Environmental Scan & Program Demand Gap Analysis

HARTNELL COLLEGE

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Emsi

Introduction

An ef cient labor market requires a seamless flow of skilled workers between the educational institutions that train them and the employers that hire them. One factor behind workforce misalignment stems from when the needs of the employers evolve differently than the educational programs that train their workers.

These misalignments may happen at different times and for different reasons: 1) employer training becomes more tailored and comprehensive; 2) businesses come and go, and certain educational programs become more or less pertinent to a speci c region; 3) rapid advances in technology and business create curriculum needs that few educational institutions possess; and 4) as economic conditions shift, businesses have different hiring requirements of their employees.

In light of these dynamics, an up-to-date understanding of the regional economy and the demand for skilled labor is vital to the planning efforts of colleges and universities seeking to adapt their program offerings to the requirements of an ever-changing workforce.

To gain better insight into economic conditions and workforce trends, Hartnell College partnered with Emsi, a CareerBuilder company and leading provider of economic impact studies and labor market data. We conducted an environmental scan of the county's economy, with some select information of the wider region, and provided a program demand gap analysis of Hartnell College's program offerings.

The program demand gap analysis is performed by assessing the supply and demand of skilled workers and identifying the educational programs that need to be adapted in order to ll any existing or future gaps. The analysis weighs the educational output of Hartnell College and other postsecondary educational institutions in the region against the number of job openings related to the college's program offerings to determine whether a de cit or an oversupply of skilled workers exists. The goal of the analysis is to provide Hartnell College with relevant data and information that it can use when solving problems and making decisions about current and future program development.

IMPORTANT NOTE

This analysis is intended to serve as a point of departure for Hartnell College as the college discusses regional workforce needs. A de cit (gap) or oversupply (surplus) of workers in a particular occupation category represents a potential problem for the region, making it important for each program and occupation group to be evaluated by the college on a

INDUSTRY COMPOSITION

Evaluating current and future employment by industry provides information on the economic diversi cation of a given region. Understanding the industry mix of the county is important for drawing connections to the occupations and companies that are in-demand in the county. The North American Industry Classi cation System (NAICS) is the structure used by federal agencies to classify business establishments based on their production process (although the nal product or service is usually similar for the rms in a given industry). NAICS applies a six-digit hierarchical coding system to organize more than 1,100 detailed industries in the U.S. For this analysis, Emsi has aggregated these detailed industries into their three-digit NAICS codes, referred to as industry subsectors. Figure 2.2 presents the 15 largest industry subsectors in Monterey County, by their 2017 job counts, and also shows the industry subsectors' projected growth or decline over the next decade. Job growth between 2017 and 2027 is calculated using a combination of government-published sources at the national, state, and regional levels and a combination of the short-, mid-, and long-term trend lines. For more detail across all three-digit industry subsectors, please refer to Appendix 2.

As shown, the Support Activities for Agriculture & Forestry industry subsector had the highest number of jobs in Monterey County in 2017 and is expected to remain the top county employer. The Local Government industry subsector and the Crop Production industry subsector are the next largest in terms of jobs. Two of the top 15 industry subsectors are expected to contract

FIGURE 2.2: Jobs by Industry Subsector in Monterey County, 2017 and 2027

is the largest industry subsector in Monterey County and has the highest LQ. The largest occupation within this industry subsector, accounting for nearly 85% of the employment

are occupations that require some level of education beyond high school with higher median hourly wages. Occupations within the Accommodation industry subsector that meet these requirements are, for example, bookkeeping, accounting, & auditing clerks; massage therapists; sales representatives, services, all other; food service managers; and chefs & head cooks.

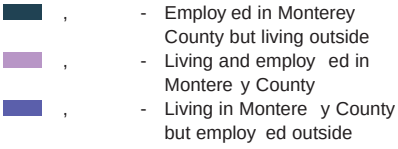
Appendix 2 provides a complete list of the top 25 occupations, with employment projections, related to the seven industry subsectors.

WORKFORCE COMMUTING PATTERNS

The Longitudinal Employer-Household Dynamics (LEHD) program [2] at the Census Bureau provides information on the residential and employment locations of workers. This provides community leaders with an idea of the commuting patterns of county employees. More speci cally, it demonstrates the extent to which employees commute to the county for work and/or residents commute to surrounding communities for work. The results of the LEHD data provide additional context as to how workers from outside the county could be lling current gaps or how the county's workers could be out-commuting when there is a surplus of available jobs. The concepts of a "gap" and "surplus" are discussed in greater detail in Section 1 of Chapter 3.

Figure 2.5 presents the inflow and outflow of jobs to and from Monterey County. There are 149,865 jobs in the county, with 98,618 lled by residents and 53,247 going to people living outside the county. Additionally, 48,684 out of the 147,302 residents commute outside the county for work. The gure illustrates that slightly more workers in-commute than out-commute. Supporting data tables can be found in Appendix 2

FIGURE 2.5: Monterey County Job Inflow and Outflow



SOC	DESCRIPTION	JOBS	RESIDENT WORKERS	NET COMMUTERS
-	Other Of ce and Administrative Support Workers	,	,	( )
-	Supervisors of Farming, Fishing, and Forestry Workers	,	,	
-	Agricultural Workers	,	,	,
-	Fishing and Hunting Workers			( )
-	Forest, Conservation, and Logging Workers			( )
-	Supervisors of Construction and Extraction Workers			( )
-	Construction Trades Workers	,	,	( )
-	Helpers, Construction Trades			
-	Other Construction and Related Workers			
-	Extraction Workers			
-	Supervisors of Installation, Maintenance, and Repair Workers			

The Standard Occupational Classi cation (SOC) is the structure used by federal agencies to classify workers into occupational categories. SOC applies a ve-digit hierarchical coding system to organize more than 860 detailed occupations in the U.S. For the analysis in this section, Emsi has aggregated these detailed occupations into their three-digit SOC codes, referred to as occupation sectors.

Table 2.1, on the previous page, shows the commuting patterns for Monterey County by occupation sector. The third column, “2017 Jobs”, displays the total number of people employed in Monterey County. The fourth column, “2017 Resident Workers”, shows the number of people living in the county that are employed in that occupation sector but not necessarily working in the county. Finally, the last column, “2017 Net Commuters”, shows the net amount of people commuting in or out of the county. For example, computer occupations (SOC 15-1100) has 2,621 people employed in the county. However, there are 3,402 workers living in the county employed in that occupation sector. Thus, 781 people employed in computer occupations are commuting to work outside of Monterey County. This speci c example has been included because of Hartnell’s Computer Programming program. Agriculture workers (SOC 45-2000) has over 11,000 workers commuting to Monterey County for employment.

POPULATION CHARACTERISTICS

This section shows data on population growth, age, race/ethnicity, poverty levels, and median household income. This information is important as it can prepare Hartnell College for potential changes in the amount of students it will serve, when these students will be reaching college age, and their socioeconomic status.

The Hartnell College Service Region is expected to grow in population between now and 2027. While the general population growth is important, also of interest to the college is the growth by age group. Table 2.2 shows population growth by county in the Hartnell College Service Region, while Figure 2.6, on the next page, shows population growth in Monterey County by age band. As can be seen in the gure, there is an overall trend that more residents will become of retirement age over the next ten years.

The Hartnell College Service Region is diverse as it has some areas below the national poverty rate and other more affluent areas. Table 2.3 displays the median household income and poverty rates for the counties comprising the Hartnell College Service Region, as well as for

TABLE 2.2: Population Growth in the Hartnell College Service Region

TABLE 2.3: Median Household Income and Poverty Rate for Selected Geographies

	MEDIAN HOUSEHOLD INCOME	POVERTY RATE	UNEMPLOYMENT
Monterey County	$,	. %	. %
Big Sur	$,	. %	. %
Carmel-by-the-Sea	$,	. %	. %
Carmel Valley	$,	. %	. %
Castroville	,	. %	. %
Gonzales	,	. %	. %
Green eld	$,	. %	. %
King City	$,	. %	. %
Pajaro	$,	. %	. %
Salinas	$,	. %	. %
San Ardo	$,	. %	. %
Seaside-Monterey	$,	. %	. %
Soledad	$,	. %	. %
Toro Park	$,	. %	

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Soleda414oro Park

liforniaBDC -53.082 -2.607 Td [(S)-15 (alina416034%)Tj E5.5C pan <</Laen-US7, 132 1362 >7MCID 1364 >>BDC 23.892 0 Td ($!7or)6 (o P)1776ark

California and the U.S. Interestingly, all counties that comprise the Hartnell College Service Region have a higher median household income than the U.S., but Monterey County has a higher poverty rate than the U.S. This, combined with the fact that Monterey County has the lowest median household income of the counties comprising the Hartnell College Service Region, indicate that the disparity in income within Monterey County is high.

EDUCATIONAL ATTAINMENT

This section describes the educational attainment of the population in Monterey County for adults aged 25 years and older. The data are useful for educators targeting speci c population groups that have low education levels. The county's educational attainment is presented by gender and ethnicity and broken out according to the following categories: 1) less than a high school diploma, 2) high school diploma, 3) some college, [3] 4) associate degree, 5) bachelor's degree, and 6) graduate degree and higher.

Figure 2.7 displays the educational attainment of the overall adult population in Monterey County, without reference to gender and ethnicity. In Monterey County, 52% of the adult population has a high school diploma or less, which is more than the national average of 42%. Out of all the education categories in Figure 2.7, the people who are most likely to seek education and training from Hartnell College are those in the "Less than High School Diploma," "High School Diploma," and "Some College" categories. Together, these categories total 195,827 people or 71% of the entire adult population in the county.

One important point to notice is that within the county, there are signi cantly the count.ountyollege are those in the "24 an7®n'éc

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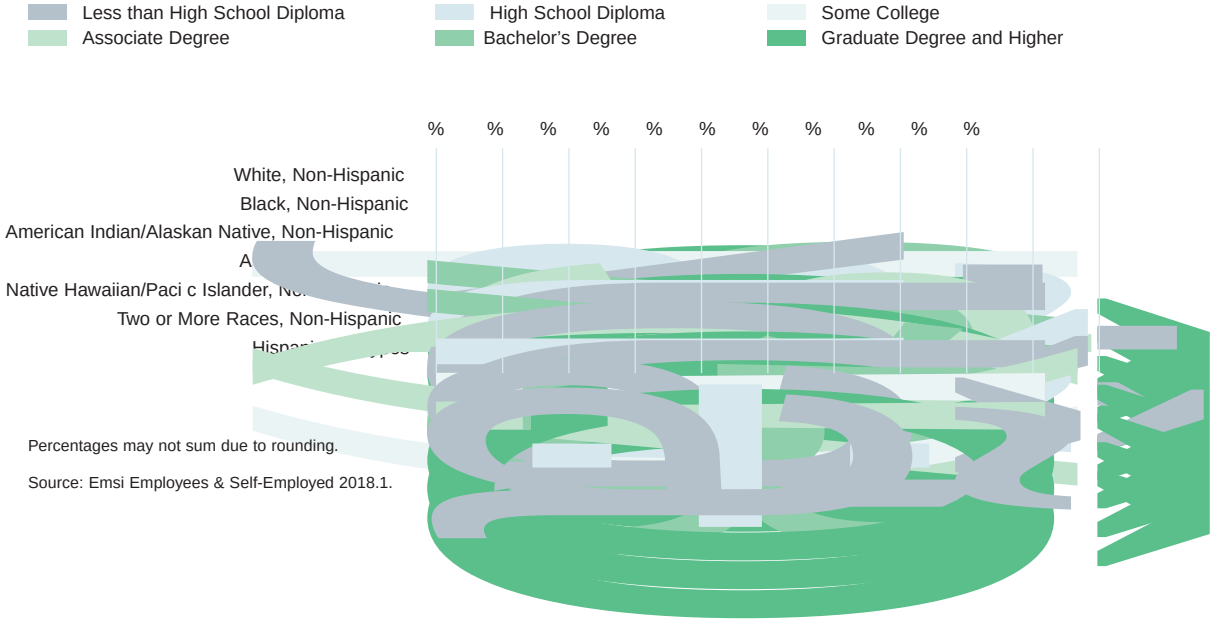
Types” and “American Indian or Alaskan Native, Non-Hispanic” categories have the lowest levels of educational attainment. For these groups, only 25% and 39%, respectively, of the adult population has had some sort of postsecondary degree training. These data suggest that there are many opportunities to increase educational attainment across all ethnic groups.

FIGURE 2.9: Educational Attainment of the Adult Population in Monterey County by Ethnicity



HARTNELL COLLEGE CURRENT AND FORMER STUDENT JOB PROFILES DATA

Emsi’s Alumni Insights database identi es current and former students by their employment outcomes through producing a database of more than 65 million professional pro les lterable by job titles, employers, occupations, locations, and more. The database contains an aggregate set of pro les from the open web, which includes all the major professional pro le sites. In this section, we: 1) report the number of current and former Hartnell College students by location, 2) provide a summary of the notable employers for Hartnell College’s current and former students, 3) show the other educational institutions associated with Hartnell College current and former students, 4) examine the most common job titles among current and former students, and 5) show the most common skills that Hartnell College’s current and former students report having on their job pro les.

Table 2.5, on the next page, displays the top locations for Hartnell College students. Of the 6,394 pro les with a location listed, the majority report Salinas as where they are currently employed. However, there are a range of other cities listed by current and former students as their place of employment across the state and country. Nearly 5% list San Francisco on their online job pro le, with other large cities in California occurring on the list as well, such as Sacramento, Los Angeles, and San Diego. There are three locations outside of California – Las Vegas, Nevada; Phoenix, Arizona; and Reno, Nevada.

TABLE 2.5: Top 25 Locations for Current and Former Hartnell College Students

TABLE 2.7: Top 25 Employers for Current and Former Hartnell College Students in Salinas, CA

COMPANY	PROFILES	OCCURANCE IN PERCENT OF PROFILES
Salinas Valley Memorial Healthcare Systems		. %
Salinas Union High School District		. %
County of Monterey		. %
Natividad Medical Center		. %
Monterey County Bank		. %
HSBC HOLDINGS PLC		. %
Capital One Financial Corporation		. %
Monterey County Of ce of Education		. %
California State University		. %
Wells Fargo & Company		. %
J.C. Penney Corporation, Inc.		. %
Alisal Union Elementary School District		. %
City of Salinas		. %
Dole Food Company, Inc.		. %
Macy's, Inc.		. %
Salinas City School District		. %
Target Corporation		. %
Community Hospital of The Monterey Peninsula		. %
Safeway Inc.		. %
State of California		. %
Bank of America Corporation		. %
Best Buy Co., Inc.		. %
Sears Holdings Corporation		. %
Taylor Farms		. %
Heavyconnect, Inc.		. %
All Other		. %
Total		N/A

Source: Emsi Alumni Insight.

Table 2.8 shows the most common educational institutions listed on current and former students' pro les. Every pro le listed Hartnell College on their online job pro le. The other institutions could occur for a number of reasons, but given the large amount of universities on

Table 2.9 shows the top occupations for current and former students from Hartnell College, while Table 2.10 shows the most common job titles. Emsi's catalogue of job titles is larger

Program Demand Gap Analysis

With the region's top industry subsectors and regional workforce in mind, the program demand gap analysis can now be conducted, answering the following question:

Where are there misalignments between the workforce demand and the supply of college completers?

This chapter outlines the de cit of Hartnell College's program completers to the workforce (gap), as well as the oversupply of completers to the workforce (surplus). The occupations directly related or mapped to the signi cant gaps are also displayed. Before providing and discussing the results, we will go over the interpretation of the results.

INTERPRETATION

The terms used in the analysis are as follows:

Gap: Represents a de cit, or when there are more job openings in a particular occupation than there are completers from higher education institutions within the region. If left unaddressed, a gap may lead to missed opportunities for economic growth and put stress on local businesses to nd the necessary talent elsewhere. Signi cant gaps translate into higher human resources costs and decreased ef ciencies in the economic system. They also provide an opportunity for institutions to develop new programs and/or strengthen their current programs.

Surplus: Represents an oversupply, or when there are more completers from regional higher education institutions than there are job openings in a particular occupation. If left unaddressed, signi cant surpluses may lead to higher unemployment rates or higher attrition rates—the college could be educating a workforce that is leaving the region after program completion because of a lack of job opportunities. Values in parentheses in the result tables represent a surplus.

One important consideration when reviewing the results is that not all gaps or surpluses indicate necessary adjustments. Due to labor market inef ciencies, it is common for most program categories to face a certain level of gap or surplus. This means only signi cant gaps or surpluses should be reviewed to allow for focus on the areas of concern. Given the size and characteristics of the Hartnell College Service Region, any gap or surplus of 80 jobs either

supply of program completers. The job demand is measured as the total number of annual job openings, on average, from 2017 to 2027. This total is calculated as the sum of the average annual job openings for every occupation mapped to the program. The job openings, by occupation, are not a gross measure of job openings available in the region; they have been weighted by the program's award level. In addition, the job openings have been de-duplicated across programs, when an occupation is mapped to more than one program. As for supply, it is shown as the average number of program completers in the region, by award level, between 2014 and 2016.[4] The gap, then, is the difference between job openings and program completers. See Appendix 3 for Hartnell College's program to occupation map and Appendix 4 for a detailed description of the report's methodology.

A greater amount of data is presented in the tables. The rst set shows the gaps and surpluses across all the programs offered at Hartnell College by award level. The tables include the Taxonomy of Programs (TOP) code and title, the average annual number of job openings associated with the program (which have been de-duplicated using the process outlined in Appendix 4), the average annual program completers from the region and from Hartnell College, and the gap or surplus for the Hartnell College Service Region. The programs' median hourly wage rates are speci c to the Hartnell College Service Region and have been tailored for each educational level.

The second set of tables provides insight into the occupations mapped to the programs with a signi cant gap, by award level, and the programs' occupational gaps and surpluses. The tables include the TOP code, TOP title, and occupations mapped to the program, by their Standard

SOC CODE	SOC TITLE	JOBS	JOBS	JOB CHANGE	AVERAGE ANNUAL JOB OPENINGS	MEDIAN HOURLY WAGE
-	Operating Engineers & Other Construction Equipment Operators					$.
-	Roofers					$.
-	Drywall & Ceiling Tile Installers					$.
-	First-Line Supervisors of Construction Trades & Extraction Workers					$.
-	Glaziers					$.
-	Sheet Metal Workers					$.
-	Cement Masons & Concrete Finishers					$.
-	Tile & Marble Setters					$.
-	Carpet Installers			( )		$.
-	Construction & Building Inspectors					$.
-	Civil Engineering Technicians					$.
-	Floor Layers, Except Carpet, Wood, & Hard Tiles					$.
-	Insulation Workers, Floor, Ceiling, & Wall					$.
-	Business Operations Specialists, All Other	,	,			$.
-	Insulation Workers, Mechanical					$.
-	Construction Managers			( )		$.
-	Cost Estimators					$.
-	Floor Sanders & Finishers			( )		$.
-	Terrazzo Workers & Finishers					$.
-	Paperhangers					$.
-	Career/Technical Education Teachers, Secondary School					$.
.	OFFICE TECHNOLOGY/OFFICE COMPUTER APPLICATIONS					
-	Secretaries & Administrative Assistants, Except Legal, Medical, & Executive	,	,			$.
-	Receptionists & Information Clerks	,	,			$.
-	Of ce Clerks, General	,	,			$.
-	Word Processors & Typists					

SOC CODE	SOC TITLE	JOBS	JOBS	JOB CHANGE	AVERAGE ANNUAL JOB OPENINGS	MEDIAN HOURLY WAGE
-	Cleaners of Vehicles & Equipment					

TABLE 3.3: Supply and Demand for Associate Degree Level Programs at Hartnell College

TOP CODE	TOP TITLE	AVERAGE ANNUAL JOB OPENINGS	AVERAGE ANNUAL COMPLETERS	AVERAGE ANNUAL HARTNELL COLLEGE COMPLETERS	GAP OR SURPLUS	MEDIAN HOURLY WAGE
.	Agriculture Technology and Sciences, General	,			,	$.
.	Business Administration	,			,	$.
.	Of ce Technology/Of ce Computer Applications					$.
.	Automotive Technology					$.
.	Welding Technology					$.
.	Administration of Justice					$.
.	Diesel Technology					$.
.						

certi cate level. Since this section of the analysis considers openings at an associate degree and below, it is important to examine how many more jobs are available to graduates by moving from a certi cate to an associate degree. There were 3,593 average annual openings at the certi cate level, and there are 3,738 average annual openings at the associate degree level. This means that attaining an associate degree increases the number of jobs available to graduates by 146 average annual job openings. It looks like this increase is spread across the occupations mapped to the program, meaning it is not due to one primary occupation that may require more of an associate degree.

The second largest gap is for Business Administration, and this program maps to a wide range of occupations. Analyzing the mapping is important to see which occupations have a high wage and ample employment opportunities. Of ce clerks, general has 500 average

TABLE 3.4:

SOC CODE	SOC TITLE	JOBS	JOBS	JOB CHANGE	AVERAGE ANNUAL JOB OPENINGS	MEDIAN HOURLY WAGE
-	Administrative Services Managers					$.
-	Construction Managers					$
-	Management Analysts	,	,			$.
-	Sales Managers	,	,			$.
-	Cost Estimators					C84les Managers

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TABLE 3.5: Supply and Demand for Transfer Track Associate Degree Level Programs at Hartnell College

TOP CODE	TOP TITLE	AVERAGE ANNUAL JOB OPENINGS	AVERAGE ANNUAL COMPLETERS	AVERAGE ANNUAL HARTNELL COLLEGE COMPLETERS	GAP OR SURPLUS	MEDIAN HOURLY WAGE
.	Child Development/Early Care and Education					$.
.	Art					$.
.	English					$.
.	Music					$.
.	Engineering, General					$.
.	Spanish					$.
.						

program completer with a bachelor's degree level of education. At Hartnell College, there are 16 such transfer track associate degree level programs when classi ed by TOP codes.

Figure 3.3 shows the programs with a signi cant gap. The Child Development/Early Care & Education program has the largest, followed by the Art program. As shown in Table 3.5, there are 670 average annual job openings in the region for occupations related to the Child Development/Early Care & Education program. On average, the college graduates 15 annual completers. These data take annual reported job openings at the bachelor's degree level of education into account and have been adjusted for other programs that train for the occupations related to Child Development/Early Care & Education.

The next step in the analysis is to consider the occupational gaps within the program. Child Development/Early Care & Education has the largest signi cant gap, with much of the demand due to two occupations – teacher assistants and childcare workers. Art also has a signi cant gap; this program is mapped to numerous education occupations such as elementary school

teachers, except special education & self-enrichment education teachers. For the Art program,

TABLE 3.10: Occupations Related to Hartnell's Signi cant Gap Programs at the Transfer Track Associate Degree Level

SOC CODE	SOC TITLE	JOBS	JOBS	JOB CHANGE	AVERAGE ANNU2e0 >>BDC 0.552 -1.167 Td [(ANNU2e0 >>BDC 0.5

correctional of cers & jailers, which is signi cantly above the nation's median hourly wage for this occupation. Most occupations require a certi cate level of education or lower, but creating an associate degree program may capture more of the regional demand for these occupations and make completers more competitive in the labor market.

ADDITIONS AT THE ASSOCIATE DEGREE LEVEL

Table 4.2 reports occupations requiring an associate degree that are not currently being trained for by Hartnell College. Most are within the healthcare eld. Although only the rst few occupations have a noticeable number of average annual openings within the Hartnell College Service Region, more are included since they could be grouped with other similar occupations or to an existing program.

The top gap is for dental hygienists, with a gap of 23 and median hourly wage of $46.69. Dental hygienists are trained for at the associate degree level but some programs can be at a bachelor's degree level. The next highest gaps are for physical therapist assistants and physical therapist aides, although physical therapist aides only have a median hourly wage of $13.71. Nevertheless, these represent an opportunity to group occupations into a program

TABLE 4.2: Programmatic Areas of Opportunity at the Associate Degree Level for Hartnell College

SOC CODE	SOC TITLE	AVERAGE ANNUAL JOB OPENINGS	AVERAGE ANNUAL REGIONAL COMPLETERS	GAP	MEDIAN HOURLY WAGE
-	Dental Hygienists				$.
-	Physical Therapist Assistants				$.
-	Physical Therapist Aides				$.
-	Occupational Therapy Assistants				$.
-	Radiologic Technologists				$.
-	Diagnostic Medical Sonographers				$.
-	Cardiovascular Technologists & Technicians				$.
-	Occupational Therapy Aides				$.
-	Morticians, Undertakers, & Funeral Directors				$.
-	Magnetic Resonance Imaging Technologists				$.
-	Nuclear Medicine Technologists				$.

Numbers may not sum due to rounding. Annual completers represent an average across the past three years.

Source: Emsi program demand gap model.

ADDITIONS AT THE TRANSFER TRACK ASSOCIATE DEGREE LEVEL

As seen in Table 4.3, business and education occupations frequently occur. The top gap

Key Recommendations

Hartnell College serves an economically diverse region, although of notable importance to Hartnell College should be the large Hispanic population. In Monterey County, 54% of the Hispanic population has less than a high school degree, with an additional 21% having just a high school degree. In the county, 54% of the population identi es as being Hispanic. Pairing this data shows that there are over 100,000 Hispanic individuals in Monterey County with a high school degree or less. With the majority of those individuals at less than a high school degree, there needs to be a robust program to engage these learners in a high school equivalency program (HEP) and English as a Second Language program, and the college should be prepared to offer remedial math and English courses.

Beyond offering these courses, there are a number of other issues to consider. For instance, many of these learners may be rst generation college students where retention and persistence issues may arise. Additionally, these learners may need additional assistance navigating through admissions, nancial aid, and deciding on a program of study. A recent

Electronics & Electric Technology (gap of 36; median hourly wage of $23.45). Additionally, there may be demand for a degree in Accounting at the associate degree award level. For transfer track programs, the best opportunity for program expansion is for Engineering, General (gap of 42; median hourly wage of $44.76).

This report identi es 74 occupations that Hartnell College's current programs are not mapped to and therefore represent potential new program opportunities. Based on the data observed in this report, Hartnell College should especially consider programs for Electricians and Heating, Air Conditioning, & Refrigeration Mechanics & Installers for trade type programs. Electricians have a gap of 116 with a median hourly wage of $28.51. Heating, Air Conditioning, & Refrigeration Mechanics & Installers have a gap of 56 and a median hourly wage of $21.81. This program may be particularly valuable in the region because of the presence of the agriculture industry. There are two certi cate level healthcare programs that Hartnell College should consider further – dental assistants and pharmacy technicians, with gaps of 89 and 38, respectively. At the associate degree level, there is a gap of 23 for dental hygienists, although further research is needed, there could be a degree of compatibility between a dental assistant and dental hygienist program. In California, the average number of completers per college for dental hygienist program's was 49. For college's offering dental hygienist program's, the average number of completers per college was 27. This data could be of importance to Hartnell College because it provides insight into whether or not the Hartnell College Service Region could support an average sized program. In addition, it offers insight into how many students the program needs in order to be sustainable.

Appendix 1: Glossary of Terms

Associate Degree A degree granted for the successful completion of a sub-baccalaureate program of studies, usually requiring at least 2 years (or equivalent) of full-time college-level study. This includes degrees granted in a cooperative or work-study program. For the program demand gap analysis degrees of greater than two years but less than four as de ned by IPED's are included in the associate degree category.

Certi cate A formal award certifying the satisfactory completion of a postsecondary education program. Certi cates can be awarded at any level of postsecondary education and include awards below the associate's degree level. For the program demand gap analysis this includes awards of less than one year and greater than one year but less than two, as de ned by IPED's.

Gap Represents a de cit, or when there are more job openings in a particular occupation than there are completers from higher education institutions within the region. If left unaddressed, a gap may lead to missed opportunities for economic growth and put stress on local businesses to nd the necessary talent elsewhere. Signi cant gaps translate into higher human resources costs and decreased ef ciencies in the economic system. They also provide an opportunity for institutions to develop new programs and/or strengthen their current programs.

Job Openings Job openings throughout the program demand gap analysis are the average number of projected openings between 2017 and 2027. The openings are calculated for each occupation that the program maps to and are deduplicated across programs that may be training for the same occupation using Emsi's weighting methodology. For each award level the number of openings are reported for that educational level and all education levels below it.

Location Quotient A comparative statistic used to calculate the relative employment concentration of a given industry or occupation against the average employment of the industry in a larger geography (for example, countrywide). Industries with a higher location quotient (usually greater than 1.2) indicate that the region has a comparative advantage or specialization in the production of that good or service or has a high degree of specialization within its workforce.

NAICS The North American Industry Classi cation System (NAICS) classi es North American business establishment in order to better collect, analyze, and publish statistical data related to the business economy.

New Programs Additions New program additions are workforce gaps that exist for occupations that the college does not currently train for based off of the mapping of the college's current programs. The award level recommended for these occupations is

determined based off the level of education of workers currently employed in that particular occupation.

Program Completers For the program demand gap analysis program completers are the average number of students over a three year period who receive a degree or award for a program of study, as reported to IPED's. An average over three years is used to control for any upward or downward spikes in completions in any one year.

Transfer Track Associate Transfer track associate degrees are not a formal award level as de ned by IPED's. These are associate degrees, as de ned by IPED's, that prepare a student to pursue a baccalaureate degree as opposed to being a two year terminal degree. These are usually denoted with an AA-T or AS-T in the college's course catalog.

Appendix 3: Economic Overview Tables

In Chapter 2, we provided a high-level overview with gures of Monterey County. This appendix holds the supporting data tables.

INDUSTRY COMPOSITION

TABLE A 2.1: Current and Projected Jobs by Industry Subsector in Monterey County, 2017 and 2027

NAICS CODE	NAICS TITLE	JOBS	JOBS

NAICS CODE	NAICS TITLE	JOBS	JOBS	CHANGE	% CHANGE
	Plastics & Rubber Products Manufacturing				%
	Nonmetallic Mineral Product Manufacturing			( )	(%)
	Primary Metal Manufacturing			( )	(%)
	Fabricated Metal Product Manufacturing				%
	Machinery Manufacturing				%
	Computer & Electronic Product Manufacturing				%
	Electrical Equipment, Appliance, & Component Manufacturing				%
	Transportation Equipment Manufacturing				%
	Furniture & Related Product Manufacturing				%
	Miscellaneous Manufacturing				%
	Merchant Wholesalers, Durable Goods	,	,		%
	Merchant Wholesalers, Nondurable Goods	,	,		%
	Wholesale Electronic Markets & Agents & Brokers			( )	(%)
	Motor Vehicle & Parts Dealers	,	,		%
	Furniture & Home Furnishings Stores				%
	Electronics & Appliance Stores				%
	Building Material & Garden Equipment & Supplies Dealers	,	,	( )	
EMC30			0126		

NAICS CODE	NAICS TITLE	JOBS	JOBS	CHANGE	% CHANGE
	Broadcasting (except Internet)			( )	(%)
	Telecommunications				%
	Data Processing, Hosting, & Related Services				
9136 .852EMC /Span <</an <3n <</Lang (en-US)/MCID 6160 >>BDC 6.9592)					

TABLE A 2.2: Employment Concentration (LQ) by Industry Subsector in Monterey County, 2017 and 2027

NAICS CODE	NAICS TITLE	LQ	LQ
	Wholesale Electronic Markets & Agents & Brokers	.	.
	Motor Vehicle & Parts Dealers	.	.
	Furniture & Home Furnishings Stores	.	.
	Electronics & Appliance Stores	.	.
	Building Material & Garden Equipment & Supplies Dealers	.	.
	Food & Beverage Stores	.	.
	Health & Personal Care Stores	.	.
	Gasoline Stations	.	.
	Clothing & Clothing Accessories Stores	.	.
	Sporting Goods, Hobby, Musical Instrument, & Book Stores	.	.
	General Merchandise Stores	.	.
	Miscellaneous Store Retailers	.	.
	Nonstore Retailers	.	.
	Air Transportation	.	.
	Rail Transportation	.	.
	Water Transportation	.	.
	Truck Transportation	.	.
	Transit & Ground Passenger Transportation	.	.
	Pipeline Transportation	.	.
	Scenic & Sightseeing Transportation	.	.
	Support Activities for Transportation	.	.
	Postal Service	.	.
	Couriers & Messengers	.	.
	Warehousing & Storage	.	.
	Publishing Industries (except Internet)	.	.
	Motion Picture & Sound Recording Industries	.	.
	Broadcasting (except Internet)	.	.
	Telecommunications	.	.
	Data Processing, Hosting, & Related Services	.	.
	Other Information Services	.	.
	Monetary Authorities-Central Bank	.	.
	Credit Intermediation & Related Activities	.	.
	Securities, Commodity Contracts, & Other Financial Investments & Related Activities	.	.
	Insurance Carriers & Related Activities	.	.
	Funds, Trusts, & Other Financial Vehicles	.	.
	Real Estate	.	.
	Rental & Leasing Services	.	.
	Lessors of Non nancial Intangible Assets (except Copyrighted Works)	.	.

SOC CODE	SOC TITLE	JOBS	JOBS	CHANGE	% CHANGE	% OF JOBS IN INDUSTRY
-	Landscaping and Groundskeeping Workers				%	. %
-	Light Truck or Delivery Services Drivers				%	. %
-	Packers and Packagers, Hand				%	. %
-	Agricultural Workers, All Other				%	. %
-	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scienti c Products					

SOC CODE	SOC TITLE	JOBS	JOBS	CHANGE	% CHANGE	% OF JOBS IN INDUSTRY
-	Shipping, Receiving, and Traf c Clerks				%	. %
-	General and Operations Managers				%	. %
-	Merchandise Displayers and Window Trimmers				%	. %
-	Industrial Truck and Tractor Operators				%	. %
-	Packers and Packagers, Hand				%	. %
-	Sales Managers				%	. %
-	Bookkeeping, Accounting, and Auditing Clerks				%	. %
-	Of ce Clerks, General				%	. %
-	First-Line Supervisors of Non-Retail Sales Workers				%	. %
-	Customer Service Representatives				%	. %
-	Cashiers				%	. %
-	First-Line Supervisors of Of ce and Administrative Support Workers				%	. %
-	Graders and Sorters, Agricultural Products				%	. %
-	Secretaries and Administrative Assistants, Except Legal, Medical, and Executive				%	. %
-	Demonstrators and Product Promoters				%	. %
-	Order Clerks				%	. %
-	Retail Salespersons				%	. %
-	First-Line Supervisors of Transportation and Material-Moving Machine and Vehicle Operators				%	. %

Source: Employees & Self-Employed 2018.1.

TABLE A 2.6: Employment Projections in Monterey County for the Top 25 Occupations Related to the Social Assistance (NAICS 624) Industry Subsector

SOC CODE	SOC TITLE	JOBS	JOBS	CHANGE	% CHANGE	% OF JOBS IN INDUSTRY
-	Personal Care Aides	,	,		%	. %
-	Childcare Workers			( )	(%)	. %
-	Social and Human Service Assistants				%	. %
-	Preschool Teachers, Except Special Education				%	. %
-	Home Health Aides				%	. %
-	Social and Community Service Managers				%	. %
-	Of ce Clerks, General				%	. %
-	Secretaries and Administrative Assistants, Except Legal, Medical, and Executive				%	. %
-	Nursing Assistants				%	. %

SOC CODE	SOC TITLE	JOBS	JOBS	CHANGE	% CHANGE	% OF JOBS IN INDUSTRY
-	Teachers and Instructors, All Other				%	. %
-	Teacher Assistants				%	. %
-	Registered Nurses				%	. %
-	General and Operations Managers				%	. %
-	Healthcare Social Workers				%	. %
-	Cooks, Institution and Cafeteria				%	. %
-	Mental Health Counselors				%	. %
-	First-Line Supervisors of Personal Service Workers				%	. %
-	Rehabilitation Counselors				%	. %
-	Licensed Practical and Licensed Vocational Nurses				%	. %
-	Janitors and Cleaners, Except Maids and Housekeeping Cleaners				%	. %
-	Community and Social Service Specialists, All Other				%	. %
-	Bookkeeping, Accounting, and Auditing Clerks				%	. %
-	Child, Family, and School Social Workers				%	. %
-	Recreation Workers				%	. %
-	Bus Drivers, School or Special Client				%	. %

Source: Employees & Self-Employed 2018.1.

TABLE A 2.7: Employment Projections in Monterey County for the Top 25 Occupations Related to the Local Government (NAICS 903) Industry Subsector

SOC CODE	SOC TITLE	JOBS	JOBS	CHANGE	% CHANGE	% OF JOBS IN INDUSTRY
-	Elementary School Teachers, Except Special Education	,	,		%	. %
-	Teacher Assistants	,	,		%	. %
-	Substitute Teachers	,	,		%	. %
-	Teachers and Instructors, All Other		,		%	. %
-	Secondary School Teachers, Except Special and					

SOC CODE	SOC TITLE	JOBS	JOBS	CHANGE	% CHANGE	% OF JOBS IN INDUSTRY
-	Correctional Of cers and Jailers				%	. %
-	Of ce Clerks, General				%	. %
-	Secretaries and Administrative Assistants, Except Legal, Medical, and Executive				%	. %

JOBS JOBSCHANGE HANGE

SOC CODE	SOC TITLE	JOBS	JOBS	CHANGE	% CHANGE	% OF JOBS IN INDUSTRY
-	Biological Scientists, All Other			( )	(%)	. %
-	Air Traf c Controllers			( )	(%)	. %
-	General and Operations Managers			( )	(%)	. %
-	Installation, Maintenance, and Repair Workers, All Other			( )	(%)	. %
-	Education, Training, and Library Workers, All Other			( )	(%)	. %

EDUCATIONAL ATTAINMENT

TABLE A 2.12: Breakdown of Adult Population in Monterey County by Educational Attainment, 2012 and 2017

EDUCATION LEVEL	POPULATION	% DISTRIBUTION	POPULATION	% DISTRIBUTION	POPULATION CHANGE	% DISTRIBUTION CHANGE
Less than high school diploma or equivalent	,	%	,	%	,	. %
High school diploma or equivalent	,	%	,	%	( )	(. %)
Some college	,	%	,	%		(. %)
Associate degree	,	%	,	%	( )	(. %)
Bachelor's degree	,	%	,	%		(. %)
Graduate degree or higher	,	%	,	%	( )	(. %)

Source: Employees & Self-Employed 2018.1.

TABLE A 2.13:

			% OF WORKFORCE WITH GIVEN EDUCATION LEVEL				
SOC CODE	SOC TITLE	PROGRAM BASED WEIGHT	LESS THAN HIGH SCHOOL	HIGH SCHOOL	CERTIFICATE OR SOME COLLEGE	ASSOCIATE DEGREE	BACHELOR'S DEGREE
-	Multimedia Artists & Animators	.					
-	Graphic Designers	.					

	% OPATION I SE8LEVEL

			% OF WORKFORCE WITH GIVEN EDUCATION LEVEL				
SOC CODE	SOC TITLE	PROGRAM BASED WEIGHT	LESS THAN HIGH SCHOOL	HIGH SCHOOL	CERTIFICATE OR SOME COLLEGE	ASSOCIATE DEGREE	BACHELOR'S DEGREE
MECHANICAL DRAFTING							
-	Mechanical Drafters	.					
SPANISH							
-	Postsecondary Teachers	.					
-	Elementary School Teachers, Except Special Education	.					
-	Middle School Teachers, Except Special & Career/ Technical Education	.					
-	Secondary School Teachers, Except Special & Career/ Technical Education	.					
-	Adult Basic & Secondary Education & Literacy Teachers & Instructors	.					
-	Interpreters & Translators	.					
-	Detectives & Criminal Investigators	.					
-							

			% OF WORKFORCE WITH GIVEN EDUCATION LEVEL							
SOC CODE	SOC TITLE	PROGRAM								

			% OF WORKFORCE WITH GIVEN EDUCATION LEVEL				
SOC CODE	SOC TITLE	PROGRAM BASED WEIGHT	LESS THAN HIGH SCHOOL	HIGH SCHOOL	CERTIFICATE OR SOME COLLEGE	ASSOCIATE DEGREE	BACHELOR'S DEGREE
-	Postsecondary Teachers	.					
-	Middle School Teachers, Except Special & Career/ Technical Education	.					
-	Secondary School Teachers, Except Special & Career/ Technical Education	.					
-	Statistical Assistants	.					
KINESIOLOGY							
-	Education Administrators, All Other	.					
-	Statisticians	.					
-	Biochemists & Biophysicists	.					
-	Exercise Physiologists	.					
-	Athletic Trainers	.					
-	Fitness Trainers & Aerobics Instructors	.					
ASTRONOMY							
-	Natural Sciences Managers	.					
-	Astronomers	.					
-	Physicists	.					
-	Atmospheric & Space Scientists	.					
-	Postsecondary Teachers	.					
CHEMISTRY, GENERAL							
-	Natural Sciences Managers	.					
-	Chemical Engineers	.					
-	Engineers, All Other	.					
-	Food Scientists & Technologists	.					
-	Soil & Plant Scientists	.					

			% OF WORKFORCE WITH GIVEN EDUCATION LEVEL				
SOC CODE	SOC TITLE	PROGRAM BASED WEIGHT	LESS THAN HIGH SCHOOL	HIGH SCHOOL	CERTIFICATE OR SOME COLLEGE	ASSOCIATE DEGREE	BACHELOR'S DEGREE
-	Geological & Petroleum Technicians	.					
-	Forensic Science Technicians	.					
-	Postsecondary Teachers	.					
-	Secondary School Teachers, Except Special & Career/ Technical Education	.					
-	Museum Technicians & Conservators	.					
PHYSICS, GENERAL							
-	Natural Sciences Managers	.					
-	Nuclear Engineers	.					
-	Biochemists & Biophysicists	.					
-	Aerospace Engineering and Operations Technologists and Technicians	.					
-	Astronomers	.					
-	Chemical Engineers	.					
-	Chemical Technicians	.					
-	Chemists	.					
-	Computer Hardware Engineers	.					
-	Electrical Engineers	.					
-	Electrical and Electronics Engineering Technologists and Technicians	.					
-	Electronics Engineers, Except Computer	.					
-	Environmental Engineering Technologists and Technicians	.					
-	Environmental Engineers	.					
-	Environmental Science and Protection Technicians, Including Health	.					
-	Health Physicists	.					
-	Industrial Engineering Technologists and Technicians	.					
-	Industrial Engineers	.					
-	Manufacturing Engineering Technologists and Technicians	.					
-	Manufacturing Engineers	.					
-	Materials Engineers	.					
-	Mechanical Engineering Technologists and Technicians	.					
-	Mechanical Engineers	.					
-	Mining and Geological Engineers, Including Mining Safety Engineers	.					
-	Nanosystems Engineers	.					
-	Nuclear Engineering Technologists and Technicians	.					
-	Petroleum Engineers	.					
-	Physicists	.					
-	Surveying and Mapping Technicians	.					
-	Surveyors	.					
-	Transportation Engineers	.					
-	Architectural and Engineering Managers	.					
-	Biochemists & Biophysicists	.					
-	Biomedical Engineers	.					
-	Chemical Engineers	.					
-	Chemical Technicians	.					
-	Chemists	.					
-	Computer Hardware Engineers	.					
-	Electrical Engineers	.					
-	Electrical and Electronics Engineering Technologists and Technicians	.					
-	Electronics Engineers, Except Computer	.					
-	Environmental Engineering Technologists and Technicians	.					
-	Environmental Engineers	.					
-	Environmental Science and Protection Technicians, Including Health	.					
-	Health Physicists	.					
-	Industrial Engineering Technologists and Technicians	.					
-	Industrial Engineers	.					
-	Manufacturing Engineering Technologists and Technicians	.					
-	Manufacturing Engineers	.					
-	Materials Engineers	.					
-	Mechanical Engineering Technologists and Technicians	.					
-	Mechanical Engineers	.					
-	Mining and Geological Engineers, Including Mining Safety Engineers	.					
-	Nanosystems Engineers	.					
-	Nuclear Engineering Technologists and Technicians	.					
-	Petroleum Engineers	.					
-	Physicists	.					
-	Surveying and Mapping Technicians	.					
-	Surveyors	.					
-	Transportation Engineers	.					

			% OF WORKFORCE WITH GIVEN EDUCATION LEVEL				
SOC CODE	SOC TITLE	PROGRAM BASED WEIGHT	LESS THAN HIGH SCHOOL	HIGH SCHOOL	CERTIFICATE OR SOME COLLEGE	ASSOCIATE DEGREE	BACHELOR'S DEGREE
-	Rehabilitation Counselors	.					
-							

			% OF WORKFORCE WITH GIVEN EDUCATION LEVEL				
SOC CODE	SOC TITLE	PROGRAM BASED WEIGHT	LESS THAN HIGH SCHOOL	HIGH SCHOOL	CERTIFICATE OR SOME COLLEGE	ASSOCIATE DEGREE	BACHELOR1 >>BDC 6.738 1.167 Td [(A)17 (SSO

			% OF WORKFORCE WITH GIVEN EDUCATION LEVEL				
SOC CODE	SOC TITLE	PROGRAM BASED WEIGHT	LESS THAN HIGH SCHOOL	HIGH SCHOOL	CERTIFICATE OR SOME COLLEGE	ASSOCIATE DEGREE	BACHELOR'S DEGREE
-	Construction Managers	.					
-	Cost Estimators	.					
-	First-Line Supervisors of Construction Trades & Extraction Workers	.					
-	Manufactured Building & Mobile Home Installers	.					
CONSTRUCTION CRAFTS TECHNOLOGY							
-	Construction Managers	.					
-	Cost Estimators	.					
-	Business Operations Specialists, All Other	.					
-	Civil Engineering Technicians	.					
-	Career/Technical Education Teachers, Secondary School	.					
-	First-Line Supervisors of Construction Trades & Extraction Workers	.					
-	Carpenters	.					
-	Carpet Installers	.					
-	Floor Layers, Except Carpet, Wood, & Hard Tiles	.					
-	Floor Sanders & Finishers	.					
-	Tile & Marble Setters	.					
-	Cement Masons & Concrete Finishers	.					
-	Terrazzo Workers & Finishers	.					
-	Construction Laborers	.					
-	Operating Engineers & Other Construction Equipment Operators	.					
-	Drywall & Ceiling Tile Installers	.					
-	Glaziers	.					
-	Insulation Workers, Floor, Ceiling, & Wall	.					
-	Insulation Workers, Mechanical	.					
-	Painters, Construction & Maintenance	.					

			% OF WORKFORCE WITH GIVEN EDUCATION LEVEL				
SOC CODE	SOC TITLE	PROGRAM BASED WEIGHT	LESS THAN HIGH SCHOOL	HIGH SCHOOL	CERTIFICATE OR SOME COLLEGE	ASSOCIATE DEGREE	BACHELOR'S DEGREE
-	Paperhangers	.					
-	Roofers	.					
-	Sheet Metal Workers	.					
-	Construction & Building Inspectors	.					
-	Maintenance & Repair Workers, General	.					
ELECTRONICS & ELECTRIC TECHNOLOGY							
-	First-Line Supervisors of Mechanics, Installers, & Repairers	.					
-	Computer, Automated Teller, & Of ce Machine Repairers	. .					
-	Radio,03 /Span <</Lang (72077 >>B /Span <</Lang AEMC /Span [illegible]						

			% OF WORKFORCE WITH GIVEN EDUCATION LEVEL				
SOC CODE	SOC TITLE	PROGRAM BASED WEIGHT	LESS THAN HIGH SCHOOL	HIGH SCHOOL	CERTIFICATE OR SOME COLLEGE	ASSOCIATE DEGREE	BACHELOR'S DEGREE
-	Electrical & Electronics Installers & Repairers, Transportation Equipment	.					
-	Electronic Equipment Installers & Repairers, Motor Vehicles	.					
-	Automotive Body & Related Repairers	.					
-	Automotive Glass Installers & Repairers	.					
-	Automotive Service Technicians & Mechanics	.					
-	Tire Repairers & Changers	.					
-	Maintenance & Repair Workers, General	.					
-	Transportation Inspectors	.					
-	Cleaners of Vehicles & Equipment	.					
DIESEL TECHNOLOGY							
-	Automotive Service Technicians & Mechanics	.					
-	Bus & Truck Mechanics & Diesel Engine Specialists	.					
-	Helpers--Installation, Maintenance, & Repair Workers	.					
-	Transportation Inspectors	.					
WELDING TECHNOLOGY							
-	First-Line Supervisors of Construction Trades & Extraction Workers	.					
-	Plumbers, Pipe tters, & Steam tters	.					
-	Reinforcing Iron & Rebar Workers	.					
-	Sheet Metal Workers	.					
-	Structural Iron & Steel Workers	.					
-	Maintenance & Repair Workers, General	.					
-	Welders, Cutters, Solderers, & Brazers	.					

			% OF WORKFORCE WITH GIVEN EDUCATION LEVEL				
SOC CODE	SOC TITLE	PROGRAM BASED WEIGHT	LESS THAN HIGH SCHOOL	HIGH SCHOOL	CERTIFICATE OR SOME COLLEGE	ASSOCIATE DEGREE	BACHELOR'S DEGREE
-	Curators	.					
-	Museum Technicians & Conservators	.					
-	Art Directors	.					
-	Craft Artists	.					
-	Fine Artists, Including Painters, Sculptors, & Illustrators	.					
-	Multimedia Artists & AnimJ EMC /Span <C 6.636 0 Td ( )Tj EMC /Span <</Lang (e74 > T 8.3647(8(An15ng (en-US)/MCID 11706 >>BDC 5.35 0 Td ( )Tj EMC /Span <<						

			% OF WORKFORCE WITH GIVEN EDUCATION LEVEL				
SOC CODE	SOC TITLE	PROGRAM BASED WEIGHT	LESS THAN HIGH SCHOOL	HIGH SCHOOL	CERTIFICATE OR SOME COLLEGE	ASSOCIATE DEGREE	BACHELOR'S DEGREE
-	Respiratory Therapy Technicians	.					
ALCOHOL AND CONTROLLED SUBSTANCES							
-	Substance Abuse & Behavioral Disorder Counselors	.					
-	Mental Health Counselors	.					
-	Mental Health & Substance Abuse Social Workers	.					
-	Social & Human Service Assistants	.					
NURSING							
-	Medical & Health Services Managers	.					
-	Postsecondary Teachers	.					
-	Registered Nurses	.					
-	Nurse Anesthetists	.					
-	Nurse Midwives	.					
-	Nurse Practitioners	.					
LICENSED VOCATIONAL NURSING							

CODE	% OF WORKFORCE WITH GIVEN 1 0 0Oc 0 0 m 48UCATIO 0 0 m LEVEL
WEIGHT	
SCHOOL	
COLLEGE	DEGREE

			% OF WORKFORCE WITH GIVEN EDUCATION LEVEL				
SOC CODE	SOC TITLE	PROGRAM BASED WEIGHT	LESS THAN HIGH SCHOOL	HIGH SCHOOL	CERTIFICATE OR SOME COLLEGE	ASSOCIATE DEGREE	BACHELOR'S DEGREE
-	Property, Real Estate, & Community Association Managers	.					
-	Appraisers & Assessors of Real Estate	.					
-	Real Estate Brokers	.					
-	Real Estate Sales Agents	.					
HISTORY							
-	Managers, All Other	.					
-	Anthropologists & Archeologists	.					
-	Historians	.					
-	Political Scientists	.					
-	Postsecondary Teachers	.					
-	Middle School Teachers, Except Special & Career/ Technical Education	.					
-	Secondary School Teachers, Except Special & Career/ Technical Education	.					
-	Archivists	.					
-	Curators	.					
-	Museum Technicians & Conservators	.					

Source: Emsi program demand gap model.

Appendix 5: Program Demand Gap Analysis Methodology

This appendix focuses on describing and understanding the methodology used in the program demand gap analysis. This requires data on both occupation demand (e.g., annual job openings) and education supply (e.g., number of postsecondary degree completions). These are then compared through an education “gap” analysis to determine whether an education program is potentially producing a surplus or shortage of workforce talent relative to the number of job openings. In this way, it is possible to see how the institution’s current programs are satisfying regional workforce needs.

SUPPLY AND DEMAND MODEL

Emsi builds a model using demand-side data (average annual openings) and supply-side data (postsecondary education output) to compare workforce demand with education supply. The purpose of this analysis is to nd the difference or “gap” between the average annual openings for an occupation and the number of people completing postsecondary degrees for that occupation, whether at Hartnell Collegf po1.556 TD ell01 >>BDC 0 -11 >n an occupation and the nu>>BDC 0 d56 TD [(occupa

De-duplication of Annual Openings

Most educational programs are designed to train people for multiple occupational types, many of which are simultaneously linked with other educational programs. This presents a complexity when comparing supply and demand for any particular educational program. For instance, the Computer Systems Networking & Telecommunications program is mapped to three different occupations: Computer Supports, information security analysts, and computer systems analysts. If we focus on just one of the occupations for this list—Computer Supports—it is also mapped to 10 different educational programs, spanning program titles such as Computer Systems Analysis and Medical Of ce Computer Specialist.

To ensure that no double-counting occurs, it is necessary to either realign the program groupings to eliminate the mapping of occupations to multiple programs or to determine what proportion of demand should be compared with supply numbers from each program. Emsi takes the second approach in this analysis, which has the advantage of maintaining the program titles and descriptions in roughly the same format that completer data were originally delivered to Emsi. Emsi uses a formula that favors program types with the largest number of completers, attributing a greater proportion of demand to these than the programs which produce a smaller number of completers. This method utilizes the assumption that the higher output educational programs are likely feeding a higher degree of demand within the Economic Region. [15] Appendix 3 contains the detailed mapping of each TOP code to all relevant occupations.

Emsi uses a methodology that allocates jobs on a proportional basis according to the number of program completers. For example, in a region where a unique program such as Commercial and Advertising Art is more prevalent than Graphic Design, it is assumed that the graduates of the Commercial and Advertising Art program will be offered a proportional, therefore a larger number of local openings than students from the Graphic Design program.

Emsi also provides an alternative program demand gap analysis, which does not de-duplicate the number of annual openings based on the size of each educational program. Rather the total number of annual openings available for students at each educational level for each program is provided without further modi cation. Due to this modi cation, these numbers have not been de-duplicated, unlike the annual openings gures shown in Chapter 3. This leads to double counting the job openings and overstates the true number of jobs available to all students. While these gures have not been provided in this analysis, they are available upon request from Emsi.

15 Note this adjustment is performed on a program-by-program basis without consideration of individual colleges or training providers. Therefore, a single program offered at one large institution has no advantage over a group of similar programs offered at several smaller educational providers given that the aggregate output of the smaller

EDUCATION OUTPUT

There are several educational institutions in the Hartnell College Service Region, some of which have programs similar to those offered at Hartnell College. Hence, completers at Hartnell College will be competing for some jobs with completers from other regional institutions. Emsi determined education output by TOP codes and identi ed the number of completers for every award level within those TOP codes. To nd the output for all public and private educational institutions in the Hartnell College Service Region, Emsi uses data from the Integrated Postsecondary Educational System (IPEDS). [16] These data are publicly available through the National Center for Educational Statistics. Completions data are averaged for a three-year period, 2014 through 2016, to smooth out any bumps in enrollment that may be unique to a particular academic year. Data gathered for Hartnell College from IPEDS were reviewed for accuracy by Hartnell College and updated with 2017 completers data.

Tables A4.2, A4.3, and A4.4 display the completion breakdown by institution in the Hartnell College Service Region at the certi cate, associate, and bachelor's degree levels, respectively. Hartnell College is one of several institutions in the region. Using a three-year average, Hartnell College grants 580 certi cates and 1,353 associate degrees every year, which is 34% and 23% of the totals, respectively.

16 These data come with inherent weaknesses. Primarily, numbers are only available for institutions that participate in or are applicants for any federal nancial assistance program authorized by the Higher Education Act (HEA). Also,

SOC CODE	SOC TITLE	JOBS	JOBS	CHANGE	% CHANGE	ANNUAL JOB OPENINGS
-	Information Security Analysts				%	
-	Computer Programmers			( )	(%)	
-	Software Developers, Applications				%	
-	Software Developers, Systems Software				%	
-	Web Developers				%	
-	Database Administrators				%	
-	Network & Computer Systems Administrators				%	
-	Computer Network Architects				%	
-	Computer User Support Specialists				%	
-	Computer Network Support Specialists				%	
-	Computer Occupations, All Other			( )	(%)	
-	Actuaries				%	
-	Mathematicians				%	
-	Operations Research Analysts				%	
-	Statisticians				%	
-	Mathematical Technicians				%	
-	Mathematical Science Occupations, All Other				%	
-	Architects, Except Landscape & Naval			( )	(%)	
-	Landscape Architects			( )	(%)	
-	Cartographers & Photogrammetrists				%	
-	Surveyors			( )	(%)	
-	Aerospace Engineers				%	
-	Agricultural Engineers				%	
-	Biomedical Engineers				%	
-	Chemical Engineers				%	
-	Civil Engineers				%	
-	Computer Hardware Engineers			( )	(%)	
-	Electrical Engineers				%	
-	Electronics Engineers, Except Computer				%	
-	Environmental Engineers				%	
-	Health & Safety Engineers, Except Mining Safety Engineers & Inspectors				%	
-	Industrial Engineers				%	
-	Marine Engineers & Naval Architects				%	
-	Materials Engineers				%	
-	Mechanical Engineers				%	
-	Mining & Geological Engineers, Including Mining Safety Engineers			( )	(%)	
-	Nuclear Engineers				%	
-	Petroleum Engineers			( )	(%)	
-	Engineers, All Other				%	
-	Architectural & Civil Drafters			( )	(%)	

SOC CODE	SOC TITLE	JOBS	JOBS	CHANGE	% CHANGE	ANNUAL JOB OPENINGS
-	Electrical & Electronics Drafters				%	
-	Mechanical Drafters				%	
-	Drafters, All Other				%	
-	Aerospace Engineering & Operations Technicians				%	
-	Civil Engineering Technicians				%	
-	Electrical & Electronics Engineering Technicians				%	
-	Electro-Mechanical Technicians				%	
-	Environmental Engineering Technicians				%	
-	Industrial Engineering Technicians				%	
-	Mechanical Engineering Technicians				%	
-	Engineering Technicians, Except Drafters, All Other				%	
-	Surveying & Mapping Technicians			( )	(%)	
-	Animal Scientists				%	
-	Food Scientists & Technologists			( )	(%)	
-	Soil & Plant Scientists				%	
-	Biochemists & Biophysicists				%	
-	Microbiologists				%	
-	Zoologists & Wildlife Biologists				%	
-	Biological Scientists, All Other			( )	(%)	
-	Conservation Scientists				%	
-	Foresters				%	
-	Epidemiologists				%	
-	Medical Scientists, Except Epidemiologists				%	
-	Life Scientists, All Other				%	
-	Astronomers			( )	(%)	
-	Physicists				%	
-	Atmospheric & Space Scientists				%	
-	Chemists				%	
-	Materials Scientists				%	
-	Environmental Scientists & Specialists, Including Health				%	
-	Geoscientists, Except Hydrologists & Geographers				%	
-	Hydrologists				%	
-	Physical Scientists, All Other				%	
-	Economists				%	
-	Survey Researchers				%	
-	Clinical, Counseling, & School Psychologists				%	
-	Industrial-Organizational Psychologists			( )	(%)	
-	Psychologists, All Other				%	
-	Sociologists			( )	(%)	
-	Urban & Regional Planners				%	

SOC CODE	SOC TITLE	JOBS	JOBS	CHANGE	%	C%

SOC CODE	SOC TITLE	JOBS	JOBS	CHANGE	% CHANGE	ANNUAL JOB OPENINGS
-	Judges, Magistrate Judges, & Magistrates				%	
-	Paralegals & Legal Assistants				%	
-	Court Reporters				%	
-	Title Examiners, Abstractors, & Searchers			( )	(%)	
-	Legal Support Workers, All Other				%	
-	Postsecondary Teachers, General	,	,		%	
-	Preschool Teachers, Except Special Education				%	
-	Kindergarten Teachers, Except Special Education				%	
-	Elementary School Teachers, Except Special Education	,	,		%	
-	Middle School Teachers, Except Special & Career/Technical Education				%	
-	Career/Technical Education Teachers, Middle School				%	
-	Secondary School Teachers, Except Special & Career/Technical Education		,		%	
-	Career/Technical Education Teachers, Secondary School				%	
-	Special Education Teachers, Preschool				%	
-	Special Education Teachers, Kindergarten & Elementary School				%	
-	Special Education Teachers, Middle School				%	
-	Special Education Teachers, Secondary School				%	
-	Special Education Teachers, All Other				%	
-	Adult Basic & Secondary Education & Literacy Teachers & Instructors				%	
-	Self-Enrichment Education Teachers				%	
-	Substitute Teachers	,	,		%	
-	Teachers & Instructors, All Other	,	,		%	
-	Archivists				%	
-	Curators				%	
-	Museum Technicians & Conservators				%	
-	Librarians				%	
-	Library Technicians				%	
-	Audio-Visual, & Multimedia Collections					

SOC CODE	SOC TITLE	JOBS	JOBS	CHANGE	% CHANGE	ANNUAL JOB OPENINGS
-	Artists & Related Workers, All Other			( )	(%)	
-	Commercial & Industrial Designers				%	
-	Fashion Designers			( )	(%)	
-	Floral Designers			( )	(%)	
-	Graphic Designers			( )	(%)	
-	Interior Designers			( )	(%)	
-	Merchandise Displayers & Window Trimmers			( )	(%)	
-	Set & Exhibit Designers				%	
-	Designers, All Other				%	
-	Actors				%	
-	Producers & Directors				%	
-	Athletes & Sports Competitors				%	
-	Coaches & Scouts				%	
-	[illegible]					

SOC CODE	SOC TITLE	JOBS	JOBS	CHANGE	% CHANGE	ANNUAL JOB OPENINGS
-	Pharmacy Technicians				%	
-	Psychiatric Technicians				%	
-	Respiratory Therapy Technicians				%	
-	Surgical Technologists				%	
-	Veterinary Technologists & Technicians				%	
-	Ophthalmic Medical Technicians				%	
-	Licensed Practical & Licensed Vocational Nurses				%	
-	Medical Records & Health Information Technicians				%	
-	Opticians, Dispensing				%	
-	Orthotists & Prosthetists				%	
-	Hearing Aid Specialists				%	
-	Health Technologists & Technicians, All Other				%	
-	Occupational Health & Safety Specialists				%	
-	Occupational Health & Safety Technicians				%	
-	Athletic Trainers				%	
-	Genetic Counselors				%	
-	Healthcare Practitioners & Technical Workers, All Other				%	
-	Home Health Aides				%	
-	Psychiatric Aides				%	
-	Nursing Assistants		,		%	
-	Orderlies				%	
-	Occupational Therapy Assistants				%	
-	Occupational Therapy Aides				%	
-	Physical Therapist Assistants				%	
-	Physical Therapist Aides				%	
-	Massage Therapists				%	
-	Dental Assistants				%	
-	Medical Assistants				%	
-	Medical Equipment Preparers				%	
-	Medical Transcriptionists			( )	(%)	
-	Pharmacy Aides			( )	(%)	
-	Veterinary Assistants & Laboratory Animal Caretakers				%	
-	Phlebotomists				%	
-	Healthcare Support Workers, All Other				%	
-	First-Line Supervisors of Correctional Of cers				%	
-	First-Line Supervisors of Police & Detectives				%	
-	First-Line Supervisors of Fire Fighting & Prevention Workers				%	
-	First-Line Supervisors of Protective Service Workers, All Other				%	
-	Fire ghters				%	

SOC CODE	SOC TITLE	JOBS	JOBS	CHANGE	% CHANGE	ANNUAL JOB OPENINGS
-	Drywall & Ceiling Tile Installers				%	
-	Tapers				%	
-	Electricians				%	
-	Glaziers				%	
-	Insulation Workers, Floor, Ceiling, & Wall				%	
-	Insulation Workers, Mechanical				%	
-		9/L /4L /4 -				

SOC CODE	SOC TITLE

SOC CODE	SOC TITLE	JOBS	JOBS	CHANGE	% CHANGE	ANNUAL JOB OPENINGS
-	Control & Valve Installers & Repairers, Except Mechanical Door				%	
-	Heating, Air Conditioning, & Refrigeration Mechanics & Installers				%	
-	Home Appliance Repairers				%	
-	Industrial Machinery Mechanics				%	
-	Maintenance Workers, Machinery				%	
-	Millwrights				%	
-	Refractory Materials Repairers, Except Brickmasons				%	
-	Electrical Power-Line Installers & Repairers				%	
-	Telecommunications Line Installers & Repairers				%	
-	Camera & Photographic Equipment Repairers				%	
-	Medical Equipment Repairers				%	
-	Musical Instrument Repairers & Tuners				%	
-	Watch Repairers			( )	(%)	
-	Precision Instrument & Equipment Repairers, All Other			( )	(%)	
-	Maintenance & Repair Workers, General	,	,		%	
-	Wind Turbine Service Technicians				%	
-	Coin, Vending, & Amusement Machine Servicers & Repairers				%	
-	Commercial Divers				%	
-	Fabric Menders, Except Garment				%	
-	Locksmiths & Safe Repairers			( )	(%)	
-	Manufactured Building & Mobile Home Installers			( )	(%)	
-	Riggers				%	
-	Signal & Track Switch Repairers				%	
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SOC CODE	SOC TITLE	JOBS	JOBS	CHANGE	% CHANGE	ANNUAL JOB OPENINGS
-	Bakers				%	
-	Butchers & Meat Cutters				%	
-	Meat, Poultry, & Fish Cutters & Trimmers				%	
-	Slaughterers & Meat Packers				%	
-	Food & Tobacco Roasting, Baking, & Drying Machine Operators & Tenders			( )	(%)	
-	Food Batchmakers			( )	(%)	
-	Food Cooking Machine Operators & Tenders			( )	(%)	
-	Food Processing Workers, All Other				%	
-	Computer-Controlled Machine Tool Operators, Metal & Plastic				%	
-						

SOC CODE	SOC TITLE	JOBS	JOBS	CHANGE	% CHANGE	ANNUAL JOB OPENINGS
-	Plating & Coating Machine Setters, Operators, & Tenders, Metal & Plastic				%	
-	Plating & Coating Machine Setters, Operators, & Tenders, Metal & Plastic				%	
-	Tool Grinders, Filers, & Sharpeners				%	
-	Metal Workers & Plastic Workers, All Other			( )	(%)	
-	Prepress Technicians & Workers				%	
-	Printing Press Operators				%	
-	Print Binding & Finishing Workers				%	
-	Laundry & Dry-Cleaning Workers			( )	(%)	
-	Pressers, Textile, Garment, & Related Materials			( )	(%)	
-	Sewing Machine Operators			( )	(%)	
-	Shoe & Leather Workers & Repairers				%	
-	Shoe Machine Operators & Tenders				%	
-	Sewers, Hand			( )	(%)	
-	Tailors, Dressmakers, & Custom Sewers				%	
-	Textile Bleaching & Dyeing Machine Operators & Tenders			( )	(%)	
-	Textile Cutting Machine Setters, Operators, & Tenders			( )	(%)	
-	Textile Knitting & Weaving Machine Setters, Operators, & Tenders				%	
-	Textile Winding, Twisting, & Drawing Out Machine Setters, Operators, & Tenders				%	
-	Extruding & Forming Machine Setters, Operators, & Tenders, Synthetic & Glass Fibers				%	
-	Fabric & Apparel Patternmakers				%	
-	Upholsterers				%	
-	Textile, Apparel, & Furnishings Workers, All Other				%	
-	Cabinetmakers & Bench Carpenters			( )	(%)	
-	Furniture Finishers				%	
-	Model Makers, Wood				%	
-	Patternmakers, Wood				%	
-	Sawing Machine Setters, Operators, & Tenders, Wood				%	
-	Woodworking Machine Setters, Operators, & Tenders, Except Sawing				%	
-	Woodworkers, All Other			( )	(%)	
-	Nuclear Power Reactor Operators			( )	(%)	
-	Power Distributors & Dispatchers			( )	(%)	
-	Power Plant Operators				%	
-	Stationary Engineers & Boiler Operators				%	
-	Water & Wastewater Treatment Plant & System Operators				%	
-	Chemical Plant & System Operators			( )	(%)	

SOC CODE	SOC TITLE	JOBS	JOBS	CHANGE	% CHANGE	ANNUAL JOB OPENINGS
-	Gas Plant Operators			( )	(%)	
-	Petroleum Pump System Operators, Re nery Operators, & Gaugers			( )	(%)	
-	Plant & System Operators, All Other				%	
-	Chemical Equipment Operators & Tenders				%	
-	Separating, Filtering, Clarifying, Precipitating, & Still Machine Setters, Operators, & Tenders				%	
-	Crushing, Grinding, & Polishing Machine Setters, Operators, & Tenders				%	
-	Grinding & Polishing Workers, Hand				%	
-	Mixing & Blending Machine Setters, Operators, & Tenders				%	
-	Cutters & Trimmers, Hand				%	
-	Cutting & Slicing Machine Setters, Operators, & Tenders				%	
-	Extruding, Forming, Pressing, & Compacting Machine Setters, Operators, & Tenders				%	
-	Furnace, Kiln, Oven, Drier, & Kettle Operators & Tenders				%	
-	Inspectors, Testers, Sorters, Samplers, & Weighers			( )	(%)	
-	Jewelers & Precious Stone & Metal Workers				%	
-	Dental Laboratory Technicians				%	
-	Medical Appliance Technicians				%	
-	Ophthalmic Laboratory Technicians				%	
-	Packaging & Filling Machine Operators & Tenders				%	
-	Coating, Painting, & Spraying Machine Setters, Operators, & Tenders				%	
-	Painters, Transportation Equipment				%	
-	Painting, Coating, & Decorating Workers				%	
-	Semiconductor Processors			( )	(%)	
-	Photographic Process Workers & Processing Machine Operators				%	
-	Adhesive Bonding Machine Operators & Tenders				%	
-	Cleaning, Washing, & Metal Pickling Equipment Operators & Tenders				%	
-	Cooling & Freezing Equipment Operators & Tenders				%	
-	Etchers & Engravers				%	
-	Molders, Shapers, & Casters, Except Metal & Plastic				%	
-	Paper Goods Machine Setters, Operators, & Tenders				%	
-	Tire Builders				%	
-	Helpers--Production Workers				%	
-	Production Workers, All Other				%	
-	Aircraft Cargo Handling Supervisors				%	

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SOC CODE	SOC TITLE	JOBS	JOBS	CHANGE	% CHANGE	JOB OPENINGS
-	Hoist & Winch Operators				%	
-	Industrial Truck & Tractor Operators				%	

Appendix 7: Unemployment

Data on unemployment give researchers an idea of where skills mismatches may exist in

TABLE A6.1: Number of Unemployed Workers by Industry Sector in Monterey County with National Comparison

NAICS CODE*	NAICS TITLE	NO. OF UNEMPLOYED	REGIONAL % OF UNEMPLOYED	% OF UNEMPLOYED NATIONAL
	Agriculture, Forestry, Fishing & Hunting	,	%	%
	Administrative & Support & Waste Management & Remediation Services		%	%
	Accommodation & Food Services		%	%
	Retail Trade		%	%
	Construction		%	%
	Health Care & Social Assistance		%	%
	Manufacturing		%	%
	Educational Services		%	%
	No Previous Work Experience/Unspeci ed		%	%
	Other Services (except Public Administration)		%	%
	Information		%	%
	Transportation & Warehousing		%	%
	Arts, Entertainment, & Recreation		%	%
	Government		%	%
	Professional, Scienti c, & Technical Services		%	%
	Finance & Insurance		%	%
	Real Estate & Rental & Leasing		%	%
	Utilities		%	%
	Wholesale Trade		%	%
	Mining, Quarrying, & Oil & Gas Extraction		%	%
	Management of Companies & Enterprises		%	%

* NAICS refers to the North American Industry Classi cation System.

Source: Emsi Total Unemployment (November 2017).

TABLE A6.2: Number of Unemployed Workers by Occupational Group in Monterey County with National Comparison

FIGURE A6.2: Number of Unemployed Workers by Occupational Group in Monterey County

Source: Emsi Total Unemployment (November 2017).