December 2020

Labor Market

Analysis

Digital Media

California Community Colleges

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CENTERS OF EXCELLENCE
Inform Connect Advance

Prepared by the Central Valley/Mother Lode Center of Excellence

Table of Contents

COVID-19 Statement: This report includes employment projection data by EMSI. EMSI's projections are modeled on recorded (historical) employment figures and incorporate several underlying assumptions, including the assumption that the economy during the projection period will be at approximately full employment or potential output. To the extent that a recession or labor shock, such as the economic effects of COVID-19, can cause long-term structural change, they may impact the projections. At this time, it is not possible to quantify the impact of COVID-19 on projections of industry and occupational employment. Other measures such as unemployment rates and monthly industry employment estimates will reflect the most recent information on employment and jobs in the state and, in combination with input from local employers, may help validate current and future employment needs as depicted here.

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Summary

This study conducted by the Central Valley/Mother Lode Center of Excellence examines labor market demand, wages, skills, and postsecondary supply for digital media. Five occupations related to digital media were identified for Columbia College: 27-1024, Graphic Designers; 15-1257, Web Developers and Digital Interface Designers; 27-1014, Special Effects Artists and Animators; 27-1021, Commercial and Industrial Designers; and 43-9031, Desktop Publishers.

Key findings:

- **Occupational demand —** More than 1,110 workers were employed in jobs related to digital media in 2019 in the North Central Valley/Northern Mother Lode (NCV/NML) subregion. The largest occupation is graphic designers with 590 workers in 2019, a projected growth rate of 4% over the next five years, and 67 annual openings.

- **Wages —** Commercial and industrial designers earn the highest entry-level wages, $28.27/hour in the subregion and $26.87/hour in the region. The subregional entry-level wage of special effects artists and animators is below the region's living wage.

- **Employers —** Employers with the most job postings in the subregion are Anthem Blue Cross, Amazon, and Nucamp.

- **Occupational titles —** The most common occupational title in job postings in the subregion is web developers. The most common job title is senior background engineers.

- **Skills and certifications —** The top baseline skill is writing, the top specialized skill is front-end development, and the top software skill is Ruby. The most in-demand certification is a driver's license.

- **Education —** Three of the five occupations typically require a bachelor's degree as entry-level education, and two require an associate degree—web developers and digital interface designers, and desktop publishers.

- **Supply —** Analysis of postsecondary completions in the region shows that on average 72 awards were conferred in the Central Valley/Mother Lode region each year.

Based on a comparison of occupational demand and supply, there is an undersupply of 107 trained workers in the subregion and 234 workers in the region. The Center of Excellence recommends that Columbia College work with the ICT/DM Regional Director, the college's advisory board, and local industry in the expansion of programs to address the shortage of digital media workers in the region.

Introduction

The Central Valley/Mother Lode Center of Excellence was asked by Columbia College to provide labor market information for digital media. The geographical focus for this report is the North Central Valley/Northern Mother Lode (NCV/NML) subregion, but regional demand and supply data has been included for broader applicability and use.

The average living wage for a single adult in the North Central Valley/Northern Mother Lode (NCV/NML) subregion is $10.27/hour.[1]

Analysis of the program and occupational data related to digital media resulted in the identification of applicable occupations. The Standard Occupational Classification (SOC) System codes and titles used in this report are:
- 27-1024, Graphic Designers
- 15-1257, Web Developers and Digital Interface Designers
- 27-1014, Special Effects Artists and Animators
- 27-1021, Commercial and Industrial Designers
- 43-9031, Desktop Publishers

The occupational titles, job descriptions, sample job titles, and knowledge and skills from the Bureau of Labor Statistics and O*NET OnLine are shown below.

Graphic Designers
Job Description: Design or create graphics to meet specific commercial or promotional needs, such as packaging, displays, or logos. May use a variety of mediums to achieve artistic or decorative effects.

Knowledge: Design, Communications and Media, English Language, Fine Arts, Computers and Electronics

Skills: Active Listening, Critical Thinking, Speaking, Reading Comprehension, Active Learning

Web Developers and Digital Interface Designers
Job Description: Design digital user interfaces or websites. Develop and test layouts, interfaces, functionality, and navigation menus to ensure compatibility and usability across browsers or devices. May use web framework applications as well as client-side code and processes. May evaluate web design following web and accessibility standards, and may analyze web use metrics and optimize websites for marketability and search engine ranking. May design and test interfaces that facilitate the human-computer interaction and maximize the usability of digital devices, websites, and software with a focus on aesthetics and design. May create graphics used in websites and manage website content and links.

*Knowledge and Skills were not available in O*NET.*

Special Effects Artists and Animators
Job Description: Create special effects or animations using film, video, computers, or other electronic tools and media for use in products, such as computer games, movies, music videos, and commercials.

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[1] The term "living wage" in Center of Excellence reports is calculated by averaging the self-sufficiency wages from the Insight Center's California Family Needs Calculator for each county in the subregion: https://insightcced.org/tools-metrics/self-sufficiency-standard-tool-for-california/.

Knowledge: Computers and Electronics, English Language, Design, Communications and Media, Customer and Personal Service

Skills: Active Listening, Critical Thinking, Reading Comprehension, Speaking, Active Learning

<u>**Commercial and Industrial Designers**</u>
Job Description: Design and develop manufactured products, such as cars, home appliances, and children's toys. Combine artistic talent with research on product use, marketing, and materials to create the most functional and appealing product design.

Knowledge: Design, Engineering and Technology, Mechanical, Production and Processing, Computers and Electronics

Skills: Active Listening, Reading Comprehension, Complex Problem Solving, Critical Thinking, Speaking

<u>**Desktop Publishers**</u>
Job Description: Format typescript and graphic elements using computer software to produce publication-ready material.

Knowledge: Computers and Electronics, Design, English Language, Production and Processing, Communications and Media

Skills: Critical Thinking, Reading Comprehension, Active Listening, Judgement and Decision Making, Speaking

Occupational Demand

The North Central Valley/Northern Mother Lode subregion employed 1,113 workers in digital media occupations in 2019 (Exhibit 1). The largest occupation is graphic designers with 590 workers in 2019. This occupation is projected to grow by 4% over the next five years and has the greatest number of projected annual openings, 67.
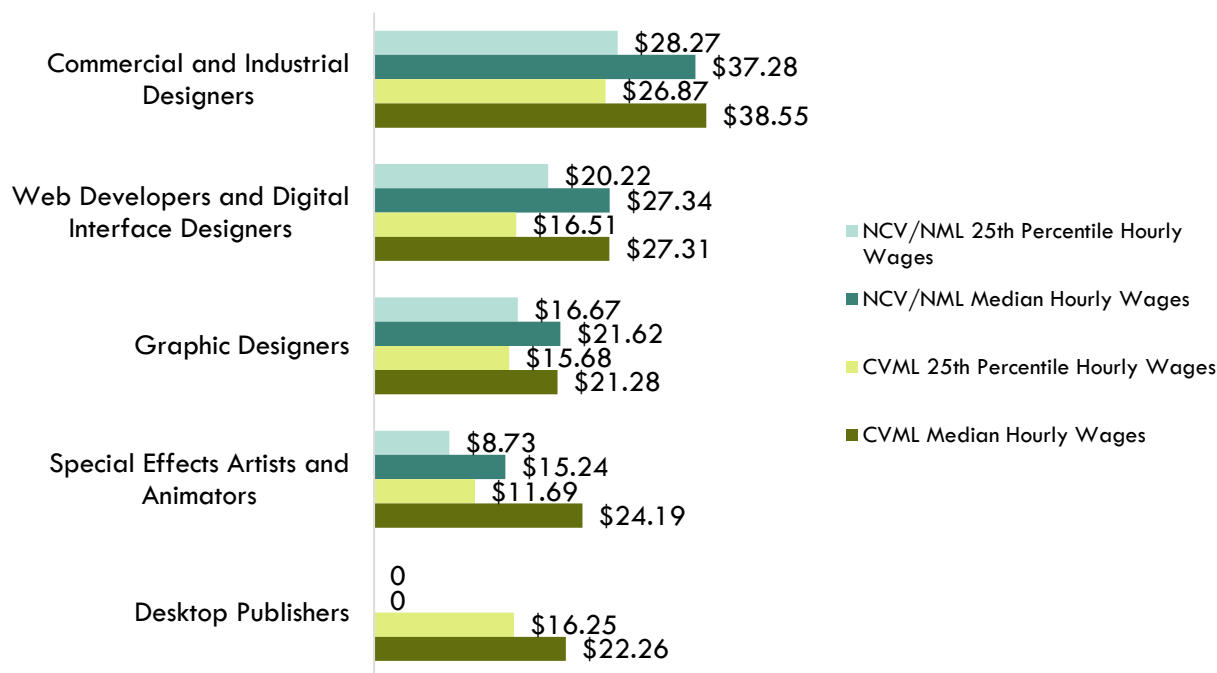
Exhibit 1. Digital media employment and occupational projections in the NCV/NML subregion

Occupation	2019 Jobs	2024 Jobs	5-Year Change	5-Year % Change	Annual Openings
Graphic Designers	590	612	22	4%	67
Web Developers and Digital Interface Designers	280	301	20	7%	26
Special Effects Artists and Animators	131	138	7	6%	17
Commercial and Industrial Designers	107	114	6	6%	13
Desktop Publishers	<10	<10	Insf. Data	Insf. Data	0
TOTAL	**1,113**	**1,169**	**56**	**5%**	**123**

Wages

Exhibit 2 compares the entry-level and experienced wages of the digital media occupations. Commercial and industrial designers earn the highest entry-level wages, $28.27/hour in the subregion and $26.87/hour in the region. The subregional entry-level wage of special effects artists and animators is below the region's living wage.

Exhibit 2. Entry-level and experienced wage comparison in the NCV/NML subregion and region

Legend:
- NCV/NML 25th Percentile Hourly Wages
- NCV/NML Median Hourly Wages
- CVML 25th Percentile Hourly Wages
- CVML Median Hourly Wages

Commercial and Industrial Designers: $28.27, $37.28, $26.87, $38.55
Web Developers and Digital Interface Designers: $20.22, $27.34, $16.51, $27.31
Graphic Designers: $16.67, $21.62, $15.68, $21.28
Special Effects Artists and Animators: $8.73, $15.24, $11.69, $24.19
Desktop Publishers: 0, 0, $16.25, $22.26

Job Postings

There were 317 job postings for the five occupations in the NCV/NML subregion from May to October 2020.[2] The employers with the most job postings are listed in Exhibit 3.

Exhibit 3. Top employers of digital media occupations by number of job postings

Employer	Job Postings	% Job Postings
Anthem Blue Cross	7	8%
Amazon	6	7%
Nucamp	5	6%
Container Graphics Corporation	3	4%
Fastenal Company	3	4%
Saveco Distributors	3	4%

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[2] Other than occupation titles and job titles, the categories below can be counted one or multiple times per job posting, and across several areas in a single posting. For example, a skill can be counted in two different skill types, and an employer can indicate more than one education level.

Employer	Job Postings	% Job Postings
California State University Stanislaus	2	2%
Collage Com	2	2%
Ironbelly Tech	2	2%
Jp Signs And Graphics	2	2%

Exhibit 4 shows how job postings for the targeted occupations in the NCV/NML subregion are distributed across three O*NET OnLine occupations. The occupational title web developers is listed in 202 job postings. Note how a higher proportion of job postings are for this occupational title. Common job titles in postings include senior backend engineer in 46 job postings, backend engineer in 36 job postings, and front-end engineer in 36 job postings.

Exhibit 4. Top occupational titles in job postings for digital media

Occupational Title	Job Postings	% of Job Postings
Web Developers	278	88%
Graphic Designers	32	10%
Commercial and Industrial Designers	7	2%

Salaries

Exhibit 5 shows the "Market Salaries" for digital media occupations that are calculated by Burning Glass which uses a machine learning model built off of millions of job postings every year, and accounts for adjustments based on locations, industry, skills, experience, education requirements, among other variables.

Exhibit 5. Salaries for digital media occupations

Market Salary Percentile	Salary Amount
10th Percentile	$43,868
25th Percentile	$71,965
50th Percentile	$87,769
75th Percentile	$100,194
90th Percentile	$106,545

Education

Of the 317 job postings, 215 listed an education level preferred for the positions being filled. Of those, 96% requested a bachelor's degree, 4% requested high school or vocational training, and 3% requested an associate degree (Exhibit 6). A job posting can indicate more than one education level. Hence, the percentages shown in the chart below total more than 100%.
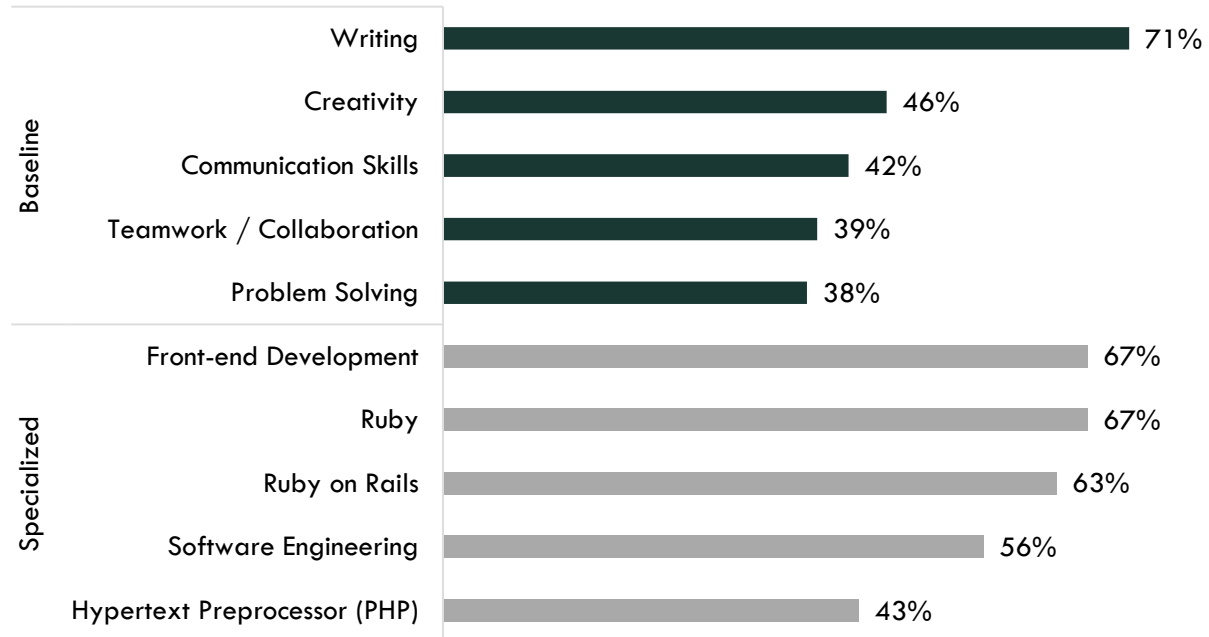
Exhibit 6. Education levels requested in job postings for digital media

Education level	Job Postings	% of Job Postings
Bachelor's degree	207	96%
High school or vocational training	9	4%
Associate degree	7	3%
Master's degree	7	3%

Baseline and Specialized Skills

Exhibit 7 depicts the top baseline and specialized skills for the targeted occupations. The three most important baseline skills are writing, 71% of job postings, creativity, 46%, and communication skills, 42%. The top three specialized skills are front-end development, 67% of job postings, Ruby, 67%, and Ruby on Rails, 63%.
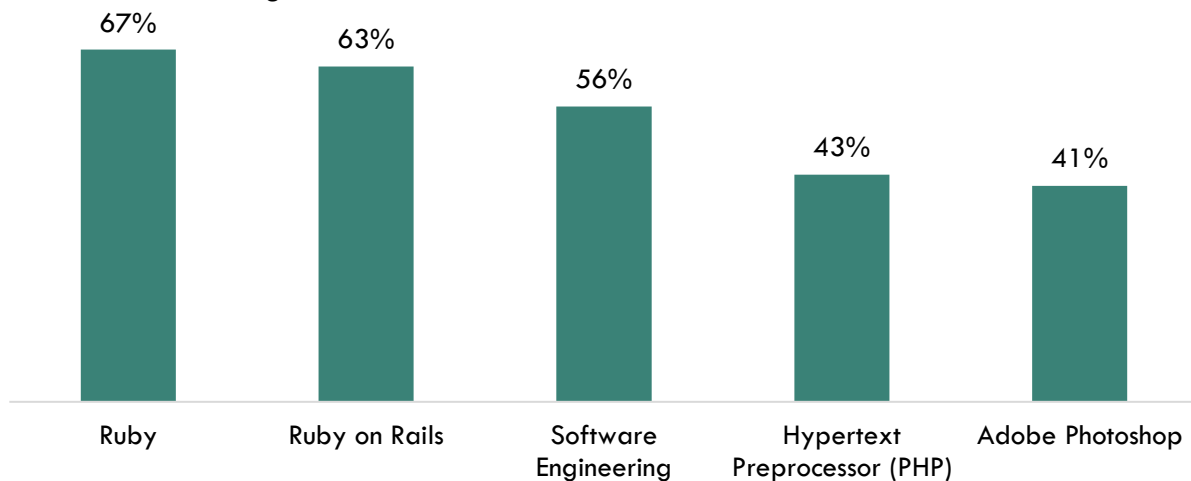
Exhibit 7. In-demand digital media baseline and specialized skills

Baseline	
Writing	71%
Creativity	46%
Communication Skills	42%
Teamwork / Collaboration	39%
Problem Solving	38%
Specialized	
Front-end Development	67%
Ruby	67%
Ruby on Rails	63%
Software Engineering	56%
Hypertext Preprocessor (PHP)	43%

Software Skills

Analysis also included the software skills most in demand by employers. Ruby and Ruby on Rails were the top two software skills identified in job postings (Exhibit 8).

Exhibit 8. In-demand digital media software skills

Ruby	Ruby on Rails	Software Engineering	Hypertext Preprocessor (PHP)	Adobe Photoshop
67%	63%	56%	43%	41%

Certifications

Of the 317 job postings, seven contained certification data. Among those, 43% indicated a need for a driver's license. The next top certifications are CDL Class C and computer science certification (Exhibit 9). (Due to the low number of job postings with certifications listed, the chart below may not be representative of the full sample.)

Exhibit 9. Top digital media certifications requested in job postings
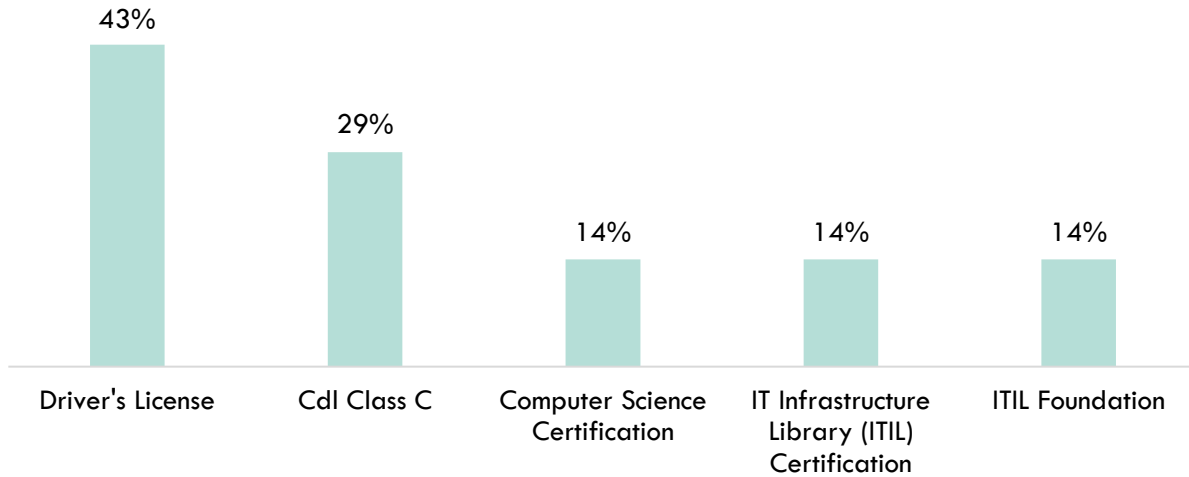
Education, Work Experience & Training

Three of the five occupations typically require a bachelor's degree as entry-level education, and two require an associate degree—web developers and digital interface designers, and desktop publishers (Exhibit 10).

Exhibit 10. Education, work experience, training, Current Population Survey, and Bureau of Labor Statistics results for digital media occupations[3]

Occupation	Typical Entry-level Education	Work Experience Required	Typical On-The-Job Training	CPS	BLS
Graphic Designers	Bachelor's degree	None	None	28.3%	23.0%
Web Developers and Digital Interface Designers	Associate degree	None	None	25.0%	34.0%
Special Effects Artists and Animators	Bachelor's degree	None	None	27.2%	
Commercial and Industrial Designers	Bachelor's degree	None	None	28.3%	27.0%
Desktop Publishers	Associate degree	None	Short-term	41.1%	34.0%

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[3] "Labor Force Statistics from the Current Population Survey," Bureau of Labor Statistics, https://www.bls.gov/cps/.

Supply

Analysis of program data from the California Community Colleges Chancellor's Office Data Mart included the TOP codes: 061400-Digital Media, 101300-Commercial Art, and 103000-Graphic Art and Design. Analysis of the last three years of TOP code data shows that, on average, 72 awards were conferred in the Central Valley/Mother Lode region each year (Exhibit 11).

Exhibit 11. Postsecondary supply for digital media occupations in the region

TOP or CIP Title-Code	College	Associate Degree	Certificate 12 < 18 units	Certificate 18 < 30 units	Certificate 30 < 60 units	Certificate 6 < 18 units	Subtotal
061400 - Digital Media	Columbia	2		1		1	3
	Sequoias					1	1
101300 - Commercial Art	Porterville	4					4
	Sequoias				1		1
103000 - Graphic Art and Design	Bakersfield	9			17		25
	Fresno City	6			6		11
	San Joaquin Delta	10			2		12
	Sequoias	2	3			10	15
TOTAL		**32**	**3**	**1**	**26**	**11**	**72**

There is an undersupply of 107 digital media workers in the NCV/NML subregion and 234 workers in the region (Exhibit 12).

Exhibit 12. Digital media workforce annual demand and supply in the NCV/NML subregion and region
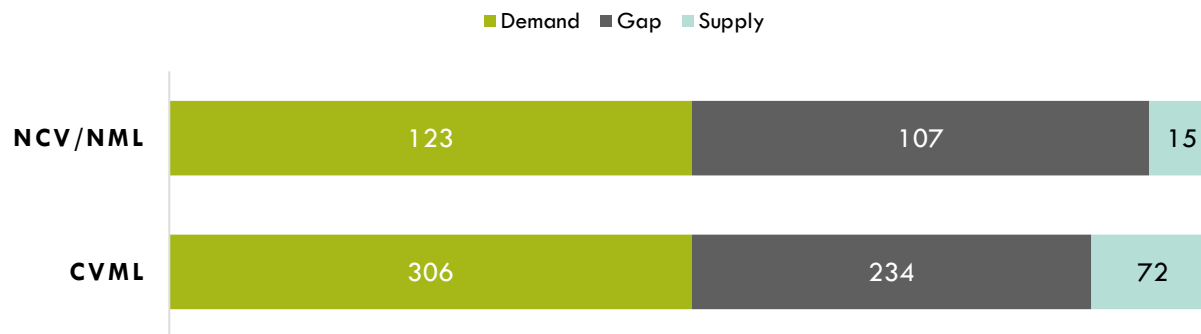
Student Outcomes

Exhibit 13 summarizes employment and wage outcomes from the California Community College Chancellor's Cal-PASS Plus LaunchBoard for the TOP codes related to digital media. There were 36 digital media and 52 graphic art and design students who received a degree, certificate, or attained apprenticeship journey status, and 73 digital media students and 78 graphic art and design students

transferred. A higher percentage of digital media students reported obtaining a job closely related to their field of study, and a higher percentage of graphic art and design students reported attaining a living wage.

Exhibit 13. Regional metrics for the TOP codes related to digital media

Metric	Digital Media 061400	Graphic Art and Design 103000
Students Who Got a Degree or Certificate or Attained Apprenticeship Journey Status	36	52
Number of Students Who Transferred	73	78
Job Closely Related to Field of Study	50%	43%
Median Change in Earnings	48%	39%
Attained a Living Wage	47%	53%
* denotes data not available.		

Conclusion

The entry-level wages of four of the five occupations exceed the NCV/NML subregion's average living wage. The subregional entry-level wage of special effects artists and animators is below the region's living wage. There were 317 job postings in the past six months for occupations related to digital media in the subregion. Analysis of skills and certification requirements in job postings indicates:

- The top baseline skill is writing, and the top specialized skill is front-end development.

- The top software skill is Ruby.

- The top certification is a driver's license.

There is an undersupply of trained workers, a shortage of 107 in the NCV/NML subregion and 234 in the region.

Recommendation

Based on these findings, it is recommended that Columbia College work with the ICT/DM Regional Director, the college's advisory board, and local industry in the expansion of programs to address the shortage of digital media in the region.

Appendix A: Methodology & Data Sources

Labor market and educational supply data compiled in this report derive from a variety of sources. Data were drawn from external sources, including the Economic Modeling Specialists, Inc., the California Community Colleges Chancellor's Office Management Information Systems Data Mart and the National Center for Educational Statistics (NCES) Integrated Postsecondary Education Data System (IPEDS). Below is the summary of the data sources found in this study.

Data Type	Source
Labor Market Information/Population Estimates and Projections/Educational Attainment	Economic Modeling Specialists, Intl. (EMSI). EMSI occupational employment data are based on final EMSI industry data and final EMSI staffing patterns. Wage estimates are based on Occupational Employment Statistics (QCEW and Non-QCEW Employees classes of worker) and the American Community Survey (Self-Employed and Extended Proprietors). Occupational wage estimates also affected by county-level EMSI earnings by industry: economicmodeling.com.
Typical Education Level and On-the-job Training	Bureau of Labor Statistics (BLS) uses a system to assign categories for entry-level education and typical on-the-job training to each occupation for which BLS publishes projections data: https://www.bls.gov/emp/tables/educational-attainment.htm.
Labor Force, Employment and Unemployment Estimates	California Employment Development Department, Labor Market Information Division: labormarketinfo.edd.ca.gov.
Job Posting and Skills Data	Burning Glass: burning-glass.com/.
Additional Education Requirements/ Employer Preferences	The O*NET Job Zone database includes over 900 occupations as well as information on skills, abilities, knowledge, work activities and interests associated with specific occupations: onetonline.org.

Key Terms and Concepts

Annual Job Openings: Annual openings are calculated by dividing the number of years in the projection period by total job openings.

Education Attainment Level: The highest education attainment level of workers age 25 years or older.

Employment Estimate: The total number of workers currently employed.

Employment Projections: Projections of employment are calculated by a proprietary Economic Modeling Specialists, Intl. (EMSI) formula that includes historical employment and economic indicators along with national, state and local trends.

Living Wage: The cost of living in a specific community or region for one adult and no children. The cost increases with the addition of children.

Occupation: An occupation is a grouping of job titles that have a similar set of activities or tasks that employees perform.

Percent Change: Rate of growth or decline in the occupation for the projected period; this does not factor in replacement openings.

Replacements: Estimate of job openings resulting from workers retiring or otherwise permanently leaving an occupation. Workers entering an occupation often need training. These replacement needs, added to job openings due to growth, may be used to assess the minimum number of workers who will need to be trained for an occupation.

Total Job Openings (New + Replacements): Sum of projected growth (new jobs) and replacement needs. When an occupation is expected to lose jobs, or retain the current employment level, number of openings will equal replacements.

Typical Education Requirement: represents the typical education level most workers need to enter an occupation.

Typical On-The-Job Training: indicates the typical on-the-job training needed to attain competency in the skills needed in the occupation.