Labor Market Analysis for Program Recommendation: 2206.10/Geographic Information Systems (*Surveying and Mapping Technician Certificate of Achievement*)

CVML Center of Excellence, December 2024

Summary

Program LMI Endorsement	Endorsed: All LMI Criteria Met ☒	Endorsed: Some LMI Criteria Met ☐	Not LMI Endorsed ☐

Program LMI Endorsement Criteria		
Supply Gap:	Yes ☑	No ☐
	Comments: There are projected to be **41 annual job openings** throughout the SCV/SML subregion for *Surveying and Mapping Technicians*, which **are more than the zero awards conferred by educational institutions in the SCV/SML subregion.**	
Living Wage: (Entry-Level, 25th)	Yes ☑	No ☐
	Comments: The entry-level hourly wage for *Surveying and Mapping Technicians* is $21.79, which is above the SCV/SML living wage of $16.08.	
Education:	Yes ☑	No ☐
	Comments: Although the typical entry-level education for *Surveying and Mapping Technicians* is a high school diploma or equivalent, **more than half (55%) of workers in the field have completed some college or an associate degree as their highest level of education.**	

Emerging Occupation(s)	
Yes ☐	*No* ☑
Comments: N/A	

The Central Valley/Mother Lode Center of Excellence for Labor Market Research (CVML COE) prepared this report to determine whether there is a supply gap in the South Central Valley/Southern Mother Lode regional labor market related to the following middle-skill occupation:

- Surveying and Mapping Technicians (17-3031)

Middle-skill occupations typically require a community college education while above middle-skill occupations typically require at least a bachelor's degree.

Based on the available data, there appears to be a supply gap for *Surveying and Mapping Technicians*. Additionally, the typical entry-level education requirement for this occupation aligns with a community college education and the entry-level hourly wage is above the regional living wage. **Therefore, due to all of the regional labor market criteria being met, the COE endorses this proposed program.**

Exhibit 1 lists the occupational demand, supply, typical entry-level education, and educational attainment for *Surveying and Mapping Technicians*.

Exhibit 1: Labor Market Endorsement Summary

Occupation (SOC)	Demand (Annual Openings)	Supply (CC and Non-CC)	Entry-Level Hourly Earnings (25th Percentile)	Typical Entry-Level Education	Community College Educational Attainment
Surveying and Mapping Technicians (17-3031)	NCV/NML: 15 SCV/SML: 41	NCV/NML: 10 SCV/SML: 0	NCV/NML: $22.89 SCV/SML: $21.79	High school diploma or equivalent	55%
Total	**56**	**10**	**-**	**-**	**-**

Demand:

- The number of jobs for *Surveying and Mapping Technicians* is projected to increase 4% through 2028, equating to 41 annual job openings (SCV/SML).
- The entry-level hourly wage for *Surveying and Mapping Technicians* is $21.79 in the South Central Valley/Southern Mother Lode subregion, which is above the living wage of $16.08.
- There were 62 online job postings for *Surveying and Mapping Technicians* over the past 12 months.
- The typical entry-level education for *Surveying and Mapping Technicians* is a high school diploma or equivalent.
- 55% of workers in the field have some community college training or an associate degree as their highest level of education.

Supply:

- Between 2020 and 2023, there were no awards conferred by community colleges in the SCV/SML subregion.
    - NOTE: There were 10 awards conferred by one community college in the NCV/NML subregion.
- Between 2019 to 2022, there were no non-community college institutions in the region that conferred awards in relevant programs.

Demand

Occupational Projections:

Exhibit 2 shows the annual percent change in jobs for *Surveying and Mapping Technicians* from 2018 through 2028. Employment in this occupation had a 9% decrease in 2020 (SCV/SML), but then experienced a significant increase of 32% in 2021 (SCV/SML), compared to the 2% increase across all occupations in 2021 in the CVML region. Also notable was the 18% increase in employment for *Surveying and Mapping Technicians* in 2022 (SCV/SML), compared to the 5% increase across all occupations in the CVML region. Employment projections through 2028 for *Surveying and Mapping Technicians* is projected to remain steady across the two subregions and the region.

Exhibit 2: Annual Percent Change in Jobs for Surveying and Mapping Technicians, 2018-2028

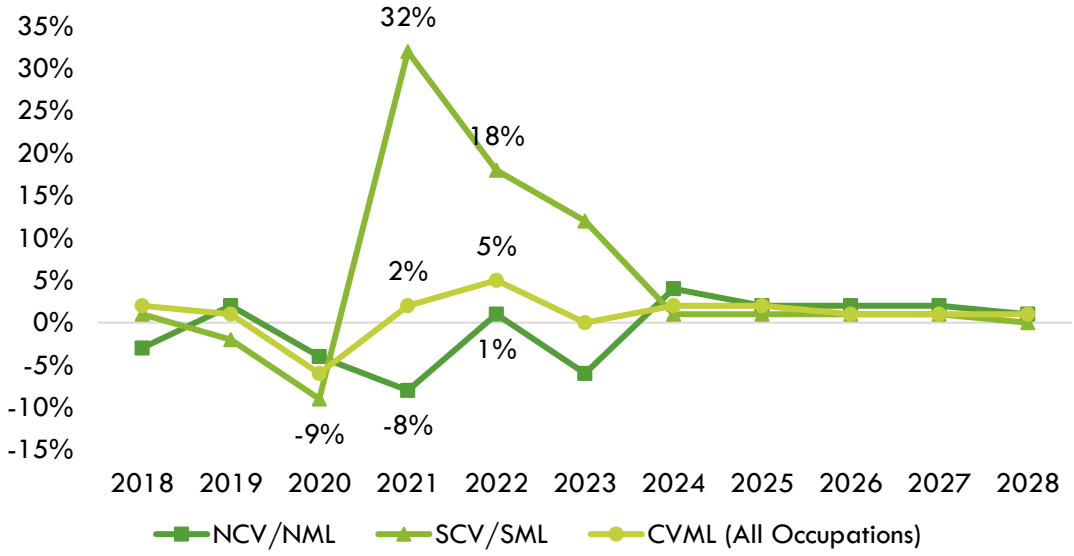


Exhibit 3 shows the five-year occupational demand projections for *Surveying and Mapping Technicians*. In the SCV/SML subregion, the number of jobs for *Surveying and Mapping Technicians* is projected to increase by 4% through 2028. There are projected to be 41 jobs available annually in the SCV/SML subregion.

Exhibit 3: Occupational Demand in NCV/NML, SCV/SML and CVML[1]

Geography	2023 Jobs	2028 Jobs	2023-2028 Change	2023-2028 % Change	Annual Openings
NCV/NML	105	117	12	11%	15
SCV/SML	321	334	13	4%	41
CVML	**426**	**451**	**25**	**6%**	**56**

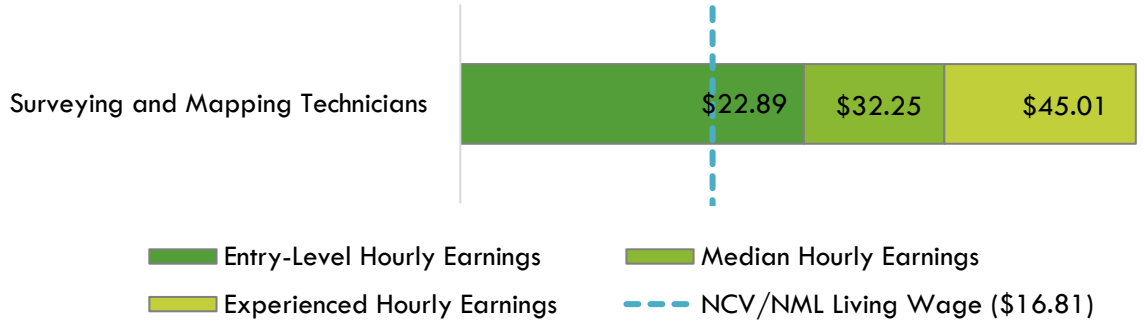
[1] Five-year change represents new job additions to the workforce. Annual openings include new jobs and replacement jobs that result from retirements and separations.

Wages:

The labor market endorsement in this report considers the entry-level hourly wages for *Surveying and Mapping Technicians* as they relate to the subregions and region's living wage. NCV/NML, SCV/SML and CVML wages are included below to provide a complete analysis of the subregions and region.

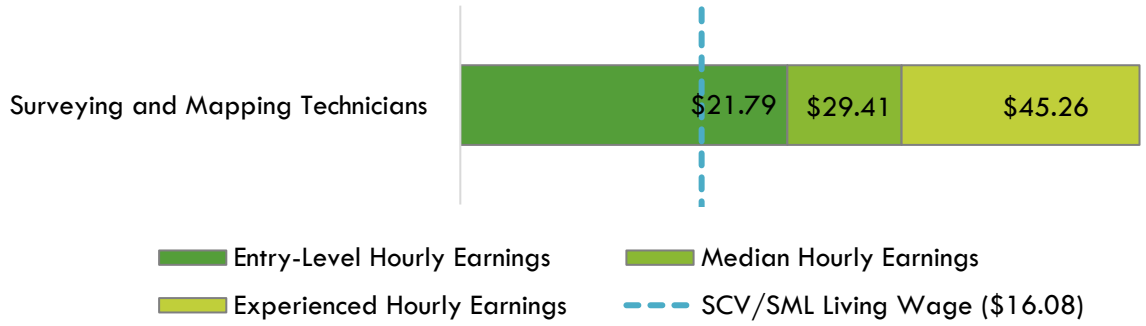
The typical entry-level hourly wage for *Surveying and Mapping Technicians* is $22.89 per hour, which is above the living wage for one adult in the NCV/NML subregion ($16.81). The NCV/NML average wage for this occupation is $33.94, which is below the average statewide wage of $35.81. Exhibit 4a shows the wage range for *Surveying and Mapping Technicians* and how it compares to the NCV/NML subregion's living wage.

Exhibit 4a: Wages by Occupation in NCV/NML



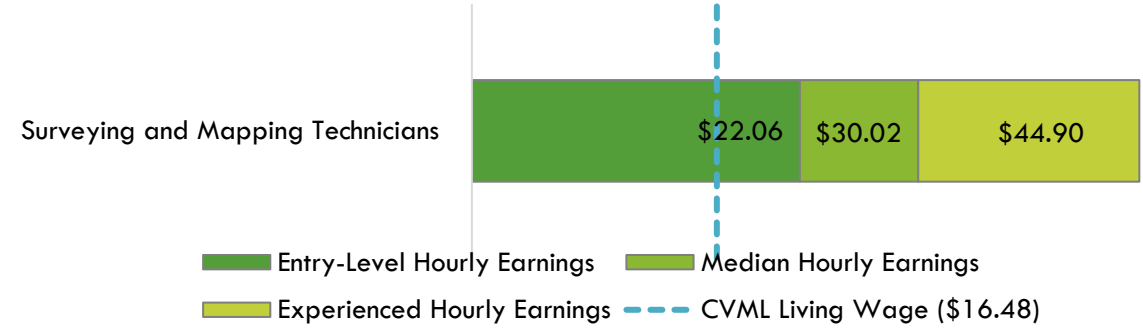
The typical entry-level hourly wage for *Surveying and Mapping Technicians* is $21.79 per hour, which is above the living wage for one adult in the SCV/SML subregion ($16.08). The SCV/SML subregion's average wage for this occupation is $32.44, which is below the average statewide wage of $35.81. Exhibit 4b shows the wage range for *Surveying and Mapping Technicians* and how it compares to the SCV/SML subregion's living wage.

Exhibit 4b: Wages by Occupation in SCV/SML



The typical entry-level hourly wage for *Surveying and Mapping Technicians* is $22.06, which is above the living wage for one adult in the CVML region ($16.48). The CVML average wage for this occupation is $32.81, which is below the average statewide wage of $35.81. Exhibit 5 shows the wage range for *Surveying and Mapping Technicians* and how it compares to the CVML region's living wage.

Exhibit 5: Wages by Occupation in CVML



Job Postings:

Important Online Job Postings Data Note: *Online job postings data is sourced from Lightcast, a labor market analytics firm that scrapes, collects, and organizes data from online job boards such as LinkedIn, Indeed, Glassdoor, Monster, GovernmentJobs.com, and thousands more. Lightcast uses natural language processing (NLP) to determine the related company, industry, occupation, and other information for each job posting. However, NLP has limitations that include understanding contextual words of phrases; determining differences in words that can be used as nouns, verbs, and/or adjectives; and misspellings or grammatical errors.*[2] *For these reasons, job postings could be assigned to the wrong employer, industry, or occupation within Lightcast's database.*

Additionally, there are several limitations when analyzing job postings. A single job posting may not represent a single job opening, as employers may be creating a pool of candidates for future openings or hiring for multiple positions with a single posting. Additionally, not all jobs are posted online, and jobs may be filled through other methods such as internal promotion, word-of-mouth advertising, physical job boards, or a variety of other channels.

There were 62 online job postings for *Surveying and Mapping Technicians* listed in the past 12 months (Exhibit 6).

Exhibit 6: Number of Job Postings by Occupation (n=62)

Occupation	Job Postings	Percentage of Job Postings
Surveying and Mapping Technicians	62	100%

[2] K. R. Chowdhary, Fundamentals of Artificial Intelligence (Basingstoke: Springer Nature, 2020), https://link.springer.com/book/10.1007/978-81-322-3972-7.

The top employers in the subregion for *Surveying and Mapping Technicians*, by number of job postings, are shown in Exhibit 7.

Exhibit 7: Top Employers by Number of Job Postings (n=62)

Employer	Job Postings	Percentage of Job Postings
Sunrun	5	8%
Dragados	4	6%
PG&E	3	5%
City of Fresno	3	5%
Lane Engineers	3	5%
4Creeks	3	5%
U.S. National Park Service	2	3%
GPAC	2	3%
Solar Maintenance Pros	2	3%
University Enterprises	2	3%

The top specialized, common, and software skills for *Surveying and Mapping Technicians* listed by those most frequently mentioned in job postings (denoted in parentheses) are shown in Exhibit 8.

Exhibit 8: Top Skills by Number of Job Postings (n=62)

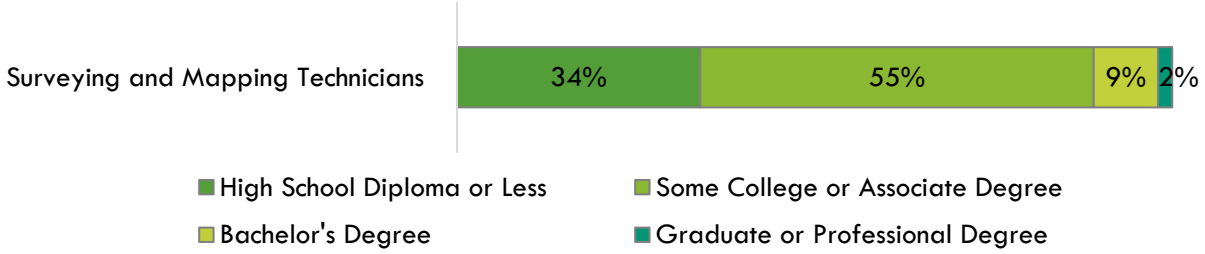
Top Specialized Skills	Top Common Skills	Top Software Skills
Surveying (31)	Communication (23)	AutoCAD Civil 3D (15)
AutoCAD Civil 3D (15)	Good Driving Record (18)	Geographic Information Systems (14)
Geographic Information Systems (14)	Customer Service (18)	Microsoft Office (13)
Legal Land Description (11)	Time Management (14)	ArcGIS (GIS Software) (8)
Topographic Surveying (10)	Professionalism (13)	MicroStation (CAD Design Software) (8)
Global Positioning Systems (10)	Research (13)	Software Systems (7)
Computer-Aided Design (9)	Microsoft Office (13)	AutoCAD (6)
Roofing (9)	Operations (13)	Microsoft Excel (5)
Surveying Instruments (8)	Verbal Communication Skills (13)	Microsoft Word (4)
ArcGIS (GIS Software) (8)	Writing (12)	Microsoft PowerPoint (4)

Educational Attainment:

The Bureau of Labor Statistics (BLS) lists a high school diploma or equivalent as the typical entry-level education for *Surveying and Mapping Technicians*. The national-level educational attainment data indicates that 55% of workers in the field have completed some college or an associate degree as their highest level of education. Exhibit 9 shows the educational attainment for *Surveying and Mapping Technicians*.

Of the 62 online job postings, 61% (equivalent to 38 postings) of cumulative job postings for *Surveying and Mapping Technicians* listed a minimum education requirement in the SCV/SML subregion, and 55% (21) requested a high school diploma or GED.

Exhibit 9: National-level Educational Attainment for Chemical Technicians



Educational Supply

Community College Supply:

Exhibit 10 shows the annual and three-year average number of awards conferred by community colleges in the related TOP code: Geographic Information Systems (2206.10). The one community college in the region that has conferred awards between 2020 and 2023 is Columbia (NCV/NML). There were no awards conferred in the SCV/SML region for Geographic Information Systems.

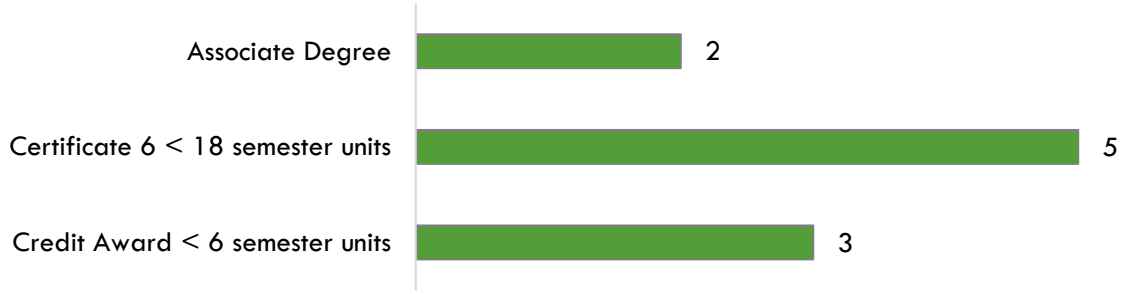
Exhibit 10: Regional Community College Awards (Certificates and Degrees), 2020-2023

TOP Code	Program	College	2020-2021 Awards	2021-2022 Awards	2022-2023 Awards	3-Year Award Average
2206.10	Geographic Information Systems	Columbia	5	7	16	10
		NCV/NML Total	**5**	**7**	**16**	**10**
		Supply Total/Average	**5**	**7**	**16**	**10**

TOP Code	Program	College	2020-2021 Awards	2021-2022 Awards	2022-2023 Awards	3-Year Award Average
2206.10	Geographic Information Systems	N/A	-	-	-	-
		SCV/SML Total	**-**	**-**	**-**	**-**
		Supply Total/Average	**-**	**-**	**-**	**-**

Exhibit 11 shows the annual average community college awards by type from 2020-21 through 2022-23. There were no awards conferred in the SCV/SML region. Of the 10 awards conferred in the NCV/NML subregion, 50% (5) were for a certificate between 6 and 18 semester units, 30% (3) were for a certificate award less than 6 semester units, and 20% (2) were for an associate degree.

Exhibit 11: Annual Average Community College Awards by Type, 2020-2023



Community College Student Outcomes:

Exhibit 12 shows the Strong Workforce Program (SWP) metrics for the Geographic Information Systems program in State Center Community College District (SCCCD), the SCV/SML subregion, the CVML region, and California. Of the 2,233 Geographic Information Systems statewide students in the 2022-23 academic year, 6% (128) attended a CVML institution.

CVML students that exited Geographic Information Systems programs in the 2021-22 academic year had median annual earnings ($29,064), which is below the statewide median annual earnings ($56,212). Notably, 72% of CVML Geographic Information Systems students attained a living wage, which is higher than the percentage of Geographic Information Systems students who attained a living wage statewide (70%).

Exhibit 12: Geographic Information Systems (2206.10) Strong Workforce Program Metrics

SWP Metric	SCCCD	SCV/SML Region	CVML Region	California
SWP Students	36	36	128	2,233
SWP Students Who Earned 9 or More Career Education Units in the District in a Single Year	0%	0%	38%	24%
SWP Students Who Completed a Noncredit CTE or Workforce Preparation Course	N/A	N/A	N/A	19%
SWP Students Who Earned a Degree or Certificate or Attained Apprenticeship Journey Status	N/A	N/A	N/A	4%
SWP Students Who Transferred to a Four-Year Postsecondary Institution	N/A	N/A	N/A	10%

SWP Metric	SCCCD	SCV/SML Region	CVML Region	California
SWP Students with a Job Closely Related to Their Field of Study	N/A	N/A	N/A	78%
Median Annual Earnings for SWP Exiting Students	N/A	N/A	$29,064 ($13.97)	$56,212 ($27.03)
Median Change in Earnings for SWP Exiting Students	N/A	N/A	35%	26%
SWP Exiting Students Who Attained the Living Wage	N/A	N/A	72%	70%

2022-23 2021-22 2020-21 N/A

Non-Community College Supply:

For a comprehensive regional supply analysis, it is also important to consider the supply from other institutions in the region that provide training programs for *Surveying and Mapping Technicians*. Supply data (2019-2022) shows there were no awards conferred by institutions in the related Classification of Instructional Programs (CIP) Code: Geographic Information Science and Cartography (45.0702).

Appendix A: Methodology

The CVML COE prepared this report by analyzing data from occupations and education programs.

Occupational data is derived from Lightcast, a labor market analytics firm that consolidates data from the California Employment Development Department (EDD), U.S. Bureau of Labor Statistics (BLS) and other government agencies. Program supply data is drawn from two systems: Taxonomy of Programs (TOP) and Classification of Instructional Programs (CIP).

Using a TOP-SOC crosswalk, the CVML COE identified middle-skill jobs for which programs within these TOP codes train. Middle-skill jobs include:

- All occupations that require an educational requirement of some college, associate degree or apprenticeship;
- All occupations that require a bachelor's degree, but also have more than one-third of their existing labor force with an educational attainment of some college or associate degree; or
- All occupations that require a high school diploma or equivalent or no formal education, but also require short- to long-term on-the-job training where multiple community colleges have existing programs.

The CVML COE determined labor market supply for an occupation or SOC code by analyzing the number of program completers or awards in a related TOP or CIP code. The COE developed a "supply table" with this information, which is the source of the program supply data for this report. TOP code data comes from the California Community Colleges Chancellor's Office MIS Data Mart (datamart.cccco.edu) and CIP code data comes from the Integrated Postsecondary Education Data System (nces.ed.gov/ipeds/use-the-data), also known as IPEDS. TOP is a system of numerical codes used at the state level to collect and report information on California community college programs and courses throughout the state that have similar outcomes. CIP codes are a taxonomy of academic disciplines at institutions of higher education in the United States and Canada. Institutions outside of the California Community College system do not use TOP codes in their reporting systems.

Data included in this analysis represent the labor market demand for relevant positions most closely related to the proposed program as expressed by the requesting college in consultation with the CVML COE. Traditional labor market information was used to show current and projected employment based on data trends, as well as annual average awards granted by regional community colleges. Real-time labor market information captures job post advertisements for occupations relevant to the field of study which can signal demand and show what employers are looking for in potential employees but is not a perfect measure of the quantity of open positions.

All representations have been produced from primary research and/or secondary review of publicly and/or privately available data and/or research reports. The most recent data available at the time of the analysis was examined; however, data sets are updated regularly and may not be consistent with previous reports. Efforts have been made to qualify and validate the accuracy of the data and findings; however, neither the Centers of Excellence for Labor Market Research (COE), COE host district, nor California Community Colleges Chancellor's Office are responsible for the applications or decisions made by individuals and/or organizations based on this study or its recommendations.

Appendix B: Data Sources

Data Type	Source
Occupational Projections, Wages, and Job Postings	Traditional labor market information data is sourced from Lightcast, a labor market analytics firm. Lightcast occupational employment data are based on final Lightcast industry data and final Lightcast staffing patterns. Wage estimates are based on Occupational Employment Statistics and the American Community Survey. For more information, see https://lightcast.io/
Living Wage	The living wage is derived from the Insight Center's California Family Needs Calculator, which measures the income necessary for an individual of family to afford basic expenses. The data assesses the cost of housing, food, childcare, health care, transportation, and taxes. For more information, see: https://selfsufficiencystandard.org/California/ The living wage for one adult in Fresno County is $16.70 per hour ($34,736.00 annually). This figure is used by the CCCCO to calculate the percentage of students that attained the regional living wage.
Typical Education and Training Requirements, and Educational Attainment	The Bureau of Labor Statistics (BLS) provides information about education and training requirements for hundreds of occupations. BLS uses a system to assign categories for entry-level education, work experience in a related occupation, and typical on-the-job training to each occupation for which BLS publishes projections data. For more information, see https://www.bls.gov/emp/documentation/education/tech.htm
Emerging Occupation Descriptions, Additional Education Requirements, and Employer Preferences	The O*NET database includes information on skills, abilities, knowledges, work activities, and interests associated with occupations. For more information, see https://www.onetonline.org/help/online/
Educational Supply	The CCCCO Data Mart provides information about students, courses, student services, outcomes and faculty and staff. For more information, see: https://datamart.cccco.edu The National Center for Education Statistics (NCES) Integrated Postsecondary Integrated Data System (IPEDS) collects data on the number of postsecondary awards earned (completions). For more information, see https://nces.ed.gov/ipeds/use-the-data/survey-components/7/completions
Student Metrics and Demographics	DataVista, a statewide data system supported by the California Community Colleges Chancellor's Office and hosted by Cal-PASS Plus, provides data on progress, success, employment, and earnings outcomes for California community college students. For more information, see: https://datavista.cccco.edu/

Data Type	Source
Population and Occupation Demographics	The Census Bureau's American Community Survey (ACS) is the premier source for detailed population and housing information. For more information, see: https://www.census.gov/programs-surveys/acs Data is sourced from IPUMS USA, a database providing access to ACS and other Census Bureau data products. For more information, see: https://usa.ipums.org/usa/about.shtml

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FOR LABOR MARKET RESEARCH
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