**San Diego Mesa Strong Workforce**
**College Allocation**

| | SDCCD Base Allocation | Mesa % | Mesa Base | District Indirect | Mesa Base Direct | Incentive Allocation | Mesa % | Mesa Incentive | Total Allocation |
|---|---|---|---|---|---|---|---|---|---|
| Round 1 | $ 3,412,913 | 27.5% | $ 938,551.08 | $ (37,542) | $ 901,009 | $ - | 0% | $ - | $ 901,009 |
| Round 2 | $ 3,543,635 | 27.5% | $ 974,499.63 | $ (42,140) | $ 932,360 | $ 1,768,557 | 27.5% | $ 486,353 | $ 1,418,713 |
| Round 3 | $ 3,618,369 | 27.5% | $ 995,051.48 | $ - | $ 995,051 | $ 1,298,616 | On Points | $ 268,860 | $ 1,263,911 |

**Annual Budget:**

- Salaries and Benefits: $823,349
- Operating Budget: $100,000
- Professional Learning: $ 40,000

**Total: $963,349**

**Discipline Allocations** (request integrated through Program Review / BARC process):

- 17-18 $329,207
- 18-19 $270,978

**Construction (Estimates):**

- Fermentation $500,000
- Architecture $ 75,000
- Work-Based Learning $ 50,000

**New Programs (Supplies & Equipment):**

- Aquatics (Fall 2019)
- Choreography (Fall 2018)
- Coaching (Fall 2019)
- Commercial Dance (Fall 2018)
- Fermentation (Fall 2019)
- Neurodiagnostic Technician (Fall 2019)
- Pharmacy Technician (Fall 2019)
- Psych Tech (Spring 2020)
- Ultrasound (On Hold)
- Yoga/Pilates (Fall 2019)

**Salaries Summary**

Contract

- Associate Dean, CTE
- Administrative Tech
- Associate Dean, Research (8%)
- Work-Based Learning Coordinator
- Program Technician
- Instructional Lab Technician –Culinary Arts/Culinary Management
- Instructional Lab Technician -Allied Health
- Research Analysist (25%)
- CTE Faculty (.20 Reassigned Time)

Adjunct

- Internship Coordinator
- Job Placement/Developer
- Curriculum Coordinator

ESUs

- New Program Development
- Special Projects

NANCE

- Fashion
- Exercise Science
- Architecture
- Allied Health (Tutoring)
- Career Peer Ambassadors
- Work-Based Learning
- CTE Office

**Operating Summary**

- Associate Dean of CTE Office (Supplies, Equipment, Travel)
- Work-Based Learning Program (Industry Trips, Employer Panels, Speakers, Industry Events, Program Operations, Travel)
- CTE Deans (Travel)
- Marketing

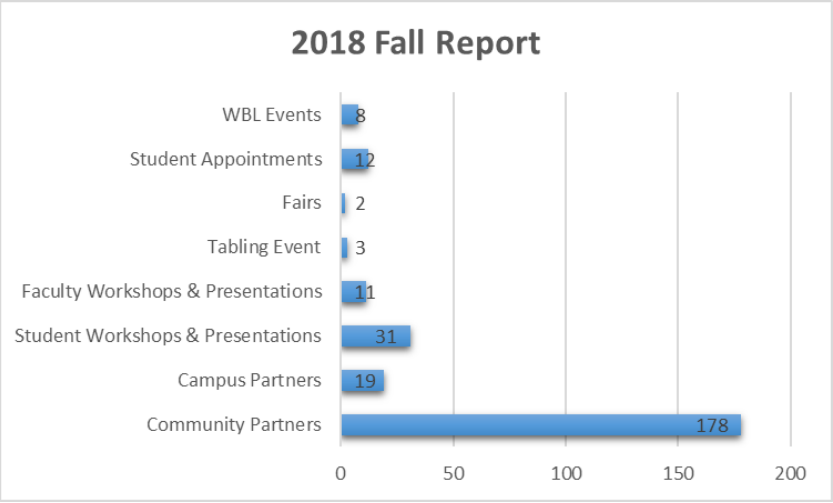
| Department | Total |
|---|---|
| ACCT | $ 4,152.58 |
| ALLIED | $ 65,936.60 |
| ANHL | $ 43,990.52 |
| ARCH/INTE/BLDC | $ 107,293.66 |
| BUSE | $ 10,099.16 |
| CACM | $ 91,983.23 |
| Career Center | $ 6,940.08 |
| CHLD | $ 1,007.28 |
| CTE | $ 420,325.13 |
| CTE-Curriculum | $ 27,047.52 |
| CTE-Marketing | $ 17,309.23 |
| CTE-Research | $ 10,982.27 |
| EXER SCI | $ 4,898.59 |
| FASH | $ 5,774.18 |
| GISG | $ 3,002.92 |
| HOSP | $ 2,241.30 |
| JOUR | $ 935.92 |
| NUTR | $ 3,595.58 |
| PTA | $ 12,973.64 |
| RADT | $ 2,150.26 |
| WBL | $ 58,475.61 |
| | $ 901,115.26 |

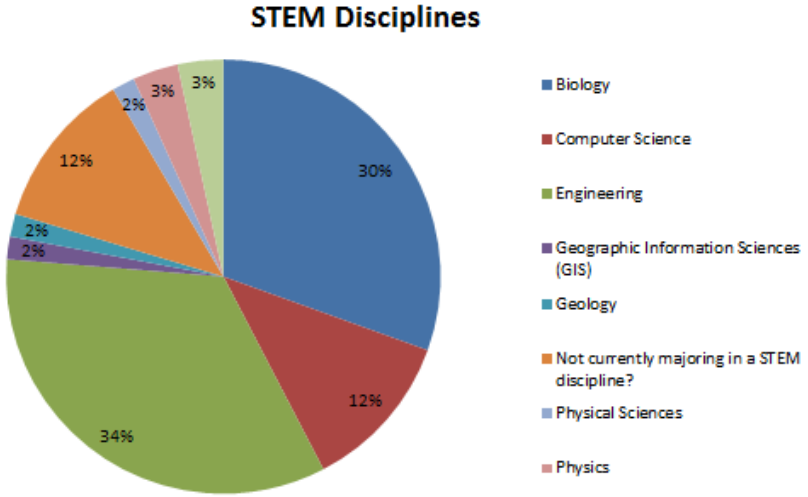
# WBL Task Breakdown:

| Shawn | Katlin | Pavel |
|---|---|---|
| Student Outreach/Guidance | Student Outreach/Guidance | Student Outreach/Guidance |
| Job Speaker & Portfolium | Employer Outreach | Employer Outreach |
| Work Experience | Service Learning | Internships |
| Majors Fair | Majors Fair | Internship Fair |
| Marketing & Website | Marketing & Website Support | Marketing & Website Support |
| School of Business & Tech | School of Exercise Science | Internship Readiness Workshops |
| School of Health & Public Service/Allied Health | School of Arts & Languages | |
| School of Equity | School of Humanities | |
| Student Development | School of Math & Natural Science | |
| Alumni | School of Social/Behavioral/Multicultural | |


# Overview of Mesa College Internship: 2018-2019

*San Diego Mesa College Internships is a comprehensive experiential learning resource to bridge students' educational learning with valuable real-world experience in their desired career field, developing hands-on skills under the guidance of faculty mentor(s) and community partners. It is designed to empower students to define and execute a unique career and life vision, with commitment to delivering equitable access, innovative outreach and support for our diverse student body.*




## QUICK FACTS

**> +178*** New Community Partners were developed during Fall 2018

**> +150** Students were benefited from attending 31 Workshops and Presentations

**> 12 Students** benefited from the **Internship Coaching 101** sessions

**> 62% STEM Core Students** completed the required Career Readiness component

**> 1 Promise Student** was accepted at the Berkeley Lab Internship Workshop & invited to attend the **Care Now Conference** in Dallas, TX

**> 2 Students** from the **Veterans Internship Program** were paired with Vocational Specialists from easterseals

* Final number will be shared soon.

# MESA INTERNSHIP

Mesa College Internship seeks to outline best practices, federal regulations, success factors, and legal implications critical for stakeholders to understand in planning, executing, overseeing, and evaluating the Work-Based Learning opportunities offered at Mesa: Service Learning, Internship, and Work Experience.

It suggests valuable real-world experience to students in their desired career field, gaining hands-on skills development under the guidance of employer and faculty mentors. This approach offers students the capability to "test-drive" a career before enduring on a particular path of advance education.

In addition, this opportunity will benefit students building a more extended professional network; at the same time, it provides them with a practical component to strengthen their resume towards sustainable employment, influencing their community in a meaningful way.

## Monica Romero

**Subject:** Reassigned Time Opportunity for Faculty- Strong Workforce

**Strong Workforce**
**.20 Faculty Reassign Time**

Colleagues,

Please find below information regarding a .20 reassigned time opportunity with Strong Workforce. Letters of interest may be submitted to the CTE Office at MesaCTE@sdccd.edu. Letters should address your qualifications, knowledge, skills and ability to meet the responsibilities and tasks the assignment. If you have questions about this assignment, please contact Monica Romero at mdromero@sdccd.edu. The assignment is expected to begin March 15, 2019 and runs through June 2020. Adjunct faculty are eligible for these assignments.

All letters of interest must be received **by Friday, February 28, 2019**.

Responsibilities:

- Work directly with the Associate Dean of CTE on Strong Workforce/CTE topics including: SW metrics, programing, activities, reporting, marketing, outreach, support services and funding.
- Meet bi-weekly with the Associate Dean of CTE
- Educate the campus regarding CTE and Strong Workforce:
    - Develop flex activities
    - Provide guidance to faculty and staff on developing projects for program improvement
    - Assess campus progress towards Strong Workforce metrics/goals
- Have an in-depth knowledge of the Strong Workforce program in order to represent and advocate for the program on the campus, in the District, in the Region and at the State level.
- Attend Strong Workforce meetings, trainings, and conferences including:
    - Strong Workforce Operational Committee – 2nd Thursday of each month from 3:00 – 4:30
    - Workforce Development Council (WDC) – 2nd Friday of each month from 10:30 – 12:00
    - California Community College Association for Occupational Education bi-annual conferences (https://www.cccaoe.org/)
    - Industry, Sector and Data workshops
    - Regional Workgroup (TBD)

Tasks may include:

- Presenting on Mesa's Strong Workforce efforts on the campus, in the District, in the Region and at the State levels.
- Assisting with Professional Learning activities for faculty and staff surrounding Strong Workforce metrics, including the use/analysis of data tools like Launchboard.

Availability in the Summer is preferred.

Learn more about Strong Workforce at: https://doingwhatmatters.cccco.edu/StrongWorkforce.aspx

*Dr. Pamela T. Luster, President*
P: (619) 388-2721
E: pluster@sdccd.edu
@sdmesaprez

# San Diego Imperial Pathway Mapping and Gap Analysis

## Comparison of K12 and College Career Education Offerings and Regional Demand Occupations

01.14.2019

Report to the San Diego Imperial Regional Consortium

Randal K Tillery
rtiller@wested.org
Allie Bollella
Abollella@wested.org

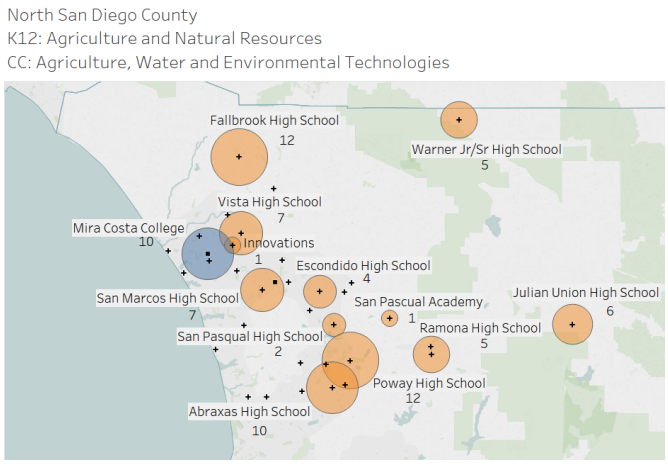
**DRAFT: Not for Distribution**

WestEd
WestEd.org

# Table of Contents

## Introduction

This study compares career education (CE) programs in the San Diego Imperial County (SDIC) region with regional employment, job growth, annual openings and earnings. The intent of the analysis is to inform the development and strengthening of regional K14 educational pathways by mapping:




1. Alignment between career education programs and offerings in regional high schools and their corresponding programs of study in the 10 SDIC region community colleges,
2. Alignment between the proportion of regional career education offerings in the 15 K12 educational sectors and the proportion of labor market demand in occupations that align to the 15 sectors.

The methodology for this work included direct collection of course characteristics for every K12 career education course in the region based on data provided directly by K12 districts. Data from college pathways was collected from the state curriculum inventory. Labor market demand data was collected from the community college Centers of Excellence demand data set. These data sources were compared and mapped using crosswalks created by the COE's and the Orange County community college consortia.

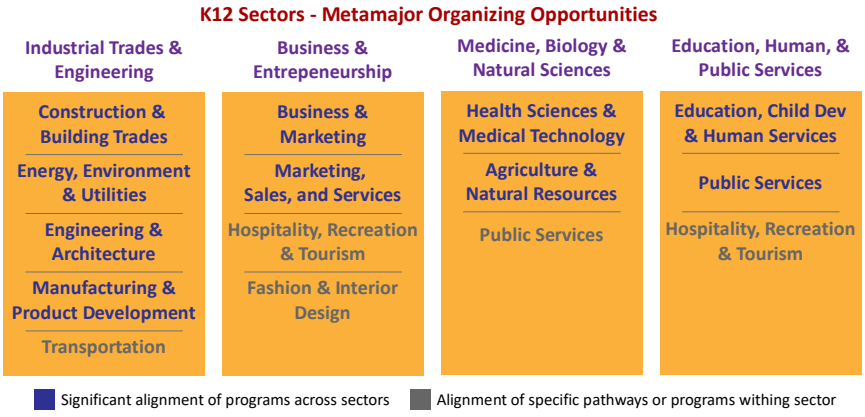
The SDIC regional consortium serves the greater San Diego Imperial counties region, one of the 7 economic macro-regions designated by the California Community College Chancellors Office (CCCCO). Under the statewide Strong Workforce Program funded by the Chancellor's Office, SDIC has embarked on an ambitious regional education reform effort to strengthen career pathway education across the 10 regional community colleges and through intersegmental integration of career education between community colleges and the regional K12 and adult education systems.

This study specifically will be used to increase dialogue to strengthen K14 career pathway development in two ways 1) Increasing partnerships between K12 and community college practitioners and leadership that strengthen regional career pathways and improve transition of students from high school into postsecondary education and the workforce; and 2) To build a dataset that can inform career exploration tools and strategies and help students and parents identify regional postsecondary CE programs of study with strong career potential including opportunities for postsecondary credentials leading to certificates, degrees and transfer to the UC or CSU systems.

This study is a higher-level analysis that focuses specifically on how K12 providers have prioritized offerings across the 15 CDE defined industry sectors that govern the classification of K12 CTE programs in California. The analysis captures how these offerings are aligned to programs of study in the SDIC region community colleges and how the relative proportion of K12 offerings by sector compare to the proportion of regional employment related to the K12 sectors in the region. It identifies gaps, or imbalances, between offerings in the systems and

where educational offerings are clearly out of alignment with regional employment and career opportunities.

Finally, the study proposes organizing strategies for combining sectors in regional pathway organizing focused on underlying competencies, particularly where K12 programs in different sectors can be seen as precursors to many of the same community college programs. Such dialogue should focus on greater integration of regional pathways through dual enrollment and articulated early credit strategies, deeper college and career exploration and advising for students in high school, and shared opportunities for collaboration across programs on employer engagement and increasing work-based learning. Cross sector organizing creates opportunities for scaffolding pathways across sectors such as construction, manufacturing, transportation and engineering – helping students understand how the work they do in their high school automotive class may be preparing them for a job as an engineer or in computer applications related to artificial intelligence in driverless vehicles.




| Construction, Energy, and Engineering - Common Programs | | | |
|---|---|---|---|
| College Programs (TOP4) | Construction & Building Trades | Engineering and Architecture | Energy, Envir. & Utilities |
| Aeronautical and Aviation Tech | | X | |
| Architecture & Architectural Tech | X | X | X |
| Civil and Construction Man. | X | X | X |
| Construction Crafts Tech | X | X | X |
| Drafting Technology | X | X | X |
| Electronics and Electrical Tech | X | X | X |
| Engineering, General (Transfer) | | X | |
| Engineering Tech, General | X | X | X |
| Environmental Control | X | X | X |
| Environmental Technology | | | X |
| Laboratory Science Technology | | X | |
| Manufacturing and Industrial | X | X | X |
| Other Eng & Related Indust Tech | X | X | X |
| Water and Wastewater Tech | X | X | X |

Methodologically, there are challenges in the comparison of data sets comprised of different kinds of information. There is no perfect way to capture the 'many to many' relationship between programs across systems and their relevant occupations in the labor market. When determining which college programs a K12 pathway should lead to there can be as many as 10 or more program areas in community college that a K12 construction or engineering class could lead to and conversely every college CE program area can be seen as aligned to multiple K12 sectors or pathways. The issues are similar for the assignment of occupations to sectors. Industry sectors and occupations are categorically different kinds of information. Software developers may work on application or game development in digital media, information and communication technology, or business. Laboratory scientists may work in agriculture or health care. That said, when compared at a higher level, the relative proportion of programs across K12, community colleges, and their correlation to the regional labor market tells a set of compelling stories that can inform regional educational reform and stronger regional pathways.

## Primary Methodology

This study specifically compares the number of K12 courses in the CDE sectors to aligned programs of study in the community college system and occupational demand in the San Diego/Imperial regional labor market. It relies on three primary information sources to identify and map career education offerings in regional San Diego/Imperial County (SDIC) K12 high schools, community colleges and job demand in the SDIC economic region. These include:

- **K12 course level data** provided by each K12 LEA including the district, school, sector, pathway, and course identifiers. Additional information included community college course articulation and A to G status with the University of California system. Data was collected using interviews and course data submitted directly by the LEA.
- **Community college award data** for the 10 regional colleges including college, sector, TOP 4, TOP6, CIP, and SOC codes where available. The primary data was pulled from the Chancellor's Office Curriculum Inventory (COCI). Secondary data about course enrollments, unduplicated student enrollments, and sections offered were pulled from the Chancellor's Office Management Information System (COMIS) for the 2016/2017 academic year.
- **Occupational demand and earnings data** gathered from the California Community Colleges Centers of Excellence (COEs) demand tool which includes 2017 economic data pulled using EMSI Analyst which uses proprietary analytics to develop comprehensive demand data using Bureau of Labor Statistics (BLS) and other publicly available data sources. The demand tool allows interactive exploration of demand data by economic region, county, occupational skill level, occupational grouping, or 6 digit Standard Occupational Classification system (SOC) codes.

These data sets were compared using crosswalks created by the Centers of Excellence and the Orange County OC Pathways partnership initiative. Based on the initial findings comparing K12 and college offerings, adjustments were made to the crosswalks to refine the analysis. For example, the initial crosswalks included college programs such as business administration or computer information systems as possible pathways for many of the sectors including construction, engineering, or even fashion and interior design. While it is clear that competencies related to business and computer systems are critical for success in many fields, in some cases the inclusion of these disciplines or occupations inflated the numbers of programs or jobs to a degree that skewed the comparison between educational offerings or between education and labor market demand. As a result, some of these broader pathway relationships were pulled out of the specific pathway mapping relationships. This will be addressed in the actual analysis of competencies and pathways.

That said, the crosswalks are still broad enough to capture the many to many relationships that characterize how pathways connect. That is

| Manufacturing and Product Development K12 Sector | |
|---|---|
| **K12 Pathway** | **Community College Top 4 Program** |
| Graphic Production Technologies - 210 | Applied Design - 100900 |
| | Applied Photography - 101200 |
| | Commercial Art - 101300 |
| | Digital Media - 061400 |
| | Graphic Art and Design - 103000 |
| | Manufacturing and Industrial Technology - 095600 |
| | Other Engineering and Related Industrial Technologies - 099900 |
| | Other Fine and Applied Arts - 109900 |
| | Printing and Lithography - 093600 |
| Product Innovation and Design - 216 | Aeronautical and Aviation Technology - 095000 |
| | Applied Design - 100900 |
| | Business Management - 050600 |
| | Drafting Technology - 095300 |
| | Electronics and Electric Technology - 093400 |
| | Graphic Art and Design - 103000 |
| | Manufacturing and Industrial Technology - 095600 |
| | Other Engineering and Related Industrial Technologies - 099900 |
| | Other Fine and Applied Arts - 109900 |

because any K12 sector or pathway can lead to multiple college programs, and any discrete college program, defined by its TOP4 or TOP6 classification can be a logical next step for multiple K12 sectors or pathways. For example, community college Applied Design (TOP4 1009.00) can be seen as a logical progression from K12 Graphic Production Technologies (210) or Product Innovation and Design (216). However, Applied Design is aligned to many K12 sectors or pathways beyond Product innovation and Graphic Production Technologies including Arts and Digital Media and Fashion and Interior Design.

## Sample Sizes

**K12 Data set:** 22 K12 districts submitted career education pathways data on courses for 100 San Diego/Imperial County region high schools serving 148,620 students grades 9-12 in the 2016-2017 academic year. Districts reported course characteristics for 1,751 career education courses including district, school, course sector, pathway code, pathway name, course descriptor, sections, Perkins status, sequence, articulation status, UC A-G status, and academy status (Project Lead the Way, California Partnership Academy, Linked Learning). Not all districts submitted complete data sets. WestEd made multiple requests from districts for data, but in the end, we had to make judgements regarding sector and pathway assignments based on the data submitted.

| SDIC Mapping Data Sets – Sample Sizes | |
|---|---|
| **Data Type** | **n-value** |
| K12 CE Course Sections | 1,751 |
| CC CE Program Awards | 1,072 |
| SDIC Regional Employment | 1,666,276 |
| 5 year growth – 2017 to 2022 | 121,956 |
| SDIC Annual Openings | 211,516 |

**CC Data Set:** College program information was collected for all CTE flagged programs of study for the 10 community colleges in San Diego and Imperial County. These colleges collectively served 186,736 students in for credit programs and 49,741 students in noncredit programs. The programs sampled from the state curriculum inventory for this study included both credit and noncredit academic programs and awards. Together the 10 San Diego/Imperial region colleges offer 1,072 types of academic awards including Associates Degrees (Science and Arts), Associate Degrees for Transfer, Chancellor's Office approved certificates, low unit certificates, and noncredit awards. The original CC data set also used data on the number of course sections and unduplicated students who took courses in each 4 digit TOP code area to validate and provide additional context for the college Award data.

**Labor Market Information:** Labor market regional employment, 5-year growth, annual openings and wage data was extracted from the California Community College Centers of Excellence demand tool. One-year data in the demand tool is based on EMSI data for 2017 and 5-year growth data is based on expected job growth or decline from 2017 to 2022. The allocation of occupations was based on existing crosswalks which were amended for this study in order to provide the best possible basis for comparison between K12 and college offerings measured against employment, growth, and annual openings. Because this study only focuses on occupations most aligned with the K12 and CC programs of study, the total demand data does not necessarily correlate to the aggregate employment for the region. As a result, the percentage of employment, growth, and demand are calculated against the aggregate occupations assigned to the sectors and not total regional employment. For the purposes of this data analysis the n values for demand includes 1,666,276 total jobs, job growth of 121,956 new jobs between 2017 and 2022, and aggregated annual openings of 211,516 jobs in occupations related to the 15 CDE sectors.

## Comparison of K12 and College Pathways and Regional Employment

| Offerings, Employment, and Wages | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| K12 Sectors | K12 Offerings | | College Awards | | 2017 Employment | | Annual Openings | | Wages | |
| | Courses | % | Awards | % | Jobs | % | Openings | % | Entry | Median |
| Agriculture and Natural Resources | 102 | 5.8% | 51 | 4.8% | 25,855 | 1.6% | 3,536 | 1.7% | $ 18.10 | $ 26.31 |
| Arts, Media, and Entertainment | 634 | 36.2% | 167 | 15.6% | 46,436 | 2.8% | 4,452 | 2.1% | $ 14.88 | $ 23.18 |
| Building and Construction Trades | 67 | 3.8% | 152 | 14.2% | 99,501 | 6.0% | 11,376 | 5.4% | $ 15.39 | $ 24.55 |
| Business and Finance | 56 | 3.2% | 142 | 13.2% | 402,968 | 24.2% | 44,299 | 20.9% | $ 17.52 | $ 27.82 |
| Educ., Child Dev., and Human Svs | 73 | 4.2% | 94 | 8.8% | 108,599 | 6.5% | 14,011 | 6.6% | $ 14.50 | $ 23.00 |
| Energy, Environment, and Utilities | 0 | 0.0% | 112 | 10.4% | 35,680 | 2.1% | 3,612 | 1.7% | $ 23.37 | $ 35.23 |
| Engineering and Architecture | 173 | 9.9% | 193 | 18.0% | 46,404 | 2.8% | 4,043 | 1.9% | $ 26.86 | $ 39.74 |
| Fashion and Interior Design | 18 | 1.0% | 58 | 5.4% | 30,851 | 1.9% | 3,210 | 1.5% | $ 14.45 | $ 21.32 |
| Health Sciences and Medical Tech | 158 | 9.0% | 110 | 10.3% | 128,788 | 7.7% | 13,774 | 6.5% | $ 27.17 | $ 42.90 |
| Hospitality, Tourism, and Recreation | 77 | 4.4% | 105 | 9.8% | 242,539 | 14.6% | 47,240 | 22.3% | $ 11.25 | $ 15.00 |
| Information and Comm Tech | 175 | 10.0% | 148 | 13.8% | 60,310 | 3.6% | 4,899 | 2.3% | $ 26.56 | $ 45.04 |
| Manufacturing and Product Dev | 50 | 2.9% | 175 | 16.3% | 119,729 | 7.2% | 12,369 | 5.8% | $ 15.76 | $ 23.09 |
| Marketing, Sales, and Services | 15 | 0.9% | 154 | 14.4% | 187,589 | 11.3% | 26,029 | 12.3% | $ 15.47 | $ 25.18 |
| Public Services | 40 | 2.3% | 126 | 11.8% | 98,661 | 5.9% | 15,363 | 7.3% | $ 18.92 | $ 28.84 |
| Transportation | 113 | 6.5% | 135 | 12.6% | 32,365 | 1.9% | 3,304 | 1.6% | $ 16.74 | $ 25.09 |

WestEd compared the number and percentage of CTE pathway courses offered by SDIC regional high schools in each K12 CDE sector (n=1,751) to the number of award types (n=1,072) offered by regional community colleges aligned to each pathway *and* to regional occupational data including the number of regional jobs (n=1,666,276) and annual openings (n=211,516).

The goal of this analysis was to compare the relative allocation of offerings by high schools, colleges, and employment by K12 sector to look gaps or imbalance between program offerings and regional demand. This is not a traditional supply and demand analysis. Rather, this study looks at how regional educators are prioritizing their pathway choices by sector to understand if the relative balance of offerings in K12 or in community colleges matches the relative proportion of jobs, job growth, annual openings and wages by sector.

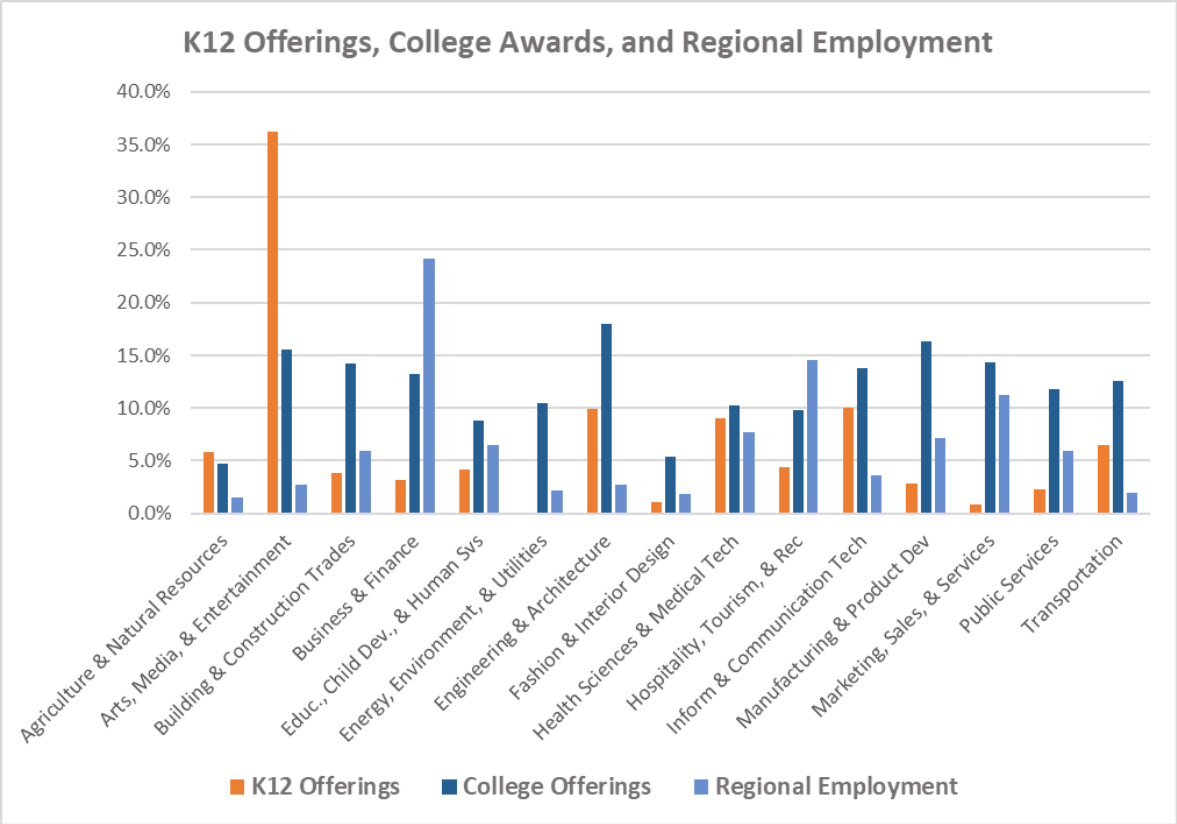
For this comparison we used the 15 CDE sectors for K12 programs and mapped those against community college TOP6 programs and six-digit federal Standard Occupational Codes (SOC). The community college system in California uses 10 sectors, however for this study we used the K12 sectors. The study notes where sectors overlap within the college offerings, including where multiple sectors seem to map to the same or very similar college academic programs.

Within each CDE sector there are also multiple pathways. While analysis of specific CDE pathways within sectors can be useful, within most of the sectors the pathways point to many of the same community college programs. For that reason, it makes more sense to focus the analysis on the broader 15 K12 sectors rather than the 58 K12 pathways which would introduce too many variables to make broader conclusions. Working from the broader K12 sectors makes it easier to assess how a students work may include competencies that map outside of their specific pathway and across programs and sectors in the postsecondary landscape.

College programs and occupations were allocated based on their alignment to the specific K12 sector, therefore both programs and occupations are allocated across multiple K12 sectors. For example, college programs in drafting technology align to Construction and Building Trades, Engineering and Architecture, and Manufacturing and Product Development since pathways in

drafting are relevant programs of student for students coming out of K12 programs in any of these four sectors. This supports the underlying assumption of this study that K12 to college pathways and occupations are one to many relationships.

Based on a high-level comparison of pathways across systems and regional employment, there are gaps between the priority programs in education and the demand occupations in the SDIC region. As illustrated below, the comparison between K12 and college offerings with regional employment varies dramatically for every sector. In many cases the percentage of offerings bear little relationship to the regional labor market with dramatic cases of overrepresentation or underrepresentation of pathway offerings compared to regional employment.




This includes scenarios where educational offerings are proportionately overrepresented compared to regional employment and occupational demand, where programs are underrepresented compared to employment and occupational demand, or where education programs are out of balance with each other. More than one of these scenarios can apply to a given sector – that is either K12 or college offerings can be out of sync with the labor market and with each other in the same sector.

**Ranking Sector Categories:** To simplify the comparison of each sector in the sector analysis portion of this report, we ranked each sector according to the number of offerings (courses in K12 and programs in community college) and by according to total employment, growth, annual openings, and median wage for each sector. While this is only one way to make the comparison between which sectors either are or should be priorities, it provides a quick way to see where there may be significant gaps between educational offerings and labor market demand. As an example Arts, Media, and Entertainment is 1st in the number of courses offered across the region, 3rd in the number of college programs, but only 10th in regional employment, 12th in 5-year job growth, 10th in annual openings and 11th in median wages. These rankings will be used in combination with the actual data for an analysis of each sector.

| Comparison of Offerings, Employment , Growth, Openings and Median Wages By Sedtor - Largest (1) to Smallest (15) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sector | K12 Offerings | | CC Programs | | 2017 Employment | | 5 yr Growth | | Annual Openings | | Median Wage | |
| Arts, Media, and Entertainment | 634 | 1 | 167 | 3 | 46,436 | 10 | 2,220 | 12 | 4,452 | 10 | $ 23.18 | 11 |
| Information and Comm Technology | 175 | 2 | 148 | 5 | 60,310 | 9 | 3,962 | 9 | 4,899 | 9 | $ 45.04 | 1 |
| Engineering and Architecture | 173 | 3 | 193 | 1 | 46,404 | 11 | 3,356 | 10 | 4,043 | 11 | $ 39.74 | 3 |
| Health Sciences and Medical Tech | 158 | 4 | 110 | 11 | 128,788 | 4 | 19,057 | 2 | 13,774 | 6 | $ 42.90 | 2 |
| Transportation | 113 | 5 | 135 | 7 | 32,365 | 13 | 1,759 | 13 | 3,304 | 14 | $ 25.09 | 9 |
| Agriculture and Natural Resources | 102 | 6 | 51 | 15 | 25,855 | 15 | 272 | 15 | 3,536 | 13 | $ 26.31 | 7 |
| Hospitality, Tourism, and Recreation | 77 | 7 | 105 | 12 | 242,539 | 2 | 29,583 | 1 | 47,240 | 1 | $ 15.00 | 15 |
| Educ, Child Dev, and Family Svs | 73 | 8 | 94 | 13 | 108,599 | 6 | 10,320 | 5 | 14,011 | 5 | $ 23.00 | 13 |
| Building and Construction Trades | 67 | 9 | 152 | 4 | 99,501 | 7 | 7,481 | 6 | 11,376 | 8 | $ 24.55 | 10 |
| Business and Finance | 56 | 10 | 142 | 6 | 402,968 | 1 | 15,626 | 3 | 44,299 | 2 | $ 27.82 | 6 |
| Manufacturing and Product Dev | 50 | 11 | 175 | 2 | 119,729 | 5 | 4,877 | 8 | 12,369 | 7 | $ 23.09 | 12 |
| Public Services | 40 | 12 | 126 | 9 | 98,661 | 8 | 14,271 | 4 | 15,363 | 4 | $ 28.84 | 5 |
| Fashion and Interior Design | 18 | 13 | 58 | 14 | 30,851 | 14 | 1,322 | 14 | 3,210 | 15 | $ 21.32 | 14 |
| Marketing, Sales, & Svs | 15 | 14 | 128 | 8 | 187,589 | 3 | 5,568 | 7 | 26,029 | 3 | $ 25.18 | 8 |
| Energy, Environment, and Utilities | | 15 | 112 | 10 | 35,680 | 12 | 2,281 | 11 | 3,612 | 12 | $ 35.23 | 4 |

## Gap Analysis

Two assumptions inform this study. First, most living wage employment requires some level of post-secondary education, the primary relationship is between the K12 sectors and their aligned programs of study at one or more regional community colleges. Most K12 career education programs do not lead directly to the workforce but should lead to college. This mediates to some degree the need for a direct correlation between high school offerings and the labor market, however there are many cases with significant imbalances which should be cause for further discussion and evaluation.

The second is that if high school career pathway programs are foundational for postsecondary education, then some pathways may be relevant to building competencies that will be valuable later in college in a college or a career unrelated or tangentially related to the K12 pathway. Digital media, information technology, and to some extent Business are pathways with competencies that are useful to students regardless of their pathway in college, and not just within the career path represented by their course or program.

Examples of noteworthy gaps or alignment issues include:

**Overrepresented program offerings –** Programs with a higher proportion of offerings in the sector compared to the labor market include:

- **Arts, Media, and Entertainment (AME):** AME offerings are 36.3% of all high school career education courses taught in SDIC region high schools, align to 15.6% of program awards in the regional community colleges, but only account for 2.8% of regional employment and 2.1% of regional annual openings.
- **Agriculture and Natural Resources (Ag):** Ag programs account for 5.8% of high school courses, 4.8% of community college programs, only 1.6% of jobs and 1.7% of annual openings, 66% of agricultural employment are farm workers and laborers.
- **Information and Communication Technology (ICT):** ICT courses constitute 10% of regional K12 offerings and 13.8% of community college programs but only 3.6% of regional employment and 2.3% of annual openings. ICT jobs are high wage occupations however and ICT skills are foundational to many other career pathways.
- **Transportation:** Transportation courses account for 6.5% of regional K12 courses, 12.6% of regional college programs, and 1.9% of regional employment and 1.6% of annual openings.
- **Engineering and Architecture (Engineering):** Engineering K12 courses account for 9.9% of all regional offerings, are aligned to 18% of college offerings (counting advanced industrial trades pathways) but only accounts for 1.9% of regional employment and 1.6% of annual openings.

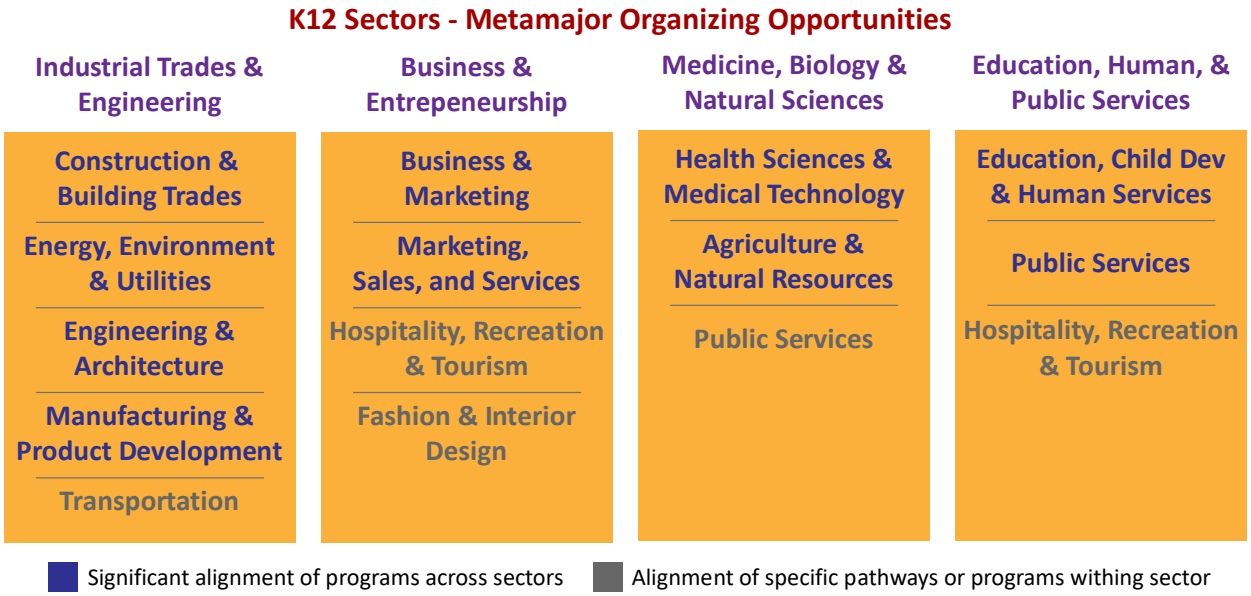
**Underrepresented Program Offerings –** Sectors with low program offerings but with significant labor market demand include:

- **Business and Finance (Business):** Business courses constitute 3.2% of regional K12 course offerings, 13.2% of regional college programs, 24.2% of regional jobs and 20.9% of regional openings each year.
- **Marketing, Sales, and Service (Marketing):** Marketing courses constitute .9% of regional K12 courses, aligned as potential pathways with 14.4% of college programs and are 11.3% of the regional labor market and 12.3% of annual openings. However, 52% of jobs in this sector are low wage sales and retail jobs.

**Gaps Between High School and College Pathways –** Sectors with low program offerings but with significant labor market demand include:

- **Energy, Environment, and Utilities (Energy):** K12 providers identified no courses taught in this sector at regional high schools, although 5.8% of college programs are aligned to this sector. Energy occupations only account for 2.1% of regional jobs and 1.7% of annual openings, however energy occupations had the second highest median wage in this study and includes competencies directly aligned to engineering, manufacturing, construction, and transportation.
- **Business and Marketing:** Business courses were only 3.2% of K12 offerings and Marketing courses only .9% of regional K12 offerings but were aligned to 13.2% an 14.4% of college offerings respectively. Given that business and marketing are significant sectors of the regional labor market, this imbalance should be analyzed further.

## Using K12 Sectors to Build K14 Meta- Majors




Because K12 pathways are foundational for many programs in college, there were instances where K12 sectors were similar enough that they targeted many of the same programs. In some cases the alignment was 80-90% in the college programs aligned to multiple K12 sectors. For the purposes of regional pathway conversations, therefore it may be more effective to not organize by sector but to group sectors as meta-major categories using underlying competencies and alignment with college programs of study as an organizing rubric. Based on the existing crosswalks of college programs to K12 sectors, it would be logical to use the groupings above as a starting point for further discussion. for further exploration and pathway development. Natural groupings which emerged from the study include:

- **Building and Construction Trades, Energy, Environment and Utilities, Engineering and Architecture, and Manufacturing and Product Development:** These four sectors had 80% or more alignment with regional college programs, making this a strong area for cross sector convening on pathway alignment. Additionally **Transportation**, while more occupationally specific at the K12 level than other sectors, has a strong overlap in underlying competencies. Automotive and Diesel mechanic college programs showed up in multiple industrial trades categories in the crosswalk to K12 sectors. Most of these K12 sectors had an 80% overlap in the community college programs they could lead to.
- **Business and Finance and Marketing and Sales:** These two sectors aligned to 80% of the same college programs and should be merged in regional pathway analysis and development. Additionally, Fashion and Interior Design and Hospitality, Tourism, and Recreation are very occupationally more specific, however they are both sectors with strong alignment with Business and Marketing as pathways and should be included as sub-conversations in the broader landscape of business pathways.
- **Health Sciences and Medical Technology and Agriculture and Natural Resources:** Health and Agriculture do not align to the same college pathways, however the underlying science competencies are very similar so there is a very strong conversation about alignment around biological and natural sciences, which are core issues for

students in both areas attempting to transition to advanced pathways in these sectors. While agricultural pathways are relatively popular in the region as K12 programs, the related job demand is very weak. Organizing K12 and college conversations across these sectors would broaden the career exploration and program opportunities for students in Agricultural programs. **Public Services** also partially aligns with this area, in particular with relationships to emergency medicine and public health so it makes sense to include those programs in regional pathway discussions as well as including the broader array of public safety programs as career exploration opportunities for students in health and agricultural sciences K12 programs.

- **Education, Child Development, and Human Services and Public Services:** Education and Public Services align in multiple areas with the exception of public safety pathways (fire admin of justice, emergency medicine), which are specific to Public Services as a pathway area. These include Child Development, Gerontology, Nutrition, Human Services, Counseling, and Recreation. They also share structural issues in that jobs in these sectors include large proportion of low wage employment accessible to individuals with very little education. This makes it important in both sectors to closely examine how to scaffold entry level programs such as Early Childhood Education, Human Services Aides, or Culinary with programs that have more earning potential such as teaching in public education (which is high demand), hospitality management, or more advance pathways in counseling or therapy. **Hospitality, Tourism, and Recreation** also aligns to some of the same college program areas, so it is recommended that this sector also be included in these same regional discussions.

## Sectors that are Both Pathways and Foundations

**Common Pathways:** There were college career education programs that, while also being occupationally focused, showed up in the crosswalks related to multiple K12 sectors:


- **College Business and Marketing** programs cross-walked to K12 sectors in Business, Marketing, Fashion, Hospitality, and Information Communication Technology,
- **College ICT** programs cross-walked to K12 sectors in Arts & Media, Construction, Engineering, Business, Engineering, Manufacturing, Marketing, and other sectors,
- **College Arts and Digital Media** programs cross-walked to Construction, Engineering, Fashion, and Manufacturing pathways among other sectors.

Competencies related to these sectors are often identified with foundational skills needed by students entering many different, if not all occupational pathways. For example, visual communication, computer skills, and business skills are identified as foundational academic or workplace skills in most sectors of the Department of Labor sector competency pyramids[1] and information technology skills are now identified as primary workforce preparation skills in multiple workforce preparation frameworks such as the New World of Work Framework that

[1] For examples of the DOL competency maps go to http://www.careeronestop.org/CompetencyModel/ and for a specific example related to advanced manufacturing: https://www.careeronestop.org/CompetencyModel/competency-models/advanced-manufacturing.aspx

identifies digital fluency and entrepreneurial mindset as two of their 10 primary 21st century workplace competencies.[2]

While this study looks at sector specific pathways and the relative representation of demand occupations in the labor force, the identification of pathways which include skills that articulate across sectors was a strong subtheme as we mapped K12 sectors and college programs. This resonates with the development of more specific occupational strands related to computer technology and visual media in industries such as business, health care, engineering and other occupations. A second recommendation of this study is that there be broader discussions across sector or pathway development conversations about how to:

1. Strengthen the development of competencies in Arts and Media, Business and ICT within all pathway areas, and
2. Expand career exploration and contextualized work in Arts and Media, Business and Finance, and ICT that helps students understand the application of these three disciplines in other disciplines and occupations such as manufacturing, fashion and design, transportation, marketing or even health care.

Such an approach supports a more nuanced way to strengthen student's understanding of industries and careers while also helping prepare them with fundamental skills necessary for success in a 21st century economy. However, this does not create a justification for some of the significant imbalance in how many programs are offered in some sectors such as Arts and Media which accounts for 36.2% of all regional K12 career education courses. While Arts and Media pathways are important competencies, it is harder to argue that they are that much more foundational to college and career success than ICT (10% of regional K12 course offerings) or Business (3.2% of regional K12 offerings).

**Engineering and Architecture:** Engineering is not a foundational program in the same way that Arts and Media, Business, or ICT are. Engineering skills are not foundational to other programs or pathways, however Engineering has become a potential foundational sector because of the dramatic expansion of K12 engineering programs across the state both for increasing the number of students migrating into postsecondary engineering programs and into the workforce *and for increasing student participation in STEM pathways and improving student learning of math, science and technology skills.*

The best example of this is the implementation of Project Lead the Way programs in high schools and middle schools in California which is widely recognized as pathway and has been implemented at hundreds of schools. This approach is valuable if high school engineering pathways are clearly articulated with programs and pathways beyond engineering including manufacturing, building and construction, energy, transportation and other disciplines, in particular if they are also clearly targeting students traditionally underserved by higher education in these fields. As will be stressed in the sector analysis portion of this report, these kinds of linkages across sectors and scaffolding of career exploration to include a full range of opportunities for students should be an important part of regional pathway organizing related to engineering and industrial trades.

[2] https://www.newworldofwork.org/

## Recommendations

Based on this initial analysis of offerings across the systems and their relative priority in comparison to demand occupations and wages, this report makes the following general recommendations:

**Convene regional pathway conversations using a K14 meta-major approach:** The SDIC consortia should organize regional pathway conversations using a meta-major approach that combines sectors with common aligned programs of study in the community college systems and occupations in the labor market. This would include a second level of analysis which would compare foundational courses with each sector and across sectors to expand opportunities for articulated courses, dual enrollment or other integration strategies.

**Address Critical Imbalances and Gaps in Regional Pathways:** While this study doesn't measure actual throughput or do a precise supply/demand analysis, critical imbalances in offerings between K12 and college offerings and the workforce are clear. As a part of regional pathway convening, providers should address overrepresentation of programs in Agriculture, Arts and Media, Engineering, ICT, and Transportation and underrepresentation of programs in Business, Marketing, and Energy. Addressing these imbalances may mean readjusting the number of offerings, creating or eliminating programs, or adjusting the content and focus of the program to reflect how it scaffolds with programs beyond the specific sector. For example, if competencies in ICT or Arts and Media are foundational to college success in a more general way, then at the high school level, these programs should be contextualized to better identify college pathways and occupations where these competencies are relevant, but which may be outside the specific sector or pathway.

**Expand Opportunity by Broader Scaffolding of Career Exploration Strategies:** Providers should use this broader understanding of the alignment between systems and the labor market to scaffold and contextualize career exploration so that students in transportation can explore careers in engineering or students in agriculture can explore careers in natural sciences and health care with clear relationships to the underlying competencies they are developing in their current K12 program.

**Strengthen Career Exploration Tools and Strategies for Students, and Counselors:** SDIC should use the data generated from this survey to inform development of both static and interactive career exploration tools for high school and entering college students to understand the relevance of their high school coursework to the breadth of related opportunities in college and in the workforce. This should include identification of a specific working group to evaluate approaches to creating such tools and making recommendations for further investments.

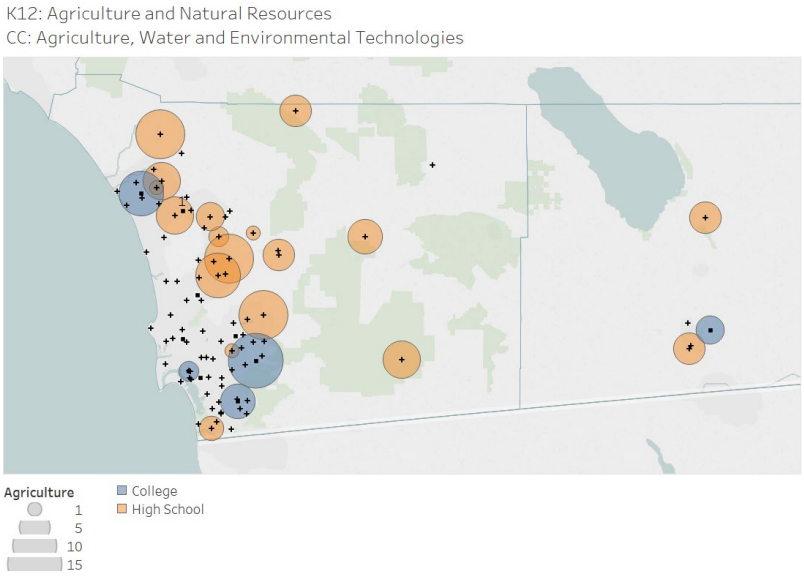
**Map Relevant STEM and Basic Skill requirements for Pathways:** As a part of regional organizing and pathway development, providers should address basic skills and map the STEM requirements and math and English competencies for every pathway to better inform how high schools can more broadly address competencies for their students. For example, if similar gateway and foundational lab science courses are a serious obstacle for students in agricultural and health programs college, providers should document this and look at shared curricular interventions to help students prepare for these courses in high school. A similar approach could be taken to understanding math and quantitative reasoning related to engineering, construction, manufacturing, energy, and transportation. This mapping could inform regional approaches to basic skills contextualization related to STEM and other pathways.

## Sector by Sector Analysis

### 1. Agriculture and Natural Resources:

| Offerings, Employment, and Wages | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| K12 Sectors | K12 Offerings | | College Awards | | 2017 Employment | | Annual Openings | | Wages | |
| | Courses | % | Awards | % | Jobs | % | Openings | % | Entry | Median |
| Agriculture and Natural Resources | 102 | 5.8% | 51 | 4.8% | 25,855 | 1.6% | 3,536 | 1.7% | $ 18.10 | $ 26.31 |

Agriculture and Natural Resources ranked 6th regionally in the number of K12 courses offered at 5.8% of regional offerings, however ranked last in the number of college offerings, regional employment, job growth, and 13th in the number of annual job openings between 2017 and 2022. While K12 and College programs account for about 5% of programs in each system, occupations related to these programs accounted for only 1.6% of regional employment in 2017. College offerings were the lowest in the region, which directly reflects the low percentage of regional jobs in this sector. Average median wages are not low in comparison to other sectors, however this number is heavily skewed by very high wages for occupations which require a bachelor's degree which only account for 19% of the relatively few jobs in this sector.




| Agriculture & Natural Res's - Comparison to other Sectors | | | | | |
|---|---|---|---|---|---|
| K12 Offerings | College Offerings | Regional Employment | Job Growth | Annual Openings | Median Wage |
| 6 | 15 | 15 | 15 | 13 | 7 |

While the difference between offerings and regional employment is not quite as disparate as other sectors, over 65% of jobs in agriculture require no formal education and over 75% would be considered low wage occupations paying just over minimum wage in many circumstances. While there are some occupations requiring post-secondary education, most occupations requiring postsecondary require a bachelors degree. Over half of agricultural jobs in the region are agricultural laborers or workers which is also probably underreported given the large numbers of undocumented workers in this sector.

| Agriculture Education and Employment | | | | | |
|---|---|---|---|---|---|
| Education Requirements | 2017 Jobs | 5 Year Change | Annual Openings | 10% Median | Median Wage |
| No Formal Education | 17,013 | -0.5% | 2,618 | $ 11.09 | $ 15.39 |
| HS diploma/HSE | 3,327 | -0.5% | 325 | $ 12.53 | $ 15.94 |
| Associate Degree | 684 | 5.9% | 84 | $ 13.80 | $ 19.40 |
| Bachelors Degree or Higher | 4,831 | 7.1% | 508 | $ 25.98 | $ 39.64 |

| SDIC Agriculture College Awards | |
|---|---|
| Noncredit Award | 0 |
| Certificate of Proficiency | 0 |
| Certificate of Achievement | 27 |
| Associate of Science | 19 |
| Associate of Arts | 3 |
| Associate Transfer Degree | 3 |

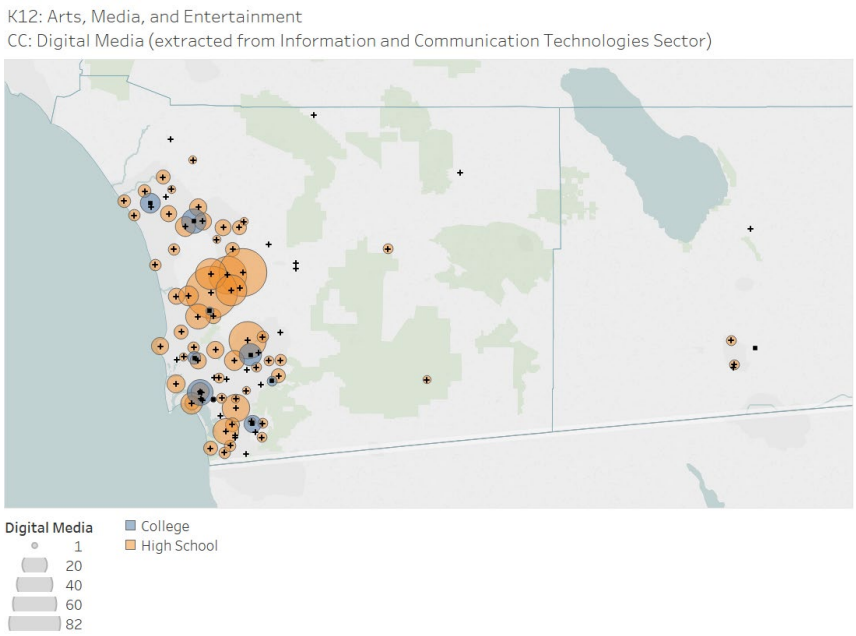
SDIC region Programs in agriculture and natural resources at local community colleges include Plant Science, Viticulture, Horticulture, Agriculture Business, Environmental Technology, Architecture, and Laboratory science. Aligned non-CTE programs would include Environmental Science, Biology, Chemistry, and Natural Science. Offerings in the region include 27 Chancellor's Office approved certificates and 25 AS, AA, or Associate Transfer Degree programs. Of the 102 high school Agriculture pathway courses, only 3 courses are articulated with regional community colleges, making it the program area with the lowest percentage of articulated courses.

There are a lot of K12 programs in this sector, including offerings at 16 regional high schools, which is a testament to the historical importance of agriculture in the region. Also, agriculture is often a sector in which the level of economic activity is not directly reflected in the number or quality of jobs. It would be a strong recommendation that providers look closely at their program offerings relative to other higher priority sectors in the region in terms of the amount of actual employment, openings, and the availability of post-secondary opportunities. Another route would be to more clearly articulate the relationship between agricultural sciences and other postsecondary STEM pathways in health or the natural sciences where there is a strong overlap in the underlying STEM competencies types of work.

## 2. Arts, Media and Entertainment:

| Offerings, Employment, and Wages | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| K12 Sectors | K12 Offerings | | College Awards | | 2017 Employment | | Annual Openings | | Wages | |
| | Courses | % | Awards | % | Jobs | % | Openings | % | Entry | Median |
| Arts, Media, and Entertainment | 634 | 36.2% | 167 | 15.6% | 46,436 | 2.8% | 4,452 | 2.1% | $ 14.88 | $ 23.18 |

Arts Media and Entertainment (AME) is another sector with a disparity between the percentage of regional offerings and the labor market, except in this case it is more acute. AME is largest K12 CTE program in the region by far and one of the larger community college pathways, comprising 36.2% of regional K12 course offerings and 15.6% of community college programs. However, only 2.8% of regional jobs are in occupations related to this sector making it the sector with the largest over-representation of educational offerings in the region related to labor market demand. Compared to other sectors, AME is at or in the bottom third of all the sectors for regional employment, job growth, annual job openings and regional median wage.




| Arts & Media Regional Sector Rankings - Offerings, Jobs, Wages | | | | | |
|---|---|---|---|---|---|
| K12 Courses | College Offerings | Regional Employment | Job Growth | Annual Openings | Median Wage |
| 1 | 3 | 10 | 12 | 10 | 11 |

78.2% of AME postsecondary pathways require either an associate degree or a bachelor degree, although the entry level and median wages for someone completing a college degree are relatively low compared to other occupations in the region. Regional programs in AME include diverse pathways in applied design, commercial art, software design, digital media, and radio and television among others. The 167 college awards offered by the region's 10 colleges include 84 associate degrees 95 Chancellor's Office approved certificates and 14 low unit certificates (certificate of proficiency) Of the 620 AME high school courses in the region, 131 are articulated with local community college courses (21%) and 470 have A-G status with the University of California system. AME has more courses articulated with regional colleges for credit than any other regional K12 CTE sector.

| Arts, Media, and Entertainment | | | | | |
|---|---|---|---|---|---|
| Education Requirements | 2017 Jobs | 5 Year Change | Annual Openings | 10% Median | Median Wage |
| No Formal Education | 3,289 | 2.1% | 333 | $ 11.02 | $ 16.52 |
| HS diploma/HSE | 4,319 | 3.8% | 435 | $ 11.69 | $ 20.79 |
| Associate Degree | 5,676 | 4.4% | 512 | $ 16.67 | $ 25.07 |
| Bachelors Degree | 30,654 | 5.6% | 2,933 | $ 16.65 | $ 25.35 |
| Postsec nondegree | 1,681 | 0.8% | 156 | $ 13.90 | $ 23.05 |
| Some college no degree | 817 | -0.5% | 83 | $ 12.20 | $ 16.90 |

55 high schools and 6 colleges offer pathways in this sector, covering the entire region, as illustrated by the geographic distribution of programs above. One of the arguments for prevalence of this sector is that students are highly interested in the arts and media, in particular digital media which aligns to the interests of many students in social media and gaming. Additionally, the increasing centrality of digital and visual communication in our culture crosses occupations as workers in business, education, and manufacturing are expected to have digital and visual literacy including the ability to communicate using social and multi-media platforms. That said, regional practitioners should look closely at their arts and media programs given limited employment and wage opportunities in this sector. If Arts and Media is foundational to other pathways, it would likely serve high schools and college programs to make the connections between digital media and other career pathways more intentional – exploring digital media for business, hospitality, or marketing to help students understand better how to connect their interests to more postsecondary and career opportunities. It may be more useful to look at Arts and Media and a foundational skill rather than an actual pathway leading to employment, in which case practitioners should be actively having students explore other careers where these skills are relevant and where there is greater opportunity for a future career.

| Arts & Media Award Types | |
|---|---|
| Noncredit Award | 3 |
| Certificate of Proficiency | 13 |
| Certificate of Achievement | 80 |
| Associate of Science | 45 |
| Associate of Arts | 26 |

| Arts & Digital Media College Programs (TOP4) |
|---|
| Applied Design |
| Commercial Art |
| Commercial Music |
| Computer Software |
| Dance |
| Digital Media |
| Drafting Technology |
| Graphic Art and Design |
| Journalism |
| Printing and Lithography |
| Radio and Television |
| Technical Theater |
| Television |

## 3. Building and Construction, Energy, *and* Engineering and Architecture

*Building and Construction Trades (Construction), Energy Environment and Utilities (Energy)* and *Engineering and Architecture (Engineering)* are so closely aligned as sectors that the crosswalks of CDE to TOP codes are aligned to almost identical programs of study in the community college system. For that reason this part of the study will look at these sectors together to promote alignment of pathway development and to encourage scaffolding of applied construction and industrial trades programs with advanced STEM skills in engineering and other advanced technology pathways. Additionally, because no K12 districts listed energy as a program, this will help identify how many of the existing programs offered by regional high schools are aligned to this sector as well.

| Construction, Energy, and Engineering - Common Programs | | | |
|---|---|---|---|
| College Programs (TOP4) | Construction & Building Trades | Engineering and Architecture | Energy, Envir. & Utilities |
| Aeronautical and Aviation Tech | | X | |
| Architecture & Architectural Tech | X | X | X |
| Civil and Construction Man. | X | X | X |
| Construction Crafts Tech | X | X | X |
| Drafting Technology | X | X | X |
| Electronics and Electrical Tech | X | X | X |
| Engineering, General (Transfer) | | X | |
| Engineering Tech, General | X | X | X |
| Environmental Control | X | X | X |
| Environmental Technology | | | X |
| Laboratory Science Technology | | X | |
| Manufacturing and Industrial | X | X | X |
| Other Eng & Related Indust Tech | X | X | X |
| Water and Wastewater Tech | X | X | X |

For the purpose of regional pathway alignment, it would be productive to convene pathway conversations and curriculum alignment across *Building and Construction Trades*, *Engineering and Architecture*, *Energy and Utilities*, *Manufacturing and Product Development,* and *Transportation.* While Manufacturing, Energy, and Transportation have some distinct occupational pathways, the overlap in core competencies related to design, engineering, mechanical, electrical, electronic and fluid systems, welding and other systems are highly aligned for educational purposes as related STEM disciplines.
While complementary, construction, energy and engineering represent different pathway scenarios in terms of the size of the regional programs compared to wages and the labor market. Construction shows relative balance between program offerings and employment, while engineering shows far more program offerings relative to the labor market for engineering, and while college offerings in energy are aligned to the labor market, there were no programs reported by K12 providers for the energy sector.

| Comparative Offerings, Employment, and Wages | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| K12 Sectors | K12 | % | CC | % | Jobs | % | Openings | % | Entry | Median |
| Building and Construction Trades | 67 | 3.8% | 152 | 7.9% | 99,501 | 6.0% | 11,376 | 5.4% | $ 15.39 | $ 24.55 |
| Energy, Environment, and Utilities | 0 | 0.0% | 112 | 5.8% | 35,680 | 2.1% | 3,612 | 1.7% | $ 23.37 | $ 35.23 |
| Engineering and Architecture | 173 | 9.9% | 193 | 10.0% | 46,404 | 2.8% | 4,043 | 1.9% | $ 26.86 | $ 39.74 |

| Construction, Energy, and Engineering - Comparison to other Sectors | | | | | | |
|---|---|---|---|---|---|---|
| Sector | K12 Offerings | College Offerings | Regional Employment | Job Growth | Annual Openings | Median Wage |
| Building and Construction Trades | 9 | 4 | 7 | 6 | 8 | 10 |
| Energy, Environment, and Utilities | 15 | 10 | 12 | 11 | 12 | 4 |
| Engineering and Architecture | 3 | 1 | 11 | 10 | 11 | 3 |

Engineering has been a strong sector for emphasis in K12 partly due to the increasing focus on STEM pathways and large investments in Project Lead the Way across California. In community college K12 engineering programs can align to traditional engineering or many different advanced technical and industrial trades pathways which are aligned to many of the same STEM competencies. For this study, the comparison is important because of how interdependent these pathways are and to inform how they can be aligned in regional or statewide pathway conversations. Additionally, for equity purposes, it allows conversations about how to build pathways out of high school construction programs into energy or engineering pathways in college and how to provide the

contextualized basic skills to help students make the jump from construction to more advanced trades requiring more complex quantitative reasoning skills.

Construction, energy, and engineering educational pathways all lead to good jobs if you correct for the impact of the 33% of construction jobs that require no formal education (which negatively impacts overall median wages for construction, all three sectors provide entry level employment at an hourly wage above self-sufficiency wage of $13.09 for an individual in San Diego County and median wages approaching the self-sufficiency wage for a family of four ($36.36 per hour or $18.18 per hour for per adult if both are working).

| Energy, Environment, and Utilities | | | | | |
|---|---|---|---|---|---|
| Education Requirements | 2017 Jobs | 5 Year Change | Annual Openings | 10% Median | Median Wage |
| Postsec nondegree | 284 | 0.7% | 26 | $ 35.30 | $ 47.50 |
| HS diploma/HSE | 14,258 | 9.4% | 1,832 | $ 21.92 | $ 32.60 |
| Associate Degree | 8,258 | 3.9% | 778 | $ 19.29 | $ 29.43 |
| Bachelors Degree | 12,880 | 4.8% | 976 | $ 27.45 | $ 42.39 |

| Engineering and Architecture | | | | | |
|---|---|---|---|---|---|
| Education Requirements | 2017 Jobs | 5 Year Change | Annual Openings | 10% Median | Median Wage |
| HS diploma/HSE | 542 | 5.8% | 65 | $ 17.80 | $ 26.70 |
| Associate Degree | 11,544 | 5.4% | 1,130 | $ 18.96 | $ 28.88 |
| Bachelors Degree | 34,318 | 7.9% | 2,847 | $ 31.58 | $ 46.25 |

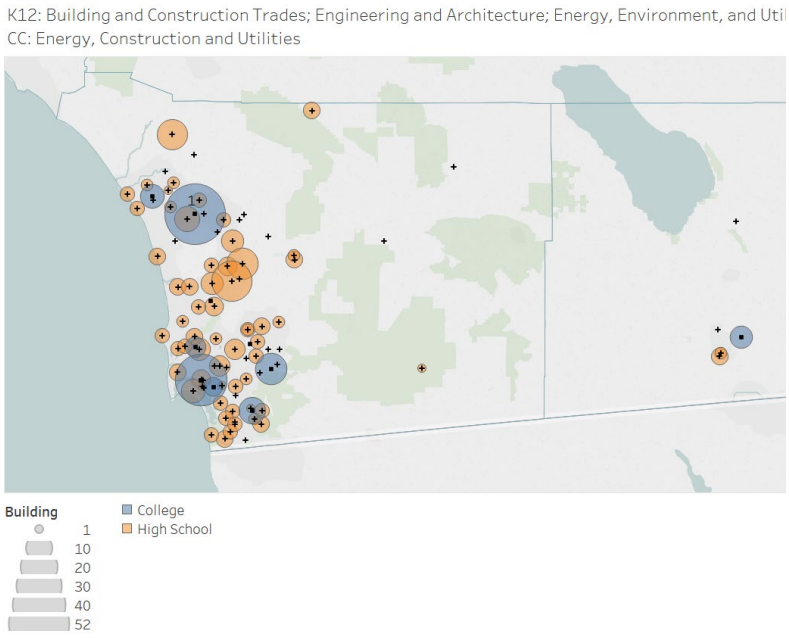
| Construction and Building Trades | | | | | |
|---|---|---|---|---|---|
| Education Requirements | 2017 Jobs | 5 Year Change | Annual Openings | 10% Median | Median Wage |
| No Formal Education | 32,965 | 7.2% | 3,771 | $ 12.64 | $ 19.16 |
| HS diploma/HSE | 51,909 | 7.7% | 6,300 | $ 15.11 | $ 25.38 |
| Associate Degree | 2,819 | 6.8% | 283 | $ 18.73 | $ 27.80 |
| Bachelors Degree or High | 7,938 | 6.6% | 688 | $ 24.55 | $ 37.90 |

There are many educational offerings and offerings are well dispersed across the entire region including 8 community colleges and 55 high schools with programs in one of these three sectors. Academic awards include 94 Chancellor's Office approved certificates, 82 Associate Degree pathways, and 14 noncredit awards. There are 7 K12 courses in construction articulated to local community colleges (10%) and 34 courses in engineering (19%) which are both low compared to percentage of courses with articulation agreements in other sectors. There are 11 courses in construction with A-G status (16%) and 144 courses in engineering (81%).

| Building, Eng, & Architecture Awards | |
|---|---|
| Noncredit Award | 14 |
| Certificate of Proficiency | 3 |
| Certificate of Achievement | 94 |
| Associate of Science | 80 |
| Associate of Arts | 2 |

Given the quality of jobs in these sectors and the diverse opportunities related to the postsecondary programs in the region, these are sectors in which there are clearly opportunities for additional work. It would make sense to scaffold building and construction trades pathways with energy and engineering, particularly around the STEM skills needed to access more advanced engineering and technology related pathways. Programs should also evaluate the creation of new pathways related to energy and utilities, given the lack of offerings in this area and should work with their colleges to either create programs or build adjuncts from their construction and engineering programs that target this sector. Additionally, the relative lack of articulation agreements in Construction and Building Trades and the low percentage of articulated courses in engineering indicates another potential opportunity for pathway alignment between systems. High school programs in construction clearly prioritize post-secondary opportunities in the construction skilled trades apprenticeship programs to ensure graduates do not end up in lower wages jobs that require no formal education. Finally, it would be recommended to do further work in regional pathway conversations to align these sectors to

Energy and Manufacturing to increase regional pathway alignment relative to the broader spectrum of industrial trades occupations in the region. Energy and construction both include apprenticeship opportunities and providers should have stronger conversations with organized labor and the skilled trades to align education offerings with the requirements for apprenticeship programs. Finally, providers should scaffold career exploration across these three sectors, manufacturing, and transportation to help students better assess their postsecondary options.



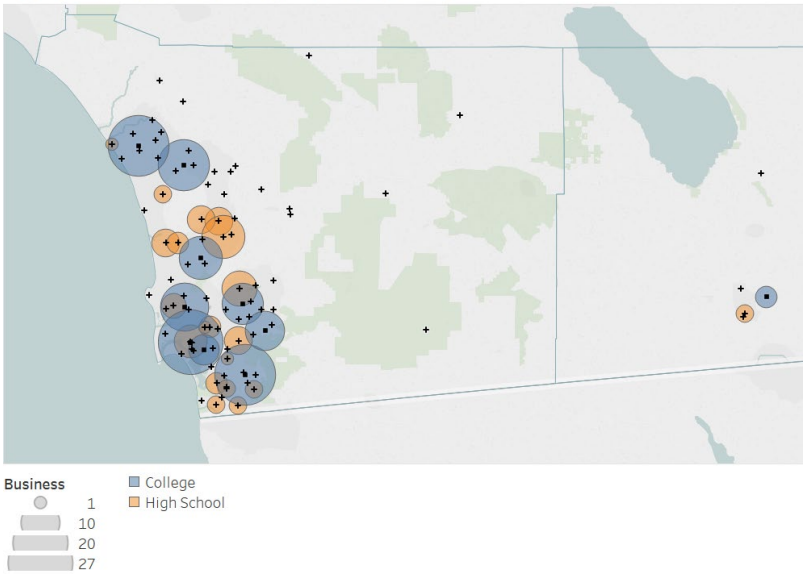
## 4. Business and Finance, *and* Marketing and Sales

| Comparative Offerings, Employment, and Wages | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| K12 Sectors | K12 | % | CC | % | Jobs | % | Openings | % | Entry | Median |
| Business and Finance | 56 | 3.2% | 142 | 7.4% | 402,968 | 24.2% | 44,299 | 20.9% | $ 17.52 | $ 27.82 |
| Marketing, Sales, and Services | 15 | 0.9% | 154 | 8.0% | 187,589 | 11.3% | 26,029 | 12.3% | $ 15.47 | $ 25.18 |

Similar to Construction and Engineering, *Business and Finance* and *Marketing and Sales* are very closely aligned as sectors and map to many of the same postsecondary programs of study in SDIC community colleges. The main differences between these sectors are the inclusion of Accounting and Finance for business and the inclusion of international trade and web administration for Marketing and Sales. Similar to Construction and Engineering discussed earlier, it would be productive to look at these sectors together for regional pathway development and alignment.

| Business and Marketing - Common Programs | | |
|---|---|---|
| College Programs (TOP4) | Business/Finance | Marketing/Sales |
| Accounting | X | |
| Banking and Finance | X | |
| Business Administration | X | X |
| Business and Commerce | X | X |
| Business Management | X | X |
| Insurance | X | X |
| International Trade | | X |
| Marketing and Distribution | X | X |
| Office Technology | X | X |
| Real Estate | X | X |
| WWW Web Administration | | X |

K12: Business and Finance; Marketing, Sales, and Services
CC: Business and Entrepreneurship; Global Trade




Business and Marketing pathways show a large imbalance between the number of regional offerings and the prominence of occupations in these sectors in the regional economy. Business related occupations in the SDIC region account for by far the largest percentage of regional jobs and rank near the top of the region in terms of job growth and annual openings while ranking 10th and 14th respectively in the number of K12 offerings. As a result, the relative percentage of K12 offerings compared to regional employment is by far the smallest of any sector in this study. College offerings are much more aligned to the prominence of these occupations in the labor market, strengthened by the fact that many more students take business courses than nearly any other program area. Business and Marketing are clearly areas for strong attention to regional pathway development and alignment and should be looked at as a collective pathway area.

| Business, Finance, Marketing and Sales - Relative Ranking | | | | | | |
|---|---|---|---|---|---|---|
| Sector | K12 Courses | College Offerings | Regional Employment | Job Growth | Annual Openings | Median Wage |
| Business and Finance | 10 | 6 | 1 | 3 | 2 | 6 |
| Marketing, Sales, & Svs | 14 | 8 | 3 | 7 | 3 | 8 |

Earnings in business-related occupations correlate at the entry level to the regional self-sufficiency wage for a single individual, which for San Diego County is $13.09 per hour and for Imperial County is $9.29 per hour presuming full time employment. Hourly wage expectations for Marketing and Sales are heavily skewed by the high number of jobs, primarily in retail sales, which require no formal education. Interestingly, wage expectations for business occupations do not vary significantly between individuals with only a high school diploma or an associate's degree, but show a significant wage difference for individuals with at least a bachelor's degree. Because of the high numbers of occupations which require only a high school diploma, business pathways are very strong candidates for earn and learn pathways in which students can work in their field of study while pursuing their education, however K12 providers building or strengthening their pathway programs should clearly target associates or transfer pathways related to business to help their students maximize their earnings over time.

| Business and Finance | | | | | |
|---|---|---|---|---|---|
| Education Requirements | 2017 Jobs | 5 Year Change | Annual Openings | 10% Median | Median Wage |
| HS diploma/HSE | 227,084 | 2.9% | 26,797 | $ 14.50 | $ 21.38 |
| Some college no degree | 18,199 | 1.0% | 2,056 | $ 13.40 | $ 20.70 |
| Associate Degree | 2,094 | -0.4% | 231 | $ 13.55 | $ 22.80 |
| Bachelors Degree | 155,175 | 5.7% | 15,178 | $ 22.29 | $ 37.96 |

| Marketing and Sales | | | | | |
|---|---|---|---|---|---|
| Education Requirements | 2017 Jobs | 5 Year Change | Annual Openings | 10% Median | Median Wage |
| No Formal Education | 97,461 | 2.3% | 16,084 | $ 10.51 | $ 13.68 |
| HS diploma/HSE | 60,567 | 3.0% | 6,867 | $ 13.78 | $ 22.07 |
| Bachelors Degree | 29,561 | 5.0% | 3,077 | $ 23.15 | $ 42.01 |

Regional colleges offer diverse kinds of awards related to business occupations including an Associate of Science Transfer degree which allows a student to complete all their transfer requirements to CSU *and* receive an associate's degree within two years. The strong emphasis on certification in regional awards is surprising given wages related to 4 year degrees in the region, but business pathways have particularly large skill builder student populations – that is students returning to higher education while working as professionals to increase their skills for career and wage advancement. Further exploration of the types of certification offered by colleges and how those related to specific advancement along a pathway would be recommended to better understand the relationship between the different award types and career opportunities in the region. Because regional K12 offerings are so few, only 16 courses in Business and Finance and only 2 in Marketing and Sales are reported to be articulated with regional college courses.

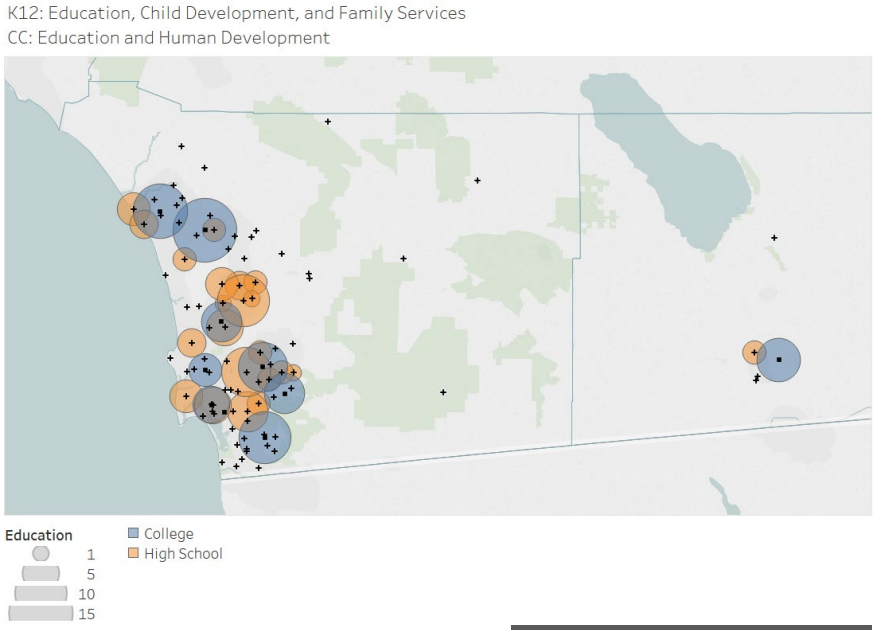
| Business and Marketing Award Types | |
|---|---|
| Noncredit Award | 8 |
| Certificate of Proficiency | 12 |
| Certificate of Achievement | 72 |
| Associate of Science | 48 |
| Associate of Arts | 14 |
| AS Transfer Degree | 7 |

Business and Marketing pathways should be a strong area for program development between regional high schools and community colleges. The combination of access to employment for individuals with only a high school diploma or less *and* the strong regional access to postsecondary business and marketing programs (which are offered at every college in the region, make these pathways both strong candidates for students who need to work while participating in high school or postsecondary pathway programs and for accessing sustainable wage employment over time.

## 5. Education, Child Development, and Family Services

| Comparative Offerings, Employment, and Wages | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| K12 Sectors | K12 | % | CC | % | Jobs | % | Openings | % | Entry | Median |
| Educ., Child Dev., and Human Svs | 73 | 4.2% | 94 | 4.9% | 108,599 | 6.5% | 14,011 | 6.6% | $ 14.50 | $ 23.00 |

Education, Child Development, and Family Services (ECF) is smaller in terms of the number of K12 pathway programs in the region and the postsecondary pathway opportunities at the regional colleges. That said, Early Childhood Education and Child Development, which is one of the college pathways related to this sector, is by itself the largest CTE program at many colleges despite the relative low wages in the associated occupations. Additionally, there is significant overlap between the college programs related to ECF and programs that align to Hospitality and Recreation so it would make sense to align pathway development process between these sectors along common pathways (such as nutrition food and culinary arts, gerontology, or recreation which are common to both sectors). The occupations for these pathways differ enough, however, to keep them independent for this study.




| Education, Child Dev & Family Svs College Programs |
|---|
| Child Development/Early Childhood |
| Family Studies |
| Gerontology |
| Nutrition, Foods, Culinary Arts |
| Physical Education |
| Recreation |
| Sign Language |

ECF pathways programs rank relatively low as a percentage of all offerings regionally, however regional employment, job growth, and annual openings are all relatively strong for the region. Only 4% of K12 offerings are in this sector compared to 8.8% of college programs. Regional employment in 2017 was 108,599 jobs or 6.1% of all occupations included in this study.

| Education, Child Dev, & Family Svs - Comparison to other | | | | | |
|---|---|---|---|---|---|
| K12 Offerings | College Offerings | Regional Employment | Job Growth | Annual Openings | Median Wage |
| 8 | 13 | 6 | 5 | 5 | 13 |

Earnings in ECF occupations are generally much lower than they are for other occupations with the same educational requirements. The most common occupations in this category include primary and secondary school teachers, which require a minimum of a bachelor's degree and teacher assistants working in early childhood and other child development programs where employment

| Education, Child Development and Family Services | | | | | |
|---|---|---|---|---|---|
| Education Requirements | 2017 Jobs | 5 Year Change | Annual Openings | 10% Median | Median Wage |
| Some college no degree | 14,887 | 7.8% | 1,789 | $ 11.50 | $ 15.80 |
| Postsec nondegree | 1,270 | 6.0% | 185 | $ 13.60 | $ 20.30 |
| HS diploma/HSE | 8,940 | 11.9% | 1,272 | $ 13.37 | $ 19.87 |
| Associate Degree | 5,025 | 6.7% | 571 | $ 10.70 | $ 14.90 |
| Bachelors Degree | 66,774 | 8.2% | 7,203 | $ 17.47 | $ 27.40 |
| Masters Degree | 11,491 | 9.0% | 1,395 | $ 17.09 | $ 26.69 |

requires completion of a certain amount of post-secondary units. This accounts for the high percentage of certificates in college programs in this pathway, most of which are in Child Development and Early Childhood programs at the community colleges and which cater to the ongoing need for entry level child development and early childhood workers. The strong demand for ECE and Child Development is reflected the prevalence of these programs at nearly every college in the region and 15 regional high schools. Other important areas of employment include counselors of various kinds including family therapists, academic counselors and addiction counselors among others. While there are programs in the colleges aligned to education and counseling, for the most part any student completing their general education requirements can transfer into a more specialized bachelors and then proceed to a master's program.

| ECF Award Types | |
|---|---|
| Noncredit Award | 0 |
| Certificate of Proficiency | 6 |
| Certificate of Achievement | 52 |
| Associate of Science | 21 |
| Associate of Arts | 7 |
| AS Transfer Degree | 6 |
| AA Transfer Degree | 2 |

While early childhood (ECE) and child development will continue to be a focus of many K12 and college programs, it would serve high schools and colleges to work on pathways that capitalize on the high interest in this sector to help more of these students access postsecondary pathways leading to employment in K12 teaching or counseling in education or human services. Many students, in particular lower income students and many English language learners, gravitate towards ECE because of its relatively low barrier to entry and quick access to employment. Also, for students whose primary language is not English, it is an occupation where primary fluency in another language is a strength and not a challenge to participation in work. However, many of those students would be better served if schools could capitalize on their interests in working with children or families to seek longer term education aligned to sustainable wage employment.

## 6. Fashion and Interior Design

| Fashion and Interior Design |
|---|
| College Programs (TOP4) |
| Applied Photography |
| Commercial Art |
| Graphic Art and Design |
| Other Fine and Applied Arts |
| Marketing and Distribution |
| Fashion |
| Interior Design and Merchandising |
| Cosmetology and Barbering |

Fashion and Interior Design is the smallest of the K12 sectors programs for SDIC. The only K12 Sectors with fewer K12 offerings are *Energy, Environment and Utilities* (0 courses) and *Marketing, Sales, and Services* (18 courses). Compared against the other 14 K12 sectors Fashion and Interior Design ranked 13th, 14th, or 15th in every category for offerings, employment or wages. Despite this, the prominence of this pathway in education and the labor market are relatively balanced, but given the challenges and relatively low median wages compared to other sectors, practitioners should look at ways to embed these programs in a broader array of career occupations relating to business or management in sales occupations related to fashion, home and garden, or other pathways. Many of the pathways within this sector are very specific compared to other sectors (such as interior design or cosmetology and barbering) making it difficult to scaffold across as many programs as engineering or business.

| Comparative Offerings, Employment, and Wages | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| K12 Sectors | K12 | % | CC | % | Jobs | % | Openings | % | Entry | Median |
| Fashion and Interior Design | 18 | 1.0% | 58 | 3.0% | 30,851 | 1.9% | 3,210 | 1.5% | $ 14.45 | $ 21.32 |

| Fashion and Interior Design - Relative Ranking | | | | | |
|---|---|---|---|---|---|
| K12 Courses | College Offerings | Regional Employment | Job Growth | Annual Openings | Median Wage |
| 13 | 14 | 14 | 14 | 15 | 14 |

Earnings in this sector are heavily weighted towards workers with a bachelor's degree, which pays very well relative to other occupations in the region. Educational offerings in the community colleges are more concentrated in certificate programs with fewer associate degree opportunities. Again, K12 providers who continue to provide programs in this sector should very carefully identify colleges with the pathway programs related to this sector while expanding the scope of career exploration to include programs in which a student could accommodate their interests in doing work related to the fashion or interior design industries. Only 1 course in the region is articulated for community college credit and 2 for A-G requirements in the UC system. Again, if K12 providers want to strengthen the ability of students to who are highly motivated to pursue careers in this sector they should deepen the integration of their programs with college offerings by increasing the number of articulation agreements and exploration of dual enrollment opportunities.

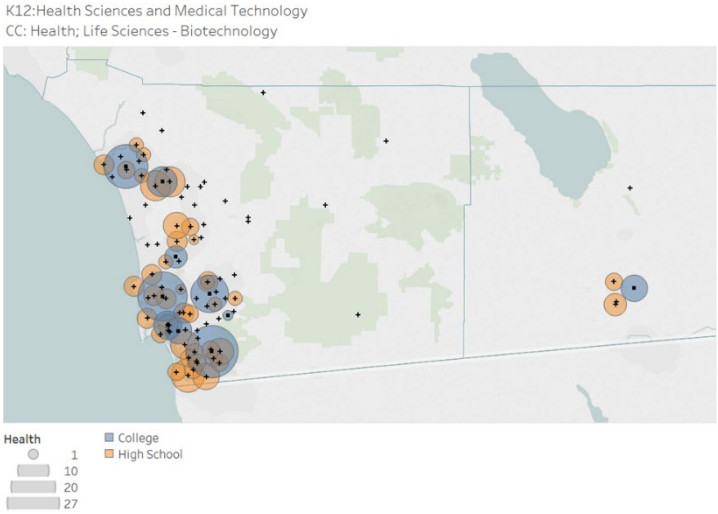
| Fashion and Interior Design | | | | | |
|---|---|---|---|---|---|
| Education Requirements | 2017 Jobs | 5 Year Change | Annual Openings | 10% Median | Median Wage |
| No Formal Education | 3,018 | -4.0% | 349 | $ 10.40 | $ 12.53 |
| HS diploma/HSE | 3,527 | 6.2% | 375 | $ 11.78 | $ 14.49 |
| Bachelors Degree | 24,305 | 5.0% | 2,486 | $ 19.21 | $ 32.82 |

| Fashion & Interior Design | |
|---|---|
| Noncredit Award | 4 |
| Certificate of Proficiency | 1 |
| Certificate of Achievement | 28 |
| Associate of Science | 17 |
| Associate of Arts | 8 |
| AS Transfer Degree | 0 |
| AA Transfer Degree | 0 |

## 7. Health Sciences and Medical Technology

| Comparative Offerings, Employment, and Wages | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| K12 Sectors | K12 | % | CC | % | Jobs | % | Openings | % | Entry | Median |
| Health Sciences and Medical Tech | 158 | 9.0% | 110 | 5.7% | 128,788 | 7.7% | 13,774 | 6.5% | $ 27.17 | $ 42.90 |

| Health Sciences & Medical Tech - College Programs (TOP4) | | |
|---|---|---|
| Biotechnology & Biomedical Tech | Hospital Central Service Tech | Office Technology (Med Office) |
| Cardiovascular Technician | Other Health Occupations | Orthopedic Assistant |
| Cosmetology and Barbering | Human Services | Paramedic |
| Dental Occupations | Laboratory Science Technology | Pharmacy Technology |
| Diagnostic Medical Sonography | Massage Therapy | Physical Therapist Assistant |
| Emergency Medical Services | Medical Assisting | Radiologic Technology |
| Gerontology | Nursing | Respiratory Care/Therapy |
| Health Information Technology | Nutrition, Foods, and Culinary Arts | Speech-Language Path/Audiology |
| Health Occupations | Occupational Therapy Tech | Surgical Technician |




| Health and Medical Technology - Comparison to Other | | | | | |
|---|---|---|---|---|---|
| K12 Offerings | College Offerings | Regional Employment | Job Growth | Annual Openings | Median Wage |
| 4 | 11 | 4 | 2 | 6 | 2 |

Health and Medical Technology is one of the most well-developed industry sectors for K12 and community college career education programs. Health employment has grown continuously over time and healthcare occupations present strong opportunities for employment a high entry and median wage with less with an associate degree, resulting in a lot of program development in K12 and community colleges related to health and medical pathways. While health care is well recognized as a career pathway, it is not one of the larger CE program groups in this study for community colleges. In fact, many healthcare programs, such as nursing, are impacted with waiting lists for students to enter the program even after they have competed the college level advanced science courses required before entry into the program. The comparison of the number of healthcare offerings in the community colleges is deceptive for two reasons: 1) Healthcare pathways are more occupationally specific than say engineering, which can lead to a much broader set of postsecondary programs from high school than health care; and 2) Many health pathways require intensive lab or clinical courses which are limited in class size and require access to clinical sites at hospitals. These factors, and the high cost of creating new programs, limits both the size and number of programs that can be offered by colleges across the region. That said, there are 110 certificate and degree options offered by the 10 SDIC region colleges, presenting diverse opportunities for students coming from the 36 K12 pathway programs in the region.

Health and medical technology careers provide access to good jobs with wages above the regional living wage for a single person with strong opportunities for advancement. Job growth is strong for all occupations at every educational level, with a strong concentration of jobs for individuals with some college coursework or a college certificate in a specific field. Because of the strong employment across educational levels, health is a strong sector for individuals who need to work and make a sustainable wage but who want to continue their education for career and wage advancement.

| Health Sciences and Medical Technology | | | | | |
|---|---|---|---|---|---|
| Education Requirements | 2017 Jobs | 5 Year Change | Annual Openings | 10% Median | Median Wage |
| HS diploma/HSE | 27,508 | 16.0% | 3,396 | $ 14.97 | $ 21.80 |
| Postsec nondegree | 42,798 | 17.3% | 5,766 | $ 14.63 | $ 20.99 |
| Associate Degree | 14,210 | 14.4% | 1,412 | $ 23.79 | $ 36.00 |
| Bachelors Degree | 28,860 | 9.9% | 2,149 | $ 22.03 | $ 35.78 |
| Masters Degree | 6,370 | 22.5% | 638 | $ 31.86 | $ 49.24 |
| Doctorate | 22,072 | 11.7% | 1,534 | $ 46.28 | $ 76.79 |

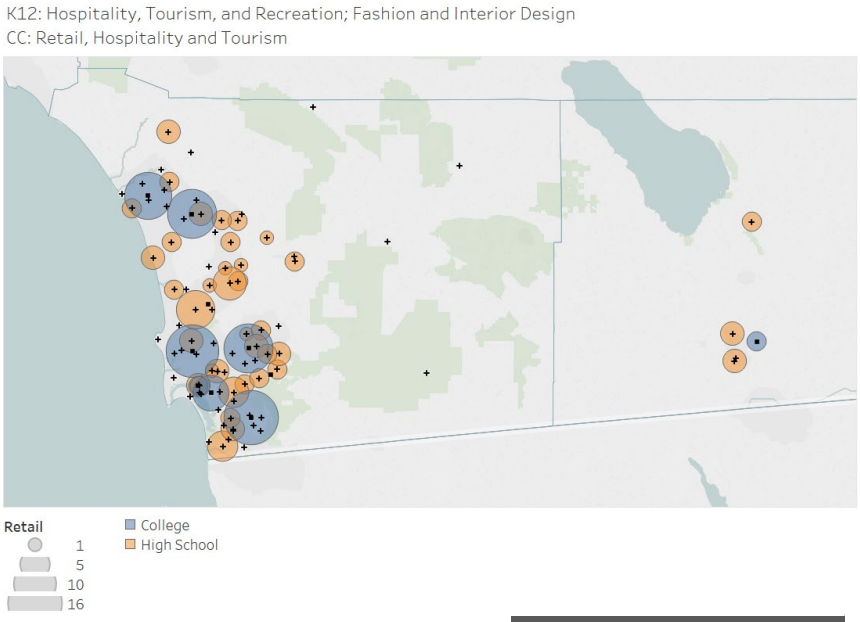
Regional colleges provide diverse certificate and degree options including noncredit certificates related to health care and medical occupations. Because many shorter certificates can be completed within a term or less, they present opportunities for high schools to embed licensure as a CNA or EMT as part of the high school pathway so students can begin working right after high school while they pursue additional study at the community college. Noncredit certificates are particularly useful for students who are nervous about attending college, but who want to begin working towards a job in healthcare and include specialized certificates for home health aides, certified nursing assistants, or medical office workers.

| Health Sciences and Medical Technology | |
|---|---|
| Noncredit Award | 7 |
| Certificate of Proficiency | 3 |
| Certificate of Achievement | 49 |
| Associate of Science | 46 |
| Associate of Arts | 6 |

One of the major barriers faced by students seeking employment in more advanced community college or transfer pathways are college level lab science classes in biology, microbiology, anatomy and physiology, or chemistry. These are 5 unit courses and can take as long as 2 years to complete the sequence before applying to nursing or advanced medical technology programs. Many students, including students who did well in high school science, struggle with these courses and many students don't make it through the entire sequence. For that reason, K12 programs should pay as much attention to preparation for these advanced science courses as much they do for health career exploration or participation in other local pathway courses and should work closely with their local colleges to identify opportunities for deeper work on articulation or dual enrollment to ensure that students are really ready for college level science coursework when they graduate.

## 8. Hospitality, Tourism, and Recreation

| Comparative Offerings, Employment, and Wages | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| K12 Sectors | K12 | % | CC | % | Jobs | % | Openings | % | Entry | Median |
| Hospitality, Tourism, and Recreation | 77 | 4.4% | 105 | 5.5% | 242,539 | 14.6% | 47,240 | 22.3% | $ 11.25 | $ 15.00 |




Hospitality, Tourism, and Recreation (HTR) related occupations are the second largest category for employment in the San Diego Imperial region and the top ranked sector for job growth and for annual openings in the region. However, HTR offerings are not especially significant in either K12 or the community colleges. While there are a fair number of programs in the region, they are not exceptionally large and that there are not a lot of diverse options for students in this sector. For example, only 5 college programs cross walk directly to HTR as a sector including child development, culinary and hospitality management.

| Hospitality, Tourism & Rec College Programs (TOP4) |
|---|
| Child Development/ECE |
| Gerontology |
| Nutritian, Food, Culinary Arts |
| Recreation |
| Hospitality |

While HTR has the largest number of annual openings, 47,240 per year, of any sector in this study, it also has by far the lowest entry level and median wages for any sector. 65% of regional HTR jobs require no formal education and 31% require only a high school diploma or equivalent, meaning that 96% of jobs require no postsecondary education. Entry level wages for jobs that require no formal education begin below $10.87 per hours and only workers in occupations that require a bachelor's degree make above $15 an hour as a median wage.

| Hospitality, Tourism, & Rec - Comparison to Other Sectors | | | | | |
|---|---|---|---|---|---|
| K12 Offerings | College Offerings | Regional Employment | Job Growth | Annual Openings | Median Wage |
| 7 | 12 | 2 | 1 | 1 | 15 |

| Hospitality, Recreation, and Tourism | | | | | |
|---|---|---|---|---|---|
| Education Requirements | 2017 Jobs | 5 Year Change | Annual Openings | 10% Median | Median Wage |
| No Formal Education | 158,156 | 10.4% | 32,173 | $ 10.87 | $ 12.42 |
| HS diploma/HSE | 76,802 | 16.5% | 14,222 | $ 11.19 | $ 17.28 |
| Associate Degree | 5,025 | 6.7% | 571 | $ 10.70 | $ 14.90 |
| Bachelors Degree | 2,540 | 6.5% | 271 | $ 19.10 | $ 28.10 |

However, this only means that postsecondary education is not required for many of the occupations in this sector, not that programs don't exist or that it may be advantageous have formal training to advance in the field. Thus, while it may not be required to have culinary training to learn to cook in a restaurant or have a hospitality management certificate or degree to work in a hotel and eventually become a manager, there are specific programs in this sector advance in those fields. HTR is unique in that there are postsecondary programs that target occupations for which there are not formal post-secondary requirements or that are

| HRT Award Types | |
|---|---|
| Certificate of Proficiency | 8 |
| Certificate of Achievement | 58 |
| Associate of Science | 23 |
| Associate of Arts | 8 |
| AS Transfer Degree | 6 |
| Associate Transfer Degree | 2 |

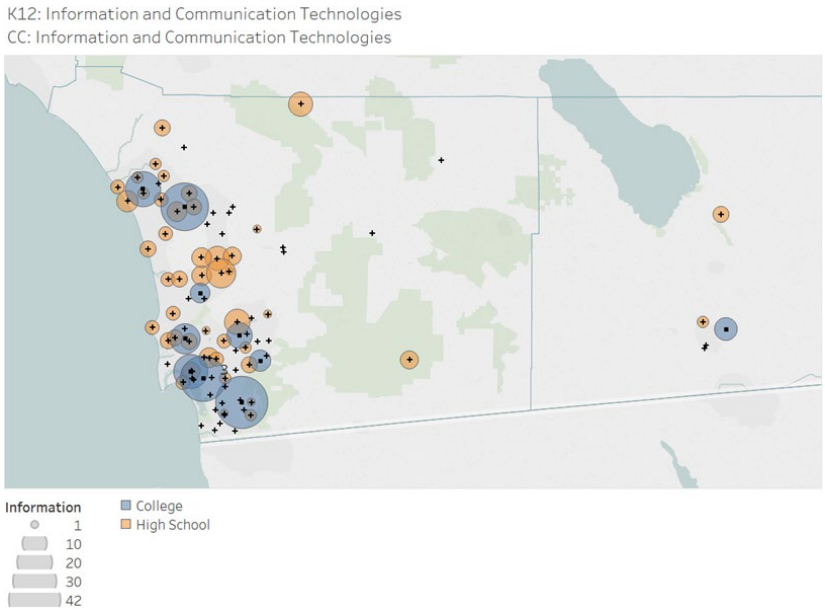
accessible to individuals with little or no formal education. Not surprising, there are many more certificates than there are degree pathways in Hospitality, Recreation, and Tourism, however there are associate and transfer pathways in Gerontology, Dietetics and Nutrition, Hotel or Hospitality Management, and Child Development. Additionally, 27% of the 77 HTR K12 courses are articulated for credit with local community colleges, a higher percentage than any sector other than business.

Hospitality jobs are similar to early childhood education in that they are accessible pathways to low income individuals and immigrants for whom such jobs constitute a step up from where they started or a viable first job. Despite the limitations of such high turnover low wage jobs, they are valuable to people who otherwise have no viable alternative. For students who do not perceive themselves on a regular academic path, these fields seem like viable alternatives which explains that despite the limitations of employment in this sector, hospitality and child development/ECE are very popular programs both in regional high schools and at regional colleges. Eight SDIC community colleges and 38 regional high schools have programs in Hospitality, Recreation, and Tourism.

Providers seeking to strengthen their existing programs should look for ways to scaffold their programs to aligned pathways, for example explicitly linking child development and ECE programs with careers in K12 education or family and child counseling. Similarly, hospitality programs could be nested within the broader framing of business management, business administration, or marketing.

## 9. Information and Communication Technology

| Comparative Offerings, Employment, and Wages | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| K12 Sectors | K12 | % | CC | % | Jobs | % | Openings | % | Entry | Median |
| Information and Communication Tech | 175 | 10.0% | 148 | 7.7% | 60,310 | 3.6% | 4,899 | 2.3% | $ 26.56 | $ 45.04 |




Information and Communication Technology (ICT) is a strong pathway in both K12 high schools and regional community colleges, comprising 10% of all courses offered at regional high schools and 7.7% of community college programs. The relative number of offerings and programs are proportionally larger than the proportion of jobs in the regional job market however ICT skills are foundational to fields far beyond employment in ICT specific occupations including transportation, manufacturing, and business among other sectors. For example, community colleges statewide are implementing new business information worker programs that are an enhanced office administration program that includes specialized and enhanced skills in computer information systems and digital media competencies, both of which fall within the ICT program area. All 10 SDIC community colleges and 40 regional high schools offer ICT programs, making this a very robust Career Education pathway in the region.

| Information Communication Technology Programs (TOP4) |
|---|
| Computer Information Systems |
| Computer Infrastucture Support |
| Computer Software Development |
| World Wide Web Administration |
| Digital Media |

While ICT employment is in the bottom half of the sectors analyzed for this study, ICT median and entry level wages are the highest of any sector analyzed in this study, including many occupations requiring an associate degree or less. While a bachelors degree is generally required for much higher wage occupations, it is also true that many people participate as programmers or developers with less than a bachelors degree as contractors as part of the expanding 'gig' economy.

| ICT - Comparison to Other Sectors | | | | | |
|---|---|---|---|---|---|
| K12 Offerings | College Offerings | Regional Employment | Job Growth | Annual Openings | Median Wage |
| 2 | 5 | 9 | 9 | 9 | 1 |

| Information Communication Technology | | | | | |
|---|---|---|---|---|---|
| Education Requirements | 2017 Jobs | 5 Year Change | Annual Openings | 10% Median | Median Wage |
| Some college no degree | 6,068 | 6.6% | 531 | $ 18.10 | $ 27.20 |
| Associate Degree | 4,125 | 4.8% | 336 | $ 17.35 | $ 27.10 |
| Bachelors Degree | 49,191 | 6.6% | 3,946 | $ 28.13 | $ 48.42 |
| Masters Degree | 926 | 11.4% | 85 | $ 34.60 | $ 58.30 |

ICT award types in the regional community colleges include 48 associate degrees, 78 certificates and 14 noncredit awards. ICT is also unique in that there are industry recognized CompTIA industry certifications recognized by employers which can be obtained through a single course (and completion of the associated industry assessment) and that are embedded as a part of the California Community Colleges statewide ICT model curriculum. In interviews with high schools, many indicated that they were adopting or interested in adopting these, and since courses aligned to these certifications are offered through most community colleges, high schools and their corresponding colleges should explore adoption of ICT CompTIA aligned courses for articulation or dual enrollment. Currently only 22 (13%) of regional K12 ICT courses are articulated with community colleges for college credit and 100 (57%) have A-G status with the UC system.

| ICT Award Types | |
|---|---|
| Noncredit Award | 14 |
| Certificate of Proficiency | 8 |
| Certificate of Achievement | 70 |
| Associate of Science | 48 |
| Associate of Arts | 8 |

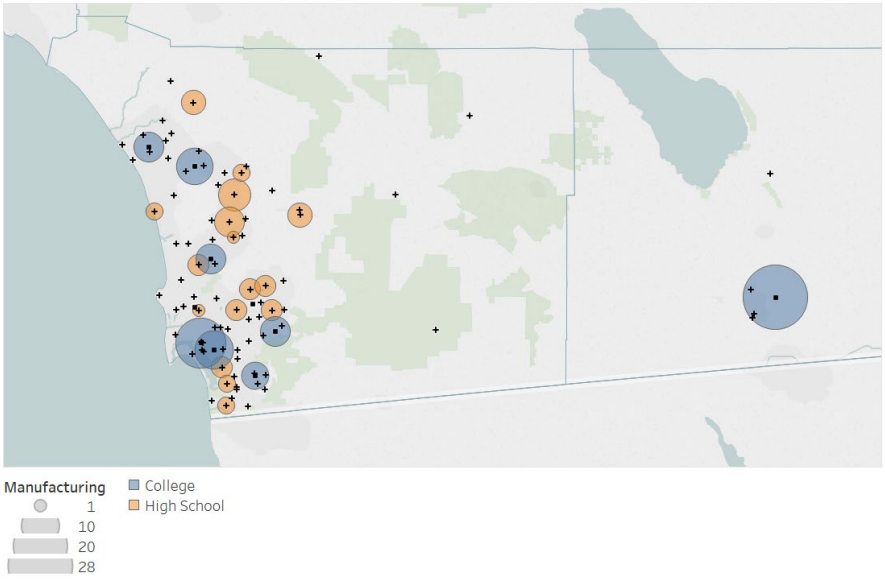
Recommendations for regional ICT pathways would be to strengthen articulation or dual enrollment early credit strategies between high schools and community colleges, including collaboration around embedding CompTIA certifications at the high school level wherever possible. Additionally, because of the relative value of ICT skills across so many career pathways, high schools *and* colleges should pay attention to scaffolding career exploration in ICT courses with other industries where ICT skills are now considered essential such as transportation, manufacturing, business, or engineering and architecture.

## 10. Manufacturing and Product Development

| Comparative Offerings, Employment, and Wages | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| K12 Sectors | K12 | % | CC | % | Jobs | % | Openings | % | Entry | Median |
| Manufacturing and Product Dev | 50 | 2.9% | 175 | 9.1% | 119,729 | 7.2% | 12,369 | 5.8% | $ 15.76 | $ 23.09 |

| Manufacturing and Product Development Programs (TOP4) |
|---|
| Aeronautical and Aviation Tech |
| Applied Design |
| Applied Photography |
| Commercial Art |
| Computer Software Development |
| Digital Media |
| Drafting Technology |
| Eletronics and Electrical Technology |
| Graphic Art and Design |
| Manufacturing and Industrial Tech |
| Other Fine and Applied Arts |
| Printing and Lithography |
| Other Engineering/Related Tech |

K12: Manufacturing and Product Development
CC: Advanced Manufacturing




| Manufacturing and Product Dev - Comparison to other | | | | | |
|---|---|---|---|---|---|
| K12 Offerings | College Offerings | Regional Employment | Job Growth | Annual Openings | Median Wage |
| 11 | 2 | 5 | 8 | 7 | 12 |

Manufacturing and Product Development (Manufacturing) is relatively small as a percentage of offerings in the K12 systems but a substantial program area in the regional community colleges. Seven SDIC colleges offer programs related to manufacturing, however only 15 regional high schools offer programs. However, in the K12 CE universe there is significant overlap between manufacturing and engineering so these are sectors which should be seen as complementary for any regional pathway development discussions and if taken together constitute a significant level of program activity in regional high schools. Additionally, in the college universe production occupations related to both direct manufacturing and product development includes a very diverse range of design, ICT, and industrial trades skills.

| Manufacturing and Product Development | | | | | |
|---|---|---|---|---|---|
| Education Requirements | 2017 Jobs | 5 Year Change | Annual Openings | 10% Median | Median Wage |
| No Formal Education | 3,331 | -3.6% | 384 | $ 10.89 | $ 13.13 |
| HS diploma/HSE | 60,209 | 1.1% | 7,030 | $ 13.79 | $ 19.53 |
| Postsec nondegree | 780 | 2.0% | 94 | $ 12.73 | $ 26.60 |
| Some college no degree | 290 | -16.1% | 32 | $ 11.40 | $ 22.00 |
| Associate Degree | 13,012 | 7.0% | 1,274 | $ 19.89 | $ 30.69 |
| Bachelors Degree | 44,136 | 8.4% | 3,759 | $ 29.63 | $ 46.65 |

Many of the underlying competencies (and related college programs) related to manufacturing can apply equally to construction, engineering, energy and utilities, or transportation sectors and their related occupations. These include underlying competencies in digital and graphic design, mechanical systems, electrical and electronic systems, process technology and pneumatics, and welding and joining technology among others. Additionally, applications for processes in additive manufacturing are rapidly expanding into areas such as medical devices manufacturing, dental implants and appliances, and transportation.

The distribution of educational requirements in manufacturing is deceptive. For example, many production occupations in machining or other pathways are identified as only requiring a high school diploma, but mathematics, ICT, and other skills related to these jobs have continued to increase often requiring postsecondary education beyond high school to enter employment. While it is possible with only a high school education and learn on the job, this is a less common pathway in many production occupations than it was 30-40 years ago. Additionally, many industrial trades programs once had robust apprenticeship programs that made it easier to enter the field straight from high school, although many industries and de-invested in on the job and apprenticeship training and have increased their reliance on students coming from community colleges or other postsecondary programs. A recommendation for strengthening regional manufacturing programs would be to scrape data from actual job postings to see what employers are actually advertising for, which often differs from the educational requirements drawn from ONET or other publicly available sources.

| Manufacturing Award Types | |
|---|---|
| Noncredit Award | 13 |
| Certificate of Proficiency | 12 |
| Certificate of Achievement | 82 |
| Associate of Science | 56 |
| Associate of Arts | 12 |

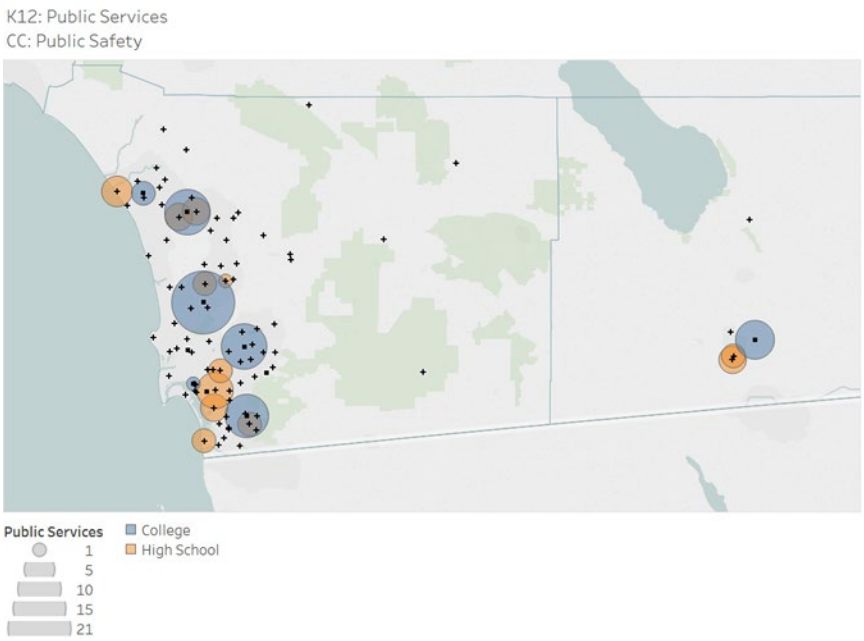
Manufacturing award types in SDIC colleges include a much higher percentage of certificates and noncredit awards compared to associate degrees which may be due to the kind of upskilling beyond high school that many of these occupations now require. Again, it would be worthwhile for high schools and colleges to carefully map the award types available in the colleges with actual job postings and feedback from regional employers to identify high priority skill sets that could inform greater program alignment between colleges and high schools as well as increasing the potential for articulated credit and dual enrollment. Regionally, only 15 (31%) of high school courses are articulated with local colleges and 20 (41%) have A-G status with the UC system. As high schools increase offerings in this area, they should in parallel explore increasing articulation and dual enrollment opportunities between systems.

Because of the strong alignment and overlap between manufacturing, construction, engineering, energy and transportation, it is recommended that providers looking to strengthen these programs organize across these programs to identify common competencies, course alignment, and how to support increasing the STEM competencies of high schools students interested into these areas. Additionally, providers should look at strategies to scaffold and expand career exploration strategies for students in these sectors so they can understand how the competencies they are gaining in one program, such as manufacturing, can lead into other fields they may know less about that may have even greater employment or earnings potential.

## 11. Public Services

| Comparative Offerings, Employment, and Wages | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| K12 Sectors | K12 | % | CC | % | Jobs | % | Openings | % | Entry | Median |
| Public Services | 40 | 2.3% | 126 | 6.6% | 98,661 | 5.9% | 15,363 | 7.3% | $ 18.92 | $ 28.84 |

| Public Services College Programs (TOP4) |
|---|
| Paramedic |
| Computer Infrastructure and Suppt |
| Emergency Medical |
| International Business and Trade |
| Office Technology/Office Comp Sys's |
| Fire Technology |
| Administration of Justice |
| Human Services |
| Labor and Industrial Relations |
| Legal and Community Interpretation |




Public services includes diverse pathways related to public safety, human services, and legal services among others. Public services programs are a small percentage of regional K12 offerings (2.3%) but are more plentiful among the regional colleges (6.6%). Overall employment in this sector is 998,661 or 5.9% of regional jobs indicating that there is general alignment between education and industry in this sector compared to some other sectors (such as business or media). Postsecondary programs are the primary source of workers for many occupations in this sector, in particular fire sciences and police officers for whom community colleges are the primary training institutions. Seven colleges and 9 regional high schools offer programs related to public safety.

| Public Services - Comparison to other Sectors | | | | | |
|---|---|---|---|---|---|
| K12 Offerings | College Offerings | Regional Employment | Job Growth | Annual Openings | Median Wage |
| 12 | 9 | 8 | 4 | 4 | 5 |

The distribution of educational requirements in public is according to ONET data is deceptive. For example, police officers, detectives, and many similar occupations are identified as only requiring a high school diploma actual employment requires completing the police academy, most of which are operated in California by community colleges. This accounts for the relatively high wages for workers with only a high school diploma, however 65% of jobs requiring only a high school diploma include lower skilled jobs such as personal care aids (34,6811) or security guards (15,209), These two occupations also account for 75% of annual openings in jobs requiring only a high school diploma. For nearly all occupations requiring postsecondary education, the annual openings are no more than a few hundred.

| Public Services | | | | | |
|---|---|---|---|---|---|
| Education Requirements | 2017 Jobs | 5 Year Change | Annual Openings | 10% Median | Median Wage |
| No Formal Education | 2,522 | 8.6% | 654 | $ 11.45 | $ 16.60 |
| HS diploma/HSE | 76,238 | 16.1% | 12,499 | $ 19.16 | $ 28.70 |
| Postsec nondegree | 6,742 | 7.8% | 554 | $ 23.94 | $ 34.14 |
| Associate Degree | 4,075 | 8.1% | 476 | $ 17.95 | $ 28.10 |
| Bachelors Degree | 6,546 | 7.9% | 822 | $ 17.88 | $ 29.83 |
| Masters Degree | 2,538 | 15.4% | 358 | $ 15.35 | $ 27.05 |
| Postsec nondegree | 6,742 | 7.8% | 554 | $ 23.94 | $ 34.14 |

That said, occupations in public service and public safety are very good jobs with high entry level and median wages and consistent growth. Additionally, many public safety occupations are experiencing their own ‘grey tsunami’ of older workers nearing retirement age meaning that openings should be consistent into the future.

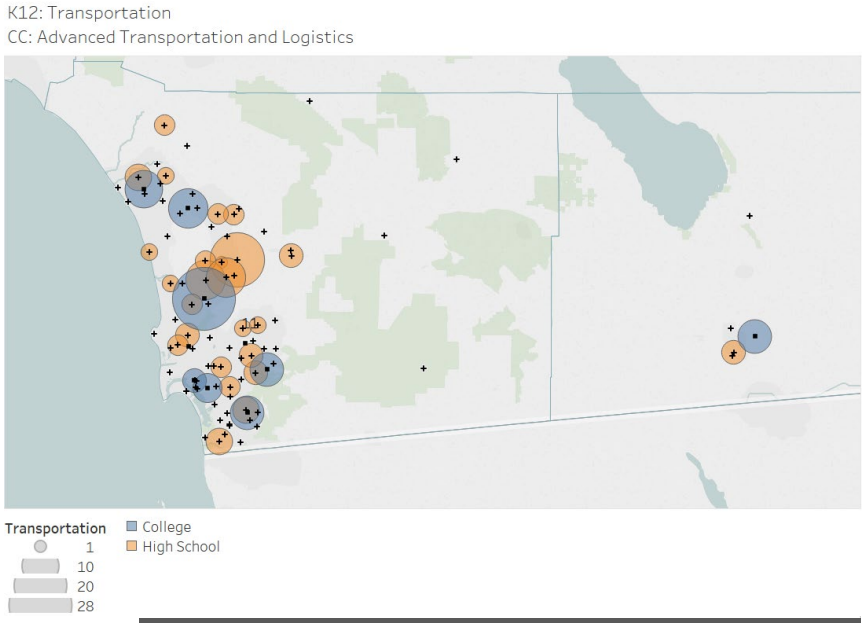
| Manufacturing Award Types | |
|---|---|
| Noncredit Award | 10 |
| Certificate of Proficiency | 0 |
| Certificate of Achievement | 64 |
| Associate of Science | 48 |
| Associate of Arts | 4 |

Because of the specificity of many public service programs, K12 and colleges should identify which specific segments of the regional job market they want to target, perhaps using public safety and human services as two of the primary pathway areas for development in this sector. While there are not a lot of K12 offerings in this sector, 10 courses (23%) are articulated for community college credit and 19 courses (43%) have A-G status in the UC system.

## 12. Transportation

| Comparative Offerings, Employment, and Wages | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| K12 Sectors | K12 | % | CC | % | Jobs | % | Openings | % | Entry | Median |
| Transportation | 113 | 6.5% | 135 | 7.0% | 32,365 | 1.9% | 3,304 | 1.6% | $ 16.74 | $ 25.09 |

| Transportation College Programs (TOP4) |
|---|
| Aeronautic and Aviation Tech |
| Automotive Collision Repair |
| Automotive Technology |
| Diesel Technology |
| Electronics and Electric Technology |
| Environmental Control Technology |
| Manufacturing and Industrial Tech |
| Other Engineering and Indust. Tech. |




Programs related to transportation, in particular automotive and diesel technology and industrial trades pathways related to automotive employment constitute 6.5% of high school offerings and 7% of college awards for the region with regional employment, however, of only 1.9%. The proportion of college programs is skewed up slightly due to the inclusion of electronics, environmental control technology, and some manufacturing pathways, but automotive and diesel programs are still substantial programs at many community colleges. Eight community colleges and 19 high schools offer transportation pathways in the region. Annual openings in this sector are also generally low. Overall transportation occupations ranked 13th in percentage of regional employment, 13th in 5 year job growth, and 14th in the percentage of annual openings for the SDIC region.

| Transportation - Comparison to other Sectors | | | | | |
|---|---|---|---|---|---|
| K12 Offerings | College Offerings | Regional Employment | Job Growth | Annual Openings | Median Wage |
| 5 | 7 | 13 | 13 | 14 | 9 |

| Transportation | | | | | |
|---|---|---|---|---|---|
| Education Requirements | 2017 Jobs | 5 Year Change | Annual Openings | 10% Median | Median Wage |
| HS diploma/HSE | 15,573 | 5.2% | 1,686 | $ 14.09 | $ 21.40 |
| Postsec nondegree | 12,995 | 3.7% | 1,249 | $ 15.70 | $ 23.93 |
| Associate Degree | 1,706 | 7.9% | 172 | $ 21.60 | $ 30.20 |
| Bachelors Degree | 2,092 | 15.9% | 198 | $ 32.00 | $ 47.50 |

Part of the popularity of transportation pathways is related to the relatively low level of education required for most of the employment in this sector compared to higher wages compared to service industries. Over 88% of jobs in the region require either only a high school diploma or a postsecondary credential. That said, transportation jobs are good jobs with reasonable wages compared to other occupations requiring only a diploma or certificate. As a result, there are many more college certificates or noncredit awards than there are associate degrees in this sector, which is aligned to the nature of employment. Of courses offered in regional high schools, 31 (27%) are articulated for college credit and only 5 (4%) have A-G status.

| Transportation Award Types | |
|---|---|
| Noncredit Award | 17 |
| Certificate of Proficiency | 7 |
| Certificate of Achievement | 72 |
| Associate of Science | 38 |

Because employment is not relatively strong compared the level of pathway activity, a strong recommendation for this sector would be to scaffold pathway discussions and planning with other industrial trades pathways. Transportation jobs require fairly sophisticated understanding of mechanical, electrical, pneumatics, computers and diagnostics and other topics which in turn require strong skills in mathematics and the ability to read and digest complex technical information. This is increasingly true as cars and trucks become more automated with the development of driverless vehicles. It would not be difficult to layer transportation pathways with contextualized higher level math and English content and expand career exploration to include engineering, industrial design, manufacturing, and advanced energy pathways. This comes back to a recurrent theme of this report in how many of these discrete sectors could be productively combined in regional pathway development and articulation discussions and planning.