Education Report

Management Science

California

Definition of Management Science, CIP 52.1301

A general program that focuses on the application of statistical modeling, data warehousing, data mining, programming, forecasting and operations research techniques to the analysis of problems of business organization and performance. Includes instruction in optimization theory and mathematical techniques, data mining, data warehousing, stochastic and dynamic modeling, operations analysis, and the design and testing of prototype systems and evaluation models.

Awards

The table below is a list of postsecondary awards in CIP 52.1301 that were granted by institutions located in California in the 2021 academic year.

Schools	Certs & 2yr Awards[1]	4yr Awards[2]	Post-Grad Awards[3]	Avg Net Price[4]
University of California-Los Angeles			728	$13,393
University of California-Berkeley			595	$17,652
Stanford University			421	$14,402
University of Southern California			395	$26,021
University of California-San Diego		121	72	$15,632
University of California-Davis			120	$16,640
California State University-East Bay			113	$12,631
University of California-Irvine			85	$11,633
Santa Clara University			70	$48,469
Claremont Graduate University		55	4	
California Lutheran University		31	14	$24,065
Loyola Marymount University		33	12	$40,180
Pepperdine University			40	$40,945
San Jose State University			39	$14,603
San Francisco State University			37	$13,641
University of California-Santa Barbara			27	$17,333
California Polytechnic State University-San Luis Obispo			19	$20,708
Alliant International University-San Diego			16	
San Diego State University			10	$6,867
National University		1	7	$9,966
University of San Francisco			7	$39,825
California State University-Los Angeles		2		$2,695
United States University				$13,529
University of California-Merced				$11,586
Westcliff University				$25,201
Total	0	243	2,831	

1. Undergraduate certificates and associate's degrees
2. Bachelor's degrees and post-baccalaureates
3. Master's, post-master's, and doctorates
4. Average net price represents full-time beginning undergraduate students who paid the in-state or in-district tuition rate and were awarded grant or scholarship aid from federal, state or local governments, or the institution. Data as of the 2020-2021 academic year.
Awards data are per the National Center for Education Statistics (NCES) and JobsEQ for the 2021 academic year. Any programs shown here reflect only data reported to the NCES; reporting is required of all schools participating in any federal finance assistance program authorized by Title IV of the Higher Education Act of 1965, as amended—other training providers in the region that do not report data to the NCES are not reflected in the above.

Occupation Crosswalk

The below table lists all occupations linked with the program, Management Science, CIP 52.1301.

		Education and Training Requirements			Educational Attainment				
		Typical Education Needed for Entry	Work Experience in a Related Occupation	Typical On-the-Job Training Needed to Attain Competency in the Occupation	No College	Some College, No Degree	Associate's Degree	Bachelor's Degree	Postgraduate Degree
11-1011	Chief Executives	Bachelor's degree	5 years or more	None	6%	9%	4%	45%	36%
11-1021	General and Operations Managers	Bachelor's degree	5 years or more	None	14%	17%	9%	43%	18%
13-1111	Management Analysts	Bachelor's degree	Less than 5 years	None	3%	6%	4%	46%	42%
15-2031	Operations Research Analysts	Bachelor's degree	None	None	3%	7%	5%	43%	41%
15-2051	Data Scientists	Bachelor's degree	None	None	1%	3%	2%	36%	57%
25-1011	Business Teachers, Postsecondary	Doctoral or professional degree	None	None	1%	1%	1%	14%	83%

Education and training requirements are from the Bureau of Labor Statistics (BLS); educational attainment mix are regional data modeled by Chmura using Census educational attainment data projected to 2022Q4 along with source data from the BLS

Definition of Chief Executives (11-1011)

Determine and formulate policies and provide overall direction of companies or private and public sector organizations within guidelines set up by a board of directors or similar governing body. Plan, direct, or coordinate operational activities at the highest level of management with the help of subordinate executives and staff managers.

Definition of General and Operations Managers (11-1021)

Plan, direct, or coordinate the operations of public or private sector organizations, overseeing multiple departments or locations. Duties and responsibilities include formulating policies, managing daily operations, and planning the use of materials and human resources, but are too diverse and general in nature to be classified in any one functional area of management or administration, such as personnel, purchasing, or administrative services. Usually manage through subordinate supervisors. Excludes First-Line Supervisors.

Definition of Management Analysts (13-1111)

Conduct organizational studies and evaluations, design systems and procedures, conduct work simplification and measurement studies, and prepare operations and procedures manuals to assist management in operating more efficiently and effectively. Includes program analysts and management consultants.

Definition of Operations Research Analysts (15-2031)

Formulate and apply mathematical modeling and other optimizing methods to develop and interpret information that assists management with decisionmaking, policy formulation, or other managerial functions. May collect and analyze data and develop decision support software, services, or products. May develop and supply optimal time, cost, or logistics networks for program evaluation, review, or implementation.

Definition of Data Scientists (15-2051)

Develop and implement a set of techniques or analytics applications to transform raw data into meaningful information using data-oriented programming languages and visualization software. Apply data mining, data modeling, natural language processing, and machine learning to extract and analyze information from large structured and unstructured datasets. Visualize, interpret, and report data findings. May create dynamic data reports.

Definition of Business Teachers, Postsecondary (25-1011)

Teach courses in business administration and management, such as accounting, finance, human resources, labor and industrial relations, marketing, and operations research. Includes both teachers primarily engaged in teaching and those who do a combination of teaching and research.

Occupation Details

As of 2022Q4, total employment for occupations linked to Management Science in California was 522,887. Over the past three years, linked occupations added 28,171 jobs in the region and are expected to need in aggregate approximately 358,399 newly trained workers over the next seven years.

Snapshot of Occupations Linked to Management Science in California[1]

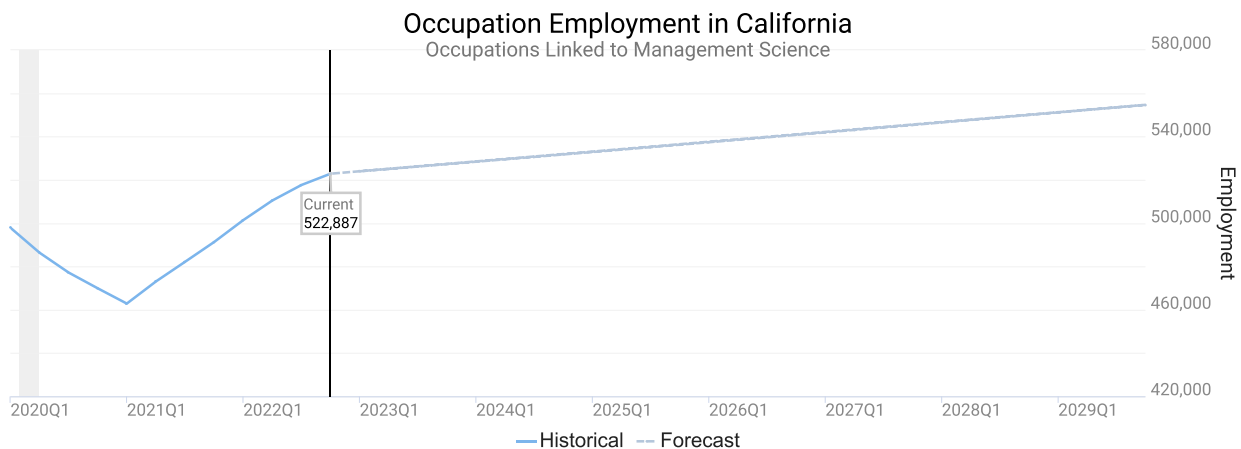| SOC	Occupation	Current						3-Year History	7-Year Forecast				
		Empl	Mean Ann Wages[2]	LQ	Unempl	Unempl Rate	Online Job Ads[3]	Ann %	Total Demand	Exits	Transfers	Empl Growth	Avg Ann Growth %
11-1021	General and Operations Managers	326,916	$137,400	0.84	6,046	1.9%	2,606	3.2%	224,873	54,541	151,768	18,564	0.8%
13-1111	Management Analysts	126,389	$110,700	1.10	2,283	1.9%	2,510	-0.3%	94,047	33,380	50,997	9,670	1.1%
11-1011	Chief Executives	38,001	$242,800	1.16	333	0.9%	1,906	-5.1%	16,803	8,001	10,582	-1,780	-0.7%
15-2051	Data Scientists	17,455	$138,400	1.27	257	1.6%	640	14.1%	13,205	3,292	6,447	3,466	2.6%
15-2031	Operations Research Analysts	9,017	$109,600	0.77	79	1.0%	2,927	3.0%	6,255	1,884	2,861	1,509	2.2%
25-1011	Business Teachers, Postsecondary	5,109	$141,100	0.54	94	1.8%	694	-1.1%	3,216	1,645	1,389	183	0.5%
	Total - Linked Occupations	**522,887**	**$138,200**	**0.92**	**9,091**	**1.8%**	**11,283**	**1.9%**	**358,399**	**102,743**	**224,044**	**31,611**	**0.8%**
	Total - All Occupations	**19,219,968**	**$71,900**	**1.00**	**797,161**	**4.1%**	**549,411**	**0.6%**	**17,029,863**	**6,722,656**	**9,379,252**	**927,955**	**0.7%**

Source: JobsEQ®
Data as of 2022Q4 unless noted otherwise
Note: Figures may not sum due to rounding.
1. Data based on a four-quarter moving average unless noted otherwise.
2. Wage data represent the average for all Covered Employment
3. Data represent found online ads active within the last thirty days in the selected region. Due to alternative county-assignment algorithms, ad counts in this analytic may not match that shown in RTI (nor in the popup window ad list). Ad counts for ZCTA-based regions are estimates.

Occupation Employment in California
Occupations Linked to Management Science

Current
522,887

Source: JobsEQ®,Data as of 2022Q4,The shaded areas of the graph represent national recessions.

Occupation employment data are estimated via industry employment data and the industry/occupation mix. Industry employment data are derived from the Quarterly Census of Employment and Wages, provided by the Bureau of Labor Statistics and currently updated through 2022Q3, imputed where necessary with preliminary estimates updated to 2022Q4. Forecast employment growth uses national projections from the Bureau of Labor Statistics adapted for regional growth patterns. Occupation unemployment figures are imputed by Chmura.

Employment by Industry

The table illustrates the industries in California which most employ occupations linked to Management Science. The single industry most employing these occupations in the region is Management, Scientific, and Technical Consulting Services, NAICS 5416. This industry employs 68,177 workers in the linked occupations—employment which is expected to increase by 9,737 jobs over the next ten years; furthermore, 64,571 additional new workers in these linked occupations will be needed for this industry due to separation demand, that is, to replace workers in this occupation and industry that retire or move into a different occupation.

Industry Distribution for Occupations Linked to Management Science in California

NAICS Code	Industry Title	Current % of Occ Empl	Empl	Exits	10-Year Demand Transfers	Empl Growth	Total Demand
5416	Management, Scientific, and Technical Consulting Services	13.0%	68,177	23,962	40,609	9,737	74,307
5415	Computer Systems Design and Related Services	4.7%	24,688	7,628	14,911	4,616	27,155
5511	Management of Companies and Enterprises	3.1%	16,424	4,634	9,416	546	14,595
7225	Restaurants and Other Eating Places	2.8%	14,585	3,678	10,098	2,825	16,602
5613	Employment Services	2.0%	10,221	2,980	6,189	906	10,075
5417	Scientific Research and Development Services	1.9%	9,725	2,693	5,800	1,291	9,783
5412	Accounting, Tax Preparation, Bookkeeping, and Payroll Services	1.7%	8,870	2,827	5,138	297	8,263
2382	Building Equipment Contractors	1.4%	7,457	1,748	4,690	21	6,459
6113	Colleges, Universities, and Professional Schools	1.4%	7,363	2,841	3,569	595	7,005
5121	Motion Picture and Video Industries	1.4%	7,185	1,920	4,697	1,481	8,097
5413	Architectural, Engineering, and Related Services	1.4%	7,112	1,832	4,239	25	6,097
5617	Services to Buildings and Dwellings	1.3%	6,859	1,603	4,414	184	6,202
9221	Justice, Public Order, and Safety Activities	1.3%	6,744	2,101	3,869	341	6,311
5611	Office Administrative Services	1.2%	6,456	1,844	4,133	1,174	7,151
5132	Software Publishers	1.2%	6,327	1,807	3,634	382	5,824
5241	Insurance Carriers	1.2%	6,159	1,965	3,566	678	6,210
6241	Individual and Family Services	1.1%	5,781	1,607	3,886	1,465	6,958
5242	Agencies, Brokerages, and Other Insurance Related Activities	1.1%	5,775	1,631	3,538	566	5,735
5221	Depository Credit Intermediation	1.1%	5,691	1,706	3,326	548	5,580
9211	Executive, Legislative, and Other General Government Support	1.1%	5,524	1,692	3,172	264	5,129
	All Others	54.7%	285,763	74,098	177,201	18,063	269,363

Source: JobsEQ®
Data as of 2022Q4 except wages which are as of 2021. Note that occupation-by-industry wages represent adjusted national data and may not be consistent with regional, all-industry occupation wages shown elsewhere in JobsEQ.
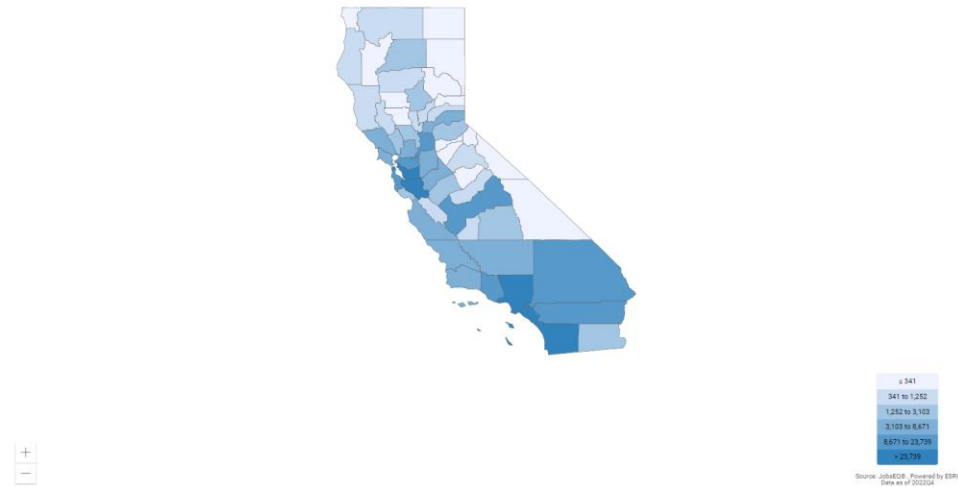Note: Figures may not sum due to rounding.
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Geographic Distribution

The map below illustrates the county-level distribution of employed workers in California in occupations linked to Management Science. Employment is shown by place of work.

California, Occupation Concentration by Place of Work for Occupations Linked to Management Science

export

Top Counties with Employment Linked to Management Science, 2022Q4

Region	Employment
Los Angeles County, California	129,073
Orange County, California	50,952
San Diego County, California	45,502
Santa Clara County, California	38,169
San Francisco County, California	30,809
Alameda County, California	23,739
Sacramento County, California	20,687
San Bernardino County, California	19,087
Riverside County, California	17,821
San Mateo County, California	15,208

Source: JobsEQ®

Occupation employment data are estimated via industry employment data and the industry/occupation mix. Industry employment data are derived from the Quarterly Census of Employment and Wages, provided by the Bureau of Labor Statistics and currently updated through 2022Q3, imputed where necessary with preliminary estimates updated to 2022Q4.

Demographic Profile

The population in California was 39,346,023 per American Community Survey data for 2016-2020.

Of individuals 25 to 64 in California, 35.4% have a bachelor's degree or higher which compares with 34.3% in the nation. Per American Community Survey 2016-2020 estimates, the region has about 576,714 students enrolled in grade 12.

Summary[1]

	Percent		Value	
	California	USA	California	USA
Demographics				
Population (ACS)	—	—	39,346,023	326,569,308
Male	49.7%	49.2%	19,562,882	160,818,530
Female	50.3%	50.8%	19,783,141	165,750,778
Median Age[2]	—	—	36.7	38.2
Under 18 Years	22.8%	22.4%	8,956,641	73,296,738
18 to 24 Years	9.5%	9.3%	3,724,239	30,435,736
25 to 34 Years	15.3%	13.9%	6,007,913	45,485,165
35 to 44 Years	13.3%	12.7%	5,233,903	41,346,677
45 to 54 Years	12.8%	12.7%	5,039,155	41,540,736
55 to 64 Years	12.0%	12.9%	4,739,675	42,101,439
65 to 74 Years	8.3%	9.4%	3,270,380	30,547,950
Population Growth				
Population (Pop Estimates)[4]	—	—	39,029,342	333,287,557
Population Annual Average Growth[4]	0.3%	0.6%	108,479	1,940,990
People per Square Mile	—	—	250.4	94.3
Educational Attainment, Age 25-64				
No High School Diploma	15.2%	10.5%	3,199,850	17,929,220
High School Graduate	20.4%	25.4%	4,282,776	43,289,555
Some College, No Degree	21.0%	20.5%	4,412,172	34,959,338
Associate's Degree	8.0%	9.3%	1,678,082	15,776,790
Bachelor's Degree	22.6%	21.6%	4,741,354	36,888,244
Postgraduate Degree	12.9%	12.7%	2,706,412	21,630,870
Social				
Poverty Level (of all people)	12.6%	12.8%	4,853,434	40,910,326
Households Receiving Food Stamps/SNAP	9.0%	11.4%	1,183,873	13,892,407
Enrolled in Grade 12 (% of total population)	1.5%	1.3%	576,714	4,358,865
Disconnected Youth[3]	1.9%	2.5%	38,451	433,164
Children in Single Parent Families (% of all children)	32.8%	34.0%	2,796,858	23,628,508
Uninsured	7.2%	8.7%	2,806,173	28,058,903
Speak English Less Than Very Well (population 5 yrs and over)	17.4%	8.2%	6,432,102	25,312,024

Source: JobsEQ®
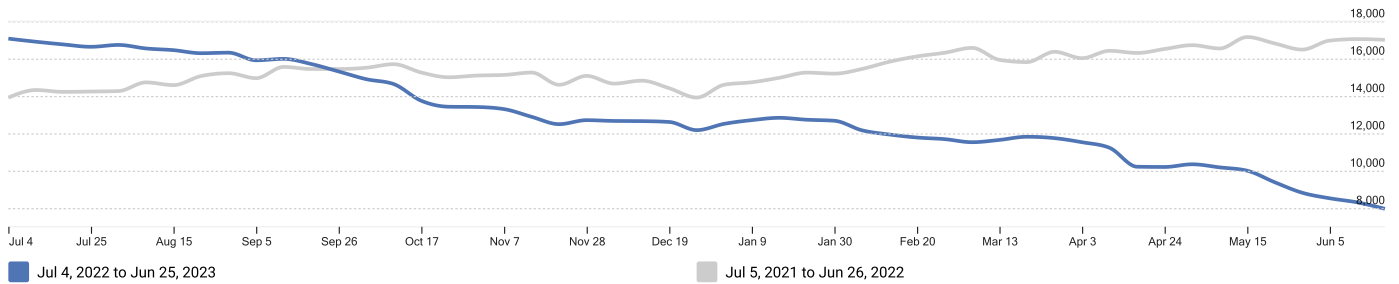1. American Community Survey 2016-2020, unless noted otherwise
2. Median values for certain aggregate regions (such as MSAs) may be estimated as the weighted averages of the median values from the composing counties.
3. Disconnected Youth are 16-19 year olds who are (1) not in school, (2) not high school graduates, and (3) either unemployed or not in the labor force.
4. Census Population Estimate for 2022, annual average growth rate since 2012. Post-2019 data for Connecticut counties are imputed by Chmura.

RTI (Job Postings)

Active Job Ads by Date

■ Jul 4, 2022 to Jun 25, 2023	■ Jul 5, 2021 to Jun 26, 2022

Occupations

SOC	Occupation	Active Job Ads	
13- 1111.00	Management Analysts	26,033	
11- 1021.00	General and Operations Managers	17,001	
15- 2031.00	Operations Research Analysts	16,997	
11- 1011.00	Chief Executives	9,172	
15- 2051.01	Business Intelligence Analysts	2,896	
25- 1011.00	Business Teachers, Postsecondary	2,242	
15- 2051.00	Data Scientists	413	
11- 1011.03	Chief Sustainability Officers	272	
15- 2051.02	Clinical Data Managers	203	

Locations

Location	Active Job Ads	
San Francisco, California	5,007	
Los Angeles, California	4,335	
San Diego, California	2,673	
Sacramento, California	2,178	
San Jose, California	2,077	
Irvine, California	1,357	
Oakland, California	1,005	

Locations

Location	Active Job Ads	
Sacramento County, California	873	
Santa Clara, California	742	
Sunnyvale, California	677	

Employers

Employer Name	Active Job Ads	
Deloitte	1,414	
Kaiser Permanente	891	
CVS	840	
Cynet Systems	763	
United Health Group	756	
Diverse Lynx	600	
Los Angeles, California	591	
NORTHROP GRUMMAN	551	
Meta	493	
Robert Half	399	

Certifications

Certificate Name	Active Job Ads	
Driver's License	1,346	
Project Management Professional (PMP)	754	
Secret Clearance	618	
Certified Public Accountant (CPA)	564	
Certification in Cardiopulmonary Resuscitation (CPR)	271	
First Aid Certification	149	
Associate Service Executive (ASE)	126	
Certified ScrumMaster (CSM)	105	
Certified Financial Planner (CFP)	98	
Series 63	95	

Hard Skills

Skill Name	Active Job Ads	
Microsoft Excel	18,812	
Structured Query Language (SQL)	11,298	
Microsoft Office	10,602	
Microsoft PowerPoint	8,668	
Data Analysis	7,830	
Tableau	7,736	
Statistics	6,044	
Python	6,025	
Presentation	5,599	
Agile	4,629	

Soft Skills

Skill Name	Active Job Ads	
Communication (Verbal and written skills)	50,858	
Cooperative/Team Player	33,825	
Analytical	24,763	
Problem Solving	18,631	
Supervision/Management	16,295	
Project Management	15,458	
Organization	13,797	
Detail Oriented/Meticulous	13,145	
Self-Motivated/Ability to Work Independently/Self Leadership	12,132	
Interpersonal Relationships/Maintain Relationships	11,598	

Job Titles

Job Title	Active Job Ads	
General Manager	2,009	
Operations Manager	1,837	
Data Analyst	988	
Unclassified	960	
Business Analyst	877	
Operations Manager-CA	516	
Assistant General Manager	506	
STAFF SERVICES ANALYST (GENERAL)	476	
Area Manager	250	
Executive Director	214	

Job Types

Type	Active Job Ads	
Full-Time	39,941	
Remote	9,009	
Permanent	7,352	
Temporary (unspecified)	5,274	
Part-Time	2,065	
Temporary (long-term)	1,032	
Temporary (short-term)	542	
Temp-to-Hire	155	
Remote Not Indicated	66,220	

Programs

Program Name	Active Job Ads	
Business	7,106	
Business Administration	6,885	
Computer Science	6,170	
Engineering	5,056	
Finance	4,081	
Economics	3,737	
Statistics	3,605	
Mathematics	3,553	
Accounting	2,522	
Information Systems	1,327	

Education Levels

Minimum Education Level	Active Job Ads	
Bachelor's degree	35,480	
High school diploma or equivalent	5,694	
Master's degree	3,704	
Associate's degree	1,863	
Doctoral or professional degree	776	
Unspecified/other	27,712	

California Regional Map

FAQ

What is CIP?

The 2010 Classification of Instructional Programs (CIP) is taxonomy of instructional program classifications and descriptions. It was developed and has been updated by the U.S. Department of Education's National Center for Education Statistics (NCES).

What is SOC?

The Standard Occupational Classification system (SOC) is used to classify workers into occupational categories. All workers are classified into one of over 804 occupations according to their occupational definition. To facilitate classification, occupations are combined to form 22 major groups, 95 minor groups, and 452 occupation groups. Each occupation group includes detailed occupations requiring similar job duties, skills, education, or experience.

What is the source of the job ads?

Job ads data are online job posts from the Real-Time Intelligence (RTI) data set, produced wholly by Chmura and gleaned from over 40,000 websites. Data reflect ads active during the last twelve month period ending 06/29/2023 and advertised for any Zip Code Tabulation Area in or intersecting with the region for which this report was produced. Historical ad volume is revised as additional data are made available and processed. Since many extraneous factors can affect short-term volume of online job postings, time-series data can be volatile and should be used with caution. All ad counts represent deduplicated figures.

What is the program-to-occupation crosswalk?

Training programs are classified according to the Classification of Instructional Programs (CIP codes). For relating training programs, this report uses a modified version of the CIP to SOC crosswalk from the National Center for Education Statistics (NCES). While this is a very helpful crosswalk for estimating occupation production from training program awards data, the crosswalk is neither perfect nor comprehensive. Indeed, it is hard to imagine such a crosswalk being perfect since many training program graduates for one reason or another do not end up employed in occupations that are most related to the training program from which they graduated. Therefore, the education program analyses should be considered in this light.

As an example of the many scenarios that may unfold, consider a journalism degree that crosswalks into three occupations: editors, writers, and postsecondary communications teachers. Graduates with a journalism degree may get a job in one of these occupations—and that may be the most-likely scenario—but a good number of these graduates may get a job in a different occupation altogether (the job may be somewhat related, such as a reporter, or the job may be totally unrelated, such as a real estate agent). Furthermore, a graduate may stay in school or go back to school for a degree that will lead to other occupation possibilities. Still another possibility includes the graduate not entering the labor market (maybe being unemployed, being a non-participant, or moving to another region).

What is separation demand?

Separation demand is the number of jobs required due to separations—labor force exits (including retirements) and turnover resulting from workers moving from one occupation into another. Note that separation demand does not include all turnover—it does not include when workers stay in the same occupation but switch employers. The total projected demand for an occupation is the sum of the separation demand and the growth

demand (which is the increase or decrease of jobs in an occupation expected due to expansion or contraction of the overall number of jobs in that occupation).

What is a location quotient?

A location quotient (LQ) is a measurement of concentration in comparison to the nation. An LQ of 1.00 indicates a region has the same concentration of an occupation (or industry) as the nation. An LQ of 2.00 would mean the region has twice the expected employment compared to the nation and an LQ of 0.50 would mean the region has half the expected employment in comparison to the nation.

What is NAICS?

The North American Industry Classification System (NAICS) is used to classify business establishments according to the type of economic activity. The NAICS Code comprises six levels, from the "all industry" level to the 6-digit level. The first two digits define the top level category, known as the "sector," which is the level examined in this report.

About This Report