add to my education"
 - b. Click button "continue to skills"
 3. Resume
- If you do not have a resume. Not a problem. Skip this step.

SKILLS MATCH ACTIVITY

Have you used the Resume Optimizer tool at skills.emsistdata.com?

That tool can help prepare a well-structured resume for use with the Skills Match tool! Strategy means engaging all the steps needed to develop an outcome. Oh, you did that already. Oh, go to the next step.

- i. Click and paste your resume into text box
- ii. Click "extract skills" button
- iii. Select each skill and choose either "I have" or "I want"
- iv. Make sure you click the arrow pointing toward the right to make sure you can see all the skills
- v. When you are done selecting skills, click save and return to skills overview
- c. Category

If you have not selected a major yet do NOT skip this step. If you have a major, then you can skip this step if you need to save time. The more information you include the better your results.

Have you used the Cal State Pays tool at calstatepays.org?

That tool can help provide field considerations to use with the Skills Match tool! Strategy means engaging all the steps needed to develop an outcome.

- i. Select category (field you would like to consider like Business and Finance)
- ii. Select sub-category. This is a concentration in your field.
- iii. Again, click on each skill and decide if it is a skill you have or that you want.
- iv. Do not forget to click the more arrow!
- v. When you are done selecting skills, click save and return to skills overview
- d. Job title

If you do not yet know which jobs you might apply for, you can skip this section. Later in your journey you will have an opportunity to add information to this organizer.

You can use the Cal State Pays tool here as well

That tool can help generate industry titles you can use with the Skills Match tool! By now, you understand the strategy! Use all your talents and resources to develop a strong plan of action.

- i. If you have identified a job title you might like to explore, enter the position title in the box provided.
- ii. click on each skill and decide if it is a skill you have or that you want.
- iii. Do not forget to click the more arrow!
- iv. When you are done selecting skills, click save and return to skills overview
- v. Click the button "done adding skills"
- vi. A pop-up window will appear, offering you more skills to explore. Decide if you want or have them. Use the more arrow if you want to see more skills!
- vii. Click the button "done adding skills"

SKILLS MATCH ACTIVITY

YOUR MATCHES

Scroll down the page to explore your matches. The match is based on skills you want and have using a 1- to 5-star rating system. More stars indicate you have already begun preparing for that career! Select the "view details" link for more information.

Top In-demand Skills

Grid view vs List view is really a matter of personal taste. You can click on the "Grid - List" button to switch views. The grid view offers you a look at your skill intensity with orange squares indicating skills you want and green circles indicating skills you have. The list view offers the same icons but within a text box which also includes the name of the skill. If you are not familiar with a skill in the list view, you can click on it and select the "info" icon. This will take you to a page that not only gives you a definition of the skill, but it also tells you:

- Other related skills
- Top job titles that use that skill
- The top companies posting jobs for employees with that skill
- How many jobs were posted for that skill in the LAST 6 MONTHS
- Job posting trends and even live job postings

Educational Opportunities

This time, you have two views that give you access to different levels of information. If you want to identify programs to apply to then you will select "programs". If you are already enrolled and have selected a major, perhaps you are looking for "courses" that will help you build skills needed for a particular job.

Job Postings

You can input a zip code close to where you live, where you want to work, or even close to the school. The job posting areas lets you search job postings using the skill information that you selected earlier. This gives you a great deal of information to assist in planning for your career. This is a lot of information however you are not alone. The Career Center, the Workforce Integration Center, University Advising, and Student Life are all departments on campus that will help you navigate this plan!

EXTRA CREDIT

Please complete the survey to receive extra credit for a class, participate in the competition, or indicate interest in the Workforce Integration Institute inaugural cohort: baselinecampuslets@csudh.edu



Source: "Skills Match Activity: Strategic Workforce Planning with Skills Match 101" (<https://www.economicmodeling.com/wp-content/uploads/2020/12/CSUDH-SkillsMatch-Activity.pdf>).

- *James Madison University (VA) partnered with Handshake in 2020 in order to embed job feeds on departmental websites..* JMU wanted to enable students to easily find job postings that closely aligned not only to their career interests but to keywords that a range of stakeholders could contribute to the search process. The college convened five stakeholder groups—faculty, the career center, information technology, communications, and the president’s office—to identify relevant keywords that would facilitate relevant job feeds on departmental websites. The 22-month process culminated with 424 total feeds that Handshake credits with boosting job application rates, total logins, and career center page views within the app.⁴⁷
- *Northeastern University (MA) partnered with Burning Glass in 2010 in order to identify sites for new online and hybrid programs.* In 2009, Northeastern’s Office of Strategy and Market Development was deciding where it should invest in program growth. It wondered where to launch new programs, how to design new curricula, where to market, and which potential industry partners to engage. BGT’s Labor Insight product helped

⁴⁷Source: <https://learn.joinhandshake.com/career-centers/embedding-job-feeds-on-departmental-websites-wi>

Northeastern identify skills and education levels demanded by regional employers. The office ultimately decided to launch a suite of degrees and certificates in the data sciences; enhance its legal studies offerings; launch satellite campuses in Charlotte, Seattle, and Silicon Valley between 2011 and 2015; and recruit in new markets, such as health research in Atlanta and cybersecurity in the Bay Area.⁴⁸

- *Northern Illinois University partnered with Burning Glass to **help students develop individual career plans***. NIU's Graduate Career and Professional Development Office noticed that few NIU graduate programs used data to identify relevant career paths for students. It used Program Insight and Labor Insight to develop a course that helped student identify their skills, develop professional development goals, connect with alumni, and prepare for the job market. Prior to launching the data-driven course, student were not aware of how their skills and interests aligned with local labor market demand for these skills and interest. Using BGT's skills taxonomy, students could visualize through custom dashboards how their skills ranked across different industry groups. The most important outcome appears to have been increased student engagement in career planning. The course was led by chemist Gary Baker and education scholar Elizabeth Wilkins.⁴⁹
- *Purdue University (IN) partnered with Burning Glass to **boost the percentage of in-state online learning enrollees***. Purdue Online noticed that while more than half of online learners came from in-state (Venable, 2020), a majority of Purdue's online students enrolled from out of state, which suggested that course offerings should offer more diverse content. Purdue Online was concerned that local enrollment was down because its programs appealed to a national audience. While this is great in principle, it limits the relevance of its programs to local labor markets. It theorized that the years required to develop new programs resulted in the university being less innovative and nimble when it comes to launching programs. Using Program Insight dashboards that included information on skills, salaries, and industry projections, Purdue Online shortened its program

⁴⁸Source: <https://www.burning-glass.com/labor-insight-case-study-northeastern-university>.

⁴⁹Source: <https://www.burning-glass.com/case-studies/labor-insight-case-study-northern-illinois-universi>

development process from three years to just over a year.⁵⁰

- *Slippery Rock University (PA) partnered with Burning Glass to **provide career coaches with real-time labor market data.*** Slippery Rock’s Office of Career Education and Development hoped to provide career coaches with a better sense of jobs and in-demand skills in order to help recruit prospective students and advise graduating students who were entering the labor market. With Labor Insight, career coaches were able to identify for prospective and existing students which skills were most rewarded by local employers. These coaches were the first point of contact for many students before they met with their academic advisors to enroll in courses. Labor Insight helped coaches advise graduating students about which skills to highlight on their resumes and online profiles. Slippery Rock credits this use of labor market data with boosting its retention rates over the past few years. The effort to provide coaches with data was led by John Rindy, Slippery Rock’s Director of the Office of Career Education and Development.⁵¹
- *University of Illinois partnered with Emsi to **assess the labor market demand for new programs.*** Adam Fein, assistant provost for educational innovation, leads this work and primarily uses Emsi’s Analyst platform to measure the programming activities at peer institutions and uses a traffic-light indicator system, where green indicates there is healthy demand for a new program and peer institutions are not meeting that need, while red suggests that peers are active in a programming area with little demand—therefore, UI should not proceed. Fein uses Emsi data at the start of his program review process, and then enlists groups like Boston-based Eduventures or DC-based EAB as research into new programs continues.⁵²
- *University of Louisiana at Monroe partnered with Emsi to **conduct an Economic Impact Study.*** UL-Monroe set out to learn the extent to which the university con-

⁵⁰Source: <https://www.burning-glass.com/case-studies/program-insight-case-study-purdue-online>. Note that Purdue Online is a Burning Glass client and Purdue University Global (PG) is an Emsi client. PG is one of three distinct online initiatives of the larger land-grant university, along with Purdue University Fort Wayne and Purdue University Northwest.

⁵¹Source: <https://www.burning-glass.com/labor-insight-case-study-slippery-rock-university>.

⁵²Source: <https://www.economicmodeling.com/2018/06/28/upcea-webinar-series-university-of-illinois-recap>.

tributed to the regional economy. The university believed that this information would signal to local stakeholders—business owners, families, taxpayers—why they should care about UL-Monroe, whether or not they are directly affiliated. The university worked with Emsi economists to quantify the how much the university contributed to the northwest Louisiana’s economy, ultimately arriving at a figure of \$567 during the 2017-18 academic year. The university subsequently used this information as part of its “Your University” public awareness campaign. The EIS and campaign were led by Julia Letlow, Executive Director of External Affairs and Strategic Communications.⁵³

- *University of New Mexico (UNM) partnered with Emsi in 2018 to **highlight alumni outcomes for current/prospective students and faculty**.* Prospective students often ask career services staff at UNM what they can do with a particular major or degree, while faculty often ask for data to help them defend and/or market their programs. Jenna Crabb, who directs career services at UNM, uses Emsi’s Analyst program—and specifically, the Profile Analytics module—to help inform students and faculty. She is able to show students how many UNM graduates are employed in a particular sector and can help faculty identify skill sets, qualifications, and employers associated with their degree programs. The UNM case represents a relatively strong example of how profile data fed into a public dashboard significantly reduces staff research time that previously depended exclusively on O*NET and BLS data for aggregated information on alumni.⁵⁴
- *University of South Florida partnered with Burning Glass to **supply local economy with workers, broaden engagement with employers, and stay accountable to the state legislature**.* SF’s College of Arts and Sciences partnered with a statewide research consortium to review 65 programs against data provided by Labor Insight and Program Insight. The main goal was to give its faculty the tools to align curriculum with the local labor market. BGT’s data dashboards helped faculty identify where their departmental majors landed jobs after graduation and the skills demanded by those jobs. These previously unknown insights helped faculty revise certain aspects of the curriculum

⁵³Source: <https://www.economicmodeling.com/2019/11/18/ulm-eis>.

⁵⁴Source: <https://www.economicmodeling.com/2018/08/14/university-of-new-mexico-uses-alumni-data>.

to strengthen and enrich skill development. USF ultimately made major changes to its curriculum, citing the History Department as a transformational example of a department that effectively used data to grow enrollment and identify job opportunities. The curriculum review was led by Associate Dean of Graduate and Undergraduate Studies Allison Cleveland-Roberts.⁵⁵

- *Ursinus College (PA) partnered with Burning Glass in 2017 to **identify programs linked to labor market demand**.* Ursinus’ Committee of Faculty and Administrators noticed that the college was facing steep enrollment declines. It wondered how it could boost enrollment with new degree programs. The committee used BGT’s Program Insight to link job postings to BLS and IPEDS data that identified geographically relevant college majors. They started with a list of 30 in-demand majors stratified by whether or not Ursinus had the resources to launch them. The committee presented 10 finalists to the college president and dean, who ultimately selected five programs. Ursinus expects to launch these new programs during the 2021-22 academic year. The college’s president launched this effort in partnership with education consultant Robert Massa, who chaired the committee.⁵⁶

3.4 Online education providers

- *Purdue University Global (PG) partnered with Emsi in 2020 to **align its online course content with hard and soft skills found in Emsi’s SkillsMatch platform**.* After Purdue University acquired Kaplan University in 2018, it launched PG as an online education initiative designed for working adults. As part of its first program review cycle, PG is mapping its desired course outcomes to Emsi’s database of hard and soft skills—effectively “skillifying” its curriculum. By summer 2020, PG “skillified” all of its courses and implemented Emsi’s SkillsMatch platform in order to effectively advertise course-skill combinations to prospective adult learners. Tom Schott, Senior Director of Strategic

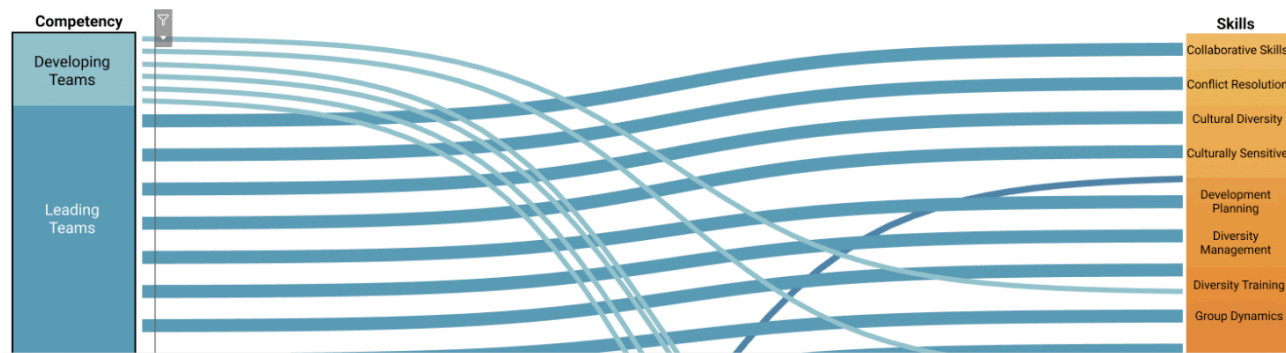
⁵⁵Source: <https://www.burning-glass.com/case-studies/labor-insight-case-study-usf>.

⁵⁶Source: <https://www.burning-glass.com/case-studies/program-insight-case-study-ursinus-college>.

Communications at PG, led this alignment effort.⁵⁷

- *Western Governors University (WGU) partnered with Emsi in 2019 to map skill clusters and course competencies in two core curricular areas.* The process begins with identifying target occupations for two of WGU’s highest demand programs, business and data management/analytics. It next used Emsi’s “profile analytics” database of more than 100 million professional profiles to identify exactly where WGU graduates were working. Along with Emsi’s labor market data, the profile occupations allowed WGU to market to its students occupations with the highest potential growth, as well as the skills that increase the likelihood of hire. The skills mapping approach aligned “sought skills” demanded by employers with “taught” skills emphasized at WGU. WGU then developed Tableau dashboards that further mapped course competencies with taught and sought skills to highlight how skills cluster within a given set of competencies. This skills mapping initiative is led by Kacey Thorne, WGU’s director of program architecture.⁵⁸

Figure 6: Snapshot of WGU’s competency-to-skill Tableau dashboard



Source: “Western Governors University Maps Curriculum to In-Demand Skills (<https://www.economicmodeling.com/2019/07/24/wgu-creates-value-by-skill-mapping-to-curriculum>).

⁵⁷Source: <https://www.economicmodeling.com/2020/09/15/pg-ems- enhance-skill-development>. Note that Purdue Online is a Burning Glass client and Purdue University Global (PG) is an Emsi client. PG is one of three distinct online initiatives of the larger land-grant university, along with Purdue University Fort Wayne and Purdue University Northwest.

⁵⁸Source: <https://www.economicmodeling.com/2019/07/24/wgu-creates-value-by-skill-mapping-to-curriculum>.

3.5 Postsecondary Consortia

- *The Inter-University Council of Ohio (IUC) partnered with Emsi in 2018 to **measure the economic impact of Ohio’s 14 public universities**.* The IUC is a voluntary association of Ohio’s 14 public universities with the mission to advance common interests and improve higher education in the state. As part of the IUC initiative “Forward Ohio,” the consortium asked Emsi to generate an economic impact study (EIS) (Emsi, 2018) to help raise awareness of public higher education in the state. The resulting EIS showed that Ohio’s public universities contributed \$42 billion (7%) to the state’s economy and supported more than half a million jobs. ⁵⁹

⁵⁹Source: <https://www.economicmodeling.com/2018/06/15/eis-shows-ohio-public-universities-add-42-billion>.

4 Developments and Limitations

For decades, colleges and universities have had access to select labor market data sources through various government agencies and private sources that I have referenced throughout this report. In its 2013 report on how IHEs have used traditional labor market data to boost student outcomes, the Aspen Institute highlights a few cases in which technical or community colleges bypassed real-time sources as they made strategic decisions. For example, Cabrillo College (Aptos, CA) “accessed labor market data from two proprietary databases, reached out to employers, and reflected on the total number of medical assistants produced across the region” to conclude that there was an oversupply of medical assistants. Instead of expanding its Medical Assisting program, it reduced its size. Lake Area Technical Institute (LATI) (Watertown, SD) examined projected job openings from the state employment agency and conversations with regional employers in order to inform decisions around its agriculture program. LATI ended up enhancing an existing program and left open the option to focus on working with large animals in lieu of a once-demanded veterinary technician program. And Monroe Community College (Rochester, NY) “use[d] a variety of data sources when evaluating the viability of its CTE programs, including a proprietary labor market database, information from the US Department of Labor specific to its region, US Census data, feedback from industry advisory boards, and survey responses from recent graduates.” This investigation led to Monroe retiring its Massage Therapy program ([Aspen Institute, 2013](#)).

The Aspen Institute report distilled these and other anecdotes into four core ways in which postsecondary institutions could use LMI. Namely, to:

- “Decide which college programs to offer and how many graduates a college should aim to produce to fill available jobs related to the program.
- Assess program effectiveness, signaling whether a college’s programs provide the necessary skills, both in terms of specific competencies and appropriate rigor, for students to succeed after they graduate.
- Help students make informed choices about which programs to enter, both by accelerating

student decision-making and thereby increase chances for graduation and by enhancing the likelihood they will choose a degree aligned to a well-paid, available job.

- Advocate for the college by using data on graduates’ employment outcomes to demonstrate to the state and others that investments in the college are worthwhile, and will go beyond broadening access to delivering graduates able to contribute to their families, communities, and states.”

At the time of Aspen’s reporting, postsecondary institutions—including many of those highlighted in Section 3 that transitioned to contemporary LMI—generally used data sources that were over-aggregated in terms of indicators or insufficiently local—or both. Below, I summarize a few of the existing systems its report summarized.

States can request individual-level data through the State Wage Interchange System (SWIS), which is the successor to Wage Record Interchange System (WRIS) and WRIS2. SWIS expands upon prior systems by including labor market data for all six programs⁶⁰ enacted under the Workforce Innovation and Opportunity Act (WIOA). Nearly all states have adopted SWIS through data sharing agreements that designate State Unemployment Insurance Agencies (SUIAs) and/or Performance Accountability and Customer Information Agencies (PACIAs) as qualified requestors. These agencies can request wage data, such as unemployment insurance (UI) records, through SWIS.⁶¹ An example of such usage is when the Texas Workforce Commission submitted its first query to WRIS2 on behalf of the state’s technical college system. According to the Workforce Data Quality Campaign, “colleges can use these reports as part of efforts to establish performance-based funding, and start to understand why some students may be leaving the state to find employment” (Zinn and Dorrer, 2014). The major limitation of SWIS is that requests must come from the designated states SUIA or PACIA and only then to measure labor market returns to university programs that fall under an WIOA eligibility list or funded through Perkins Act funds (Leventoff, 2019). In addition, data requested by state agencies can generally only be shared back to postsecondary institutions in aggregate form.

⁶⁰Adult, Dislocated Worker, Youth programs, Adult Education and Family Literacy Act (AEFLA) program (Administered by ED), Employment Service program, Vocational Rehabilitation (VR) program (Administered by ED)

⁶¹Feldbaum and Harmon (2012) detail how community and technical colleges can access UI data.

Colleges have also traditionally used data held by the U.S. Bureau of Labor Statistics. For example, university administrators can view occupation growth, job counts, and average income across a number of dimensions through the BLS's Occupational Outlook Handbook (OOH). The Overview of Wage Data by Area and Occupation provides comparable information. Like SWIS and its predecessors, BLS data are also limited by their aggregate nature. Universities can use the Census Bureau's Longitudinal Employer-Household Dynamics (LEHD) program, which includes the Local Employment Dynamics (LED) Partnership, a consortium of nearly all U.S. states. Partner states share UI and Quarterly Census of Employment and Wages (QCEW) data with the bureau, which in turn can be used by universities to inform program development. Colleges also frequently turn to Integrated Postsecondary Education Data System (IPEDS) data, which houses a number of indicators that institutions submit to the National Center for Education Statistics (NCES). These indicators include institutional characteristics, enrollment, completions, graduation rates and outcomes, admissions, student financial aid, human resources information, university finances, and information on academic libraries.

The limitations of these aggregate data sources are considerable. In the case of individual-level labor market data, institutions do not have direct access to data sources and must submit customized requests to authorized state-level agencies (e.g., SUIA or PACIA). These agencies report outcomes to university administrators in aggregate form to remain in compliance with FERPA (i.e., the governing agencies cannot disclose person-level outcomes). In other cases, data are not sufficiently local to provide job-placement relevance to university administrators hoping to advise recent graduates—many of whom hope to work close to home or their alma mater. IPEDS data helps institutions compare themselves to peers but do not include economic indicators.

Perhaps the most substantial federal effort to enhance state-level LMI came through the \$50 million LMI grant program that was funded in 2009 through the American Recovery and Reinvestment Act (ARRA). Two dozen state workforce agencies (SWAs) and six SWA consortia divided the funds in order to “collect, analyze, and disseminate LMI and enhance the labor-exchange infrastructure for jobs and careers within the energy-efficiency and renewable-energy industries” (Laird et al., 2012, p. viii) While the grant program was dedicated to the

green jobs industry, it nonetheless related to postsecondary efforts in a few ways. First, nearly all state- and consortia-level grant recipients, which were typically SWAs, partnered with research universities (26 of 30 grantees) for research expertise and community colleges (18 of 30 grantees) for information on training programs and career pathway development. For example, the Northeast Consortium partnered with Georgetown University to take advantage of the school’s expertise analyzing LMI, while Oregon’s SWA partnered with the state’s Department of Community Colleges and Workforce Development to create “career pathway roadmaps” for seven green careers. Oregon was the only recipient to use LMI grant funding for this purpose in its effort to link students to information on technical skills, job opportunities, and education and training requirements. The ARRA LMI grant program highlights the fiscal challenges associated with transitioning from traditional to contemporary LMI data systems. Oregon, for example, received \$1.25 million for an effort designed for a single sector. LMI firms appear to offer a comparatively reasonable value proposition by offering data—however imperfect—that spans pretty much any sector of interest to IHEs.

Contemporary LMI fills additional gaps in coverage by leveraging the “real-time” nature of their data. At best, this means that web-crawling algorithms update hourly or daily and full-service subscriber institutions can access data through company dashboards (e.g., BGT’s Labor Insight) or by piping the data into their own customized dashboard by connecting to the company’s API. On occasion, firms will compare their own data reporting results to those of established federal indicators. For example, in 2019, BGT reported that a decade-long time series of its web scraped job openings correlated strongly (0.90) with semi-comparable openings reported by the federal Job Openings and Labor Turnover Survey (JOLTS).⁶²

The biggest apparent limitation is that these indicators—whether in-demand skills within a geographic radius or job vacancies across occupational groups—are based on incomplete representations of the labor market. For example, the hundreds of millions of social and professional profiles that underpin products, while substantial in number, still represent a fraction of active labor market participants in the U.S. and abroad. Moreover, the products and their associated outputs are only as good as the inputs that are aggregated, deduplicated, and processed. In

⁶²Source: https://www.burning-glass.com/wp-content/uploads/2019/11/Burning_Glass_JOLTS.png.

one particular incident that led to a *mea culpa*, BGT erroneously omitted 1,500 employers—representing 4% of all 2019 job postings—from its Labor Insight product. (Recall from Section 2 that Labor Insight is one of three core products BGT markets to IHEs.) While the error did not ultimately cause inaccuracies across the platform, BGT was concerned about the omission at the time of its discovery. The demand side of LMI is only aware of process lapses if vendors alert them and the public is only aware in the event of a public apology. To BGT’s credit, it acknowledged the mistake on its website,⁶³ but it remains unclear how often and to what extent such errors occur.

⁶³See <https://www.burning-glass.com/data-improvements>.

5 Conclusion

Postsecondary institutions hoping to boost enrollment, improve student outcomes, and launch new programs have turned to contemporary labor market information (LMI) to inform decisionmaking. While traditional LMI in the form of government statistics has for decades helped colleges and universities plan for the future, such data have clear limitations. These limitations include geographic coarseness, lagged releases, and wide reporting intervals. To bridge these gaps for postsecondary clients, contemporary LMI firms draw on web-scraping and machine learning technologies in order to offer a new generation of LMI. The “real-time” sources of data supplied by firms such as Burning Glass Technologies and Emsi can help colleges align marketing, guidance, and recruitment efforts with local labor market dynamics. A wide range of institutions, including community colleges, four-year colleges, and online schools rely on contemporary LMI for niche and targeted strategic initiatives.

After reviewing a number of publicly available sources, this report finds that contemporary LMI does indeed appear to have value for institutions using it for program planning, career counseling, and communicating economic impacts. When it comes to marketing products and services to postsecondary customers, two firms in particular—BGT and Emsi—dominate the landscape. Other firms, like LinkedIn, Handshake, and Indeed are making inroads.

These data extractions from hundreds of millions of job postings and social profiles have clear strengths. They provide real-time snapshots of employment trends, employer demand, and emerging skills. By leveraging software products powered by these data, postsecondary stakeholders can advise students, recommend programs, and justify faculty hires. But contemporary LMI also has limitations. Data scraped from job postings do not include real wage or UI data—for that, these firms must turn to the same sources of data provided through government agencies. Moreover, the universe of job postings represents a snapshot of labor market demand and participation. Thus, potential clients should continue to use traditional LMI and only turn to contemporary LMI if they do not face financial barriers in doing so. In some cases described in this report, colleges use federal funding streams to purchase licenses, which run into the tens of thousands of dollars annually.

If the contemporary LMI sector remains stable in the face of recent acquisitions, postsecondary institutions should consider products from firms like BGT and Emsi. If publicly available testimonials are to be believed, then the investment in such data infrastructure appears to pay off. But contemporary LMI—like its traditional counterpart—should be a public good and thus, postsecondary philanthropies, innovators, and technologists might consider approaches that help democratize these important data sources.

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