Labor Market Analysis for Program Recommendation: 0614.30/Website Design and Development
(Full Stack Web Developer)
Orange County Center of Excellence, October 2023

Summary

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

Program LMI Endorsement Criteria		
	Yes ☐	No ☑
Supply Gap:	*Comments:* there is projected to be **1,219 annual job openings** throughout Los Angeles and Orange counties for these full stack web development occupations, which **is less than the 4,503 awards conferred by educational institutions**. However, the related educational programs train for an additional 14 occupations that account for over 18,500 annual job openings. **Therefore, supply is overstated for these full stack web development occupations.**	
	Yes ☑	No ☐
Living Wage: (Entry-Level, 25th)	*Comments:* **All annual job openings** for these full stack web development occupations **have entry-level hourly wages above the OC living wage of $20.63.**	
	Yes ☑	No ☐
Education:	*Comments:* Though these full stack web development occupations typically require a bachelor's degree, **a significant percentage of workers in the field have completed some college or an associate degree as their highest level of education.**	

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

The Orange County Center of Excellence for Labor Market Research (OC COE) prepared this report to determine whether there is a supply gap in the Los Angeles/Orange County regional labor market related to two middle-skill occupations most closely related to full stack web development:

- Web Developers (15-1254)
- Web and Digital Interface Designers (15-1255)

Based on the available data, there appears to be an oversupply for full stack web development occupations in the region. However, supply is overstated because the related educational programs that train for these cloud computing occupations also train for 14 other occupations not included in this report. Additionally, typical entry-level wages for these full stack web development occupations are above the living wage, and typical education requirements align with a community college education. Therefore, **due to some of the regional labor market criteria being met, the COE endorses this proposed program.**

Exhibit 1 lists the occupational demand, supply, typical entry-level education, and educational attainment for the occupations included in this report.

Exhibit 1: Labor Market Endorsement Summary

Occupation (SOC)	Demand (Annual Openings)	Supply (CC and Non-CC)	Entry-Level Hourly Earnings (25th Percentile)	Typical Entry-Level Education	Community College Educational Attainment
Web Developers (15-1254)	LA: 299	LA: *Accounted for Below*	OC: $23.61	Bachelor's degree	25%
	OC: 112	OC: *Accounted for Below*			
	TTL: 411	TTL: *Accounted for Below*			
Web and Digital Interface Designers (15-1255)	LA: 604	LA: 2,880	OC: $25.00	Bachelor's degree	25%
	OC: 204	OC: 1,623			
	TTL: 808	TTL: 4,503			
Total	**1,219**	**4,503**	**N/A**	**N/A**	**N/A**

Demand:

- The number of jobs related to these full stack web development occupations are projected to increase 11% through 2027, equating to 1,219 annual job openings.
- Hourly entry-level wages for these full stack web development occupations range from $23.61 to $25.00 in Orange County; all annual job openings have entry-level wages above the living wage.
- There were 5,741 online job postings for these full stack web development occupations over the past 12 months. The highest number of postings were for web developers, front-end developers, UI/UX designers, and front-end engineers.
- The typical entry-level education for these full stack web development occupations is a bachelor's degree.
- Approximately 25% of workers in the field have completed some college or an associate degree as their highest level of education.

Supply:

- There was an average of 1,119 awards conferred by 28 community colleges in Los Angeles and Orange Counties from 2019 to 2022.
- Non-community college institutions conferred an average of 3,384 awards from 2019 to 2021.
- Orange County community college students that exited website design and development programs in the 2020-21 academic year had a median annual wage of $40,472 after exiting the program and 43% attained the regional living wage.
- Throughout Orange County, 50% of website design and development students that exited their program in 2019-20 reported that they are working in a job closely related to their field of study.

Demand

Occupational Projections:

Exhibit 2 shows the annual percent change in jobs for these full stack web development occupations from 2017 through 2027. Though there was a 7% decline across all occupations from 2019 to 2020 due to the COVID-19 pandemic, employment in these full stack web development occupations increased during the same period. From 2019-2021, employment in these occupations increased 8%, 10% and 5%, respectively in Orange County. These full stack web development occupations are projected to grow at a slightly higher rate compared to all occupations through 2027.

Exhibit 2: Annual Percent Change in Jobs for Full Stack Web Development Occupations, 2017-2027
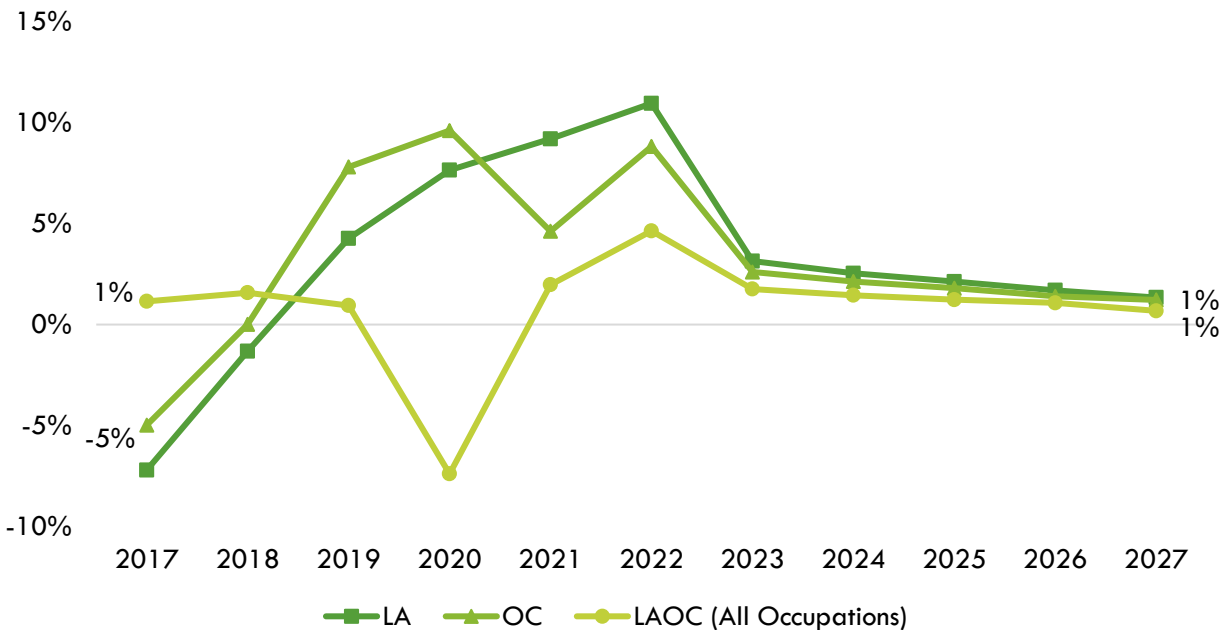

Exhibit 3 shows the five-year occupational demand projections for these full stack web development occupations. In Los Angeles/Orange County, the number of jobs related to these occupations is projected to increase by 11% through 2027. There is projected to be 1,219 jobs available annually.

Exhibit 3: Occupational Demand in Los Angeles and Orange Counties[1]

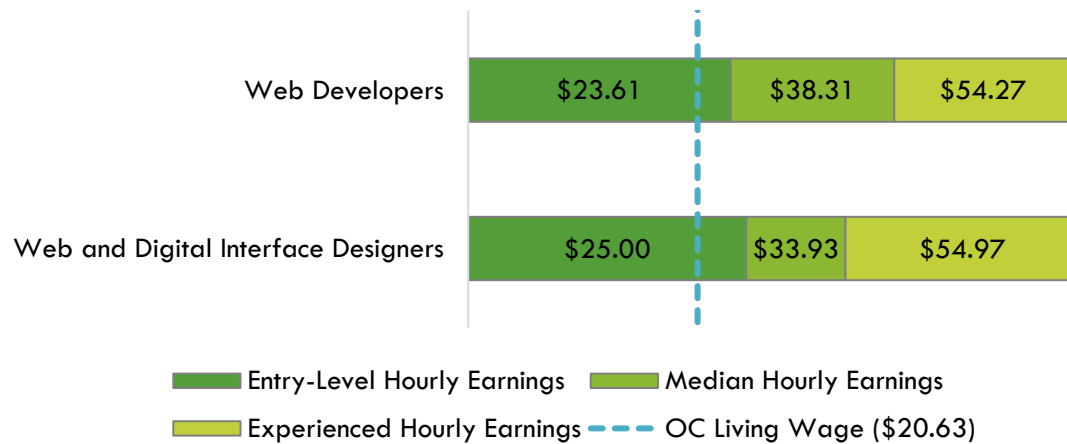| Geography	2022 Jobs	2027 Jobs	2022-2027 Change	2022-2027 % Change	Annual Openings
Los Angeles	8,464	9,421	957	11%	903
Orange	3,091	3,384	293	10%	316
Total	**11,554**	**12,805**	**1,250**	**11%**	**1,219**

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

Wages:

The labor market endorsement in this report considers the entry-level hourly wages for these full stack web development occupations in Orange County as they relate to the county's living wage. Los Angeles County wages are included below in order to provide a complete analysis of the LA/OC region.
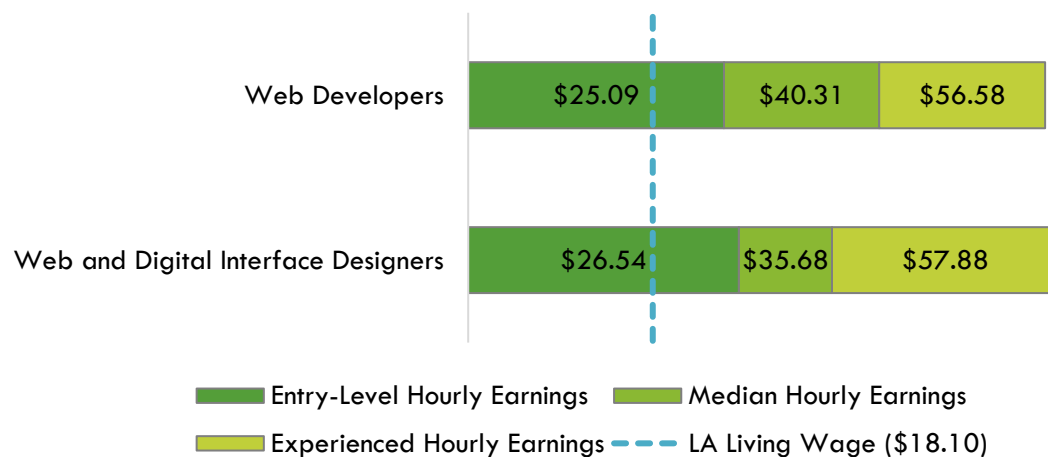
All annual openings for these full stack web development occupations have entry-level wages above the living wage for one adult in Orange County ($20.63). Typical entry-level hourly wages for these occupations range between $23.61and $25.00. Orange County's average wages ($41.16) are slightly below the average statewide wage of $45.21 for these occupations. Exhibit 4 shows the wage range for each of these full stack web development occupations in Orange County and how they compare to the regional living wage, sorted from lowest to highest entry-level wage.

Exhibit 4: Wages by Occupation in Orange County

| Web Developers | $23.61 | $38.31 | $54.27 |
| Web and Digital Interface Designers | $25.00 | $33.93 | $54.97 |

Entry-Level Hourly Earnings   Median Hourly Earnings
Experienced Hourly Earnings — — OC Living Wage ($20.63)

All annual openings for these full stack web development occupations have entry-level wages above the living wage for one adult in Los Angeles County ($18.10). Typical entry-level hourly wages range between $25.09 and $26.54 for these occupations. Los Angeles County's average wages ($42.93) are slightly below the average statewide wage of $45.21 for these occupations. Exhibit 5 shows the wage range for each of these full stack web development occupations in Los Angeles County and how they compare to the regional living wage, sorted from lowest to highest entry-level wage.

Exhibit 5: Wages by Occupation in Los Angeles County

| Web Developers | $25.09 | $40.31 | $56.58 |
| Web and Digital Interface Designers | $26.54 | $35.68 | $57.88 |

Entry-Level Hourly Earnings   Median Hourly Earnings
Experienced Hourly Earnings — — LA Living Wage ($18.10)

Job Postings:

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

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

There were 5,741 online job postings related to these full stack web development occupations listed in the past 12 months. Exhibit 6 shows the number of job postings by occupation. Approximately 80% of job postings were for web developers and 20% were for web and digital interface designers.

Exhibit 6: Number of Job Postings by Occupation (n=5,741)

Occupation	Job Postings	Percentage of Job Postings
Web Developers	4,582	80%
Web and Digital Interface Designers	1,159	20%
Total Postings	**5,741**	**100%**

The top employers in the region, by number of job postings, are shown in Exhibit 7.

Exhibit 7: Top Employers by Number of Job Postings (n=5,741)

Employer	Job Postings	Percentage of Job Postings
CyberCoders	218	4%
Motion Recruitment	178	3%
Boeing	95	2%
Canteen Vending	90	2%
Riot Games	80	1%
Amazon	50	1%
Robert Half	48	1%
Electronic Arts	45	1%
Disney	40	1%
Activision Blizzard	39	1%

The top specialized, soft, and computer skills listed by those most frequently mentioned in job postings (denoted in parentheses) are shown in Exhibit 8.

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

Exhibit 8: Top Skills by Number of Job Postings (n=5,741)

Top Specialized Skills	Top Soft Skills	Top Computer Skills
JavaScript (Programming Language) (1,911)	Communication Skills (2,057)	JavaScript (Programming Language) (1,911)
CSS (Cascading Style Sheets) (1,621)	Research (1,097)	CSS (Cascading Style Sheets) (1,621)
UX (User Experience) (1,477)	Problem Solving (951)	HTML (HyperText Markup Language) (1,301)
Front-End (Software Engineering) (1,390)	Leadership (724)	React.js (Javascript Library) (1,252)
Computer Science (1,303)	Management (710)	API (Application Programming Interface) (878)
HTML (HyperText Markup Language) (1,301)	Detail Oriented (690)	Node.js (Javascript Library) (730)
React.js (Javascript Library) (1,252)	Innovation (667)	Git (Version Control System) (698)
UI (User Interface) (1,183)	Writing (649)	Angular (Web Framework) (685)
Agile Methodology (1,004)	Self-Motivation (574)	Amazon Web Services (656)
API (Application Programming Interface) (878)	Troubleshooting (Problem Solving) (569)	Adobe Photoshop (652)

Educational Attainment:

The Bureau of Labor Statistics (BLS) lists a bachelor's degree as the typical entry-level education for these full stack web developer occupations. Additionally, the national-level educational attainment data indicates approximately 25% of workers in these occupations have completed some college or associate degree as their highest level of education. The vast majority of workers in these occupations have completed a bachelor's master's, or doctoral degree as their highest level of education. Exhibit 9 shows the educational attainment for these occupations.

Of the 44% of the cumulative job postings for these full stack web development occupations that listed a minimum education requirement in Los Angeles/Orange County, 8% (182) requested a high school diploma or an associate degree and 91% (2,304) requested a bachelor's degree.

Exhibit 9: National-level Educational Attainment for Occupations

Occupation	High School Diploma or Less	Some College or Associate Degree	Bachelor's Degree	Graduate or Professional Degree
Web Developers	6%	25%	54%	15%
Web and Digital Interface Designers	6%	25%	54%	15%

Legend:
- ■ High School Diploma or Less
- ■ Some College or Associate Degree
- ■ Bachelor's Degree
- ■ Graduate or Professional Degree
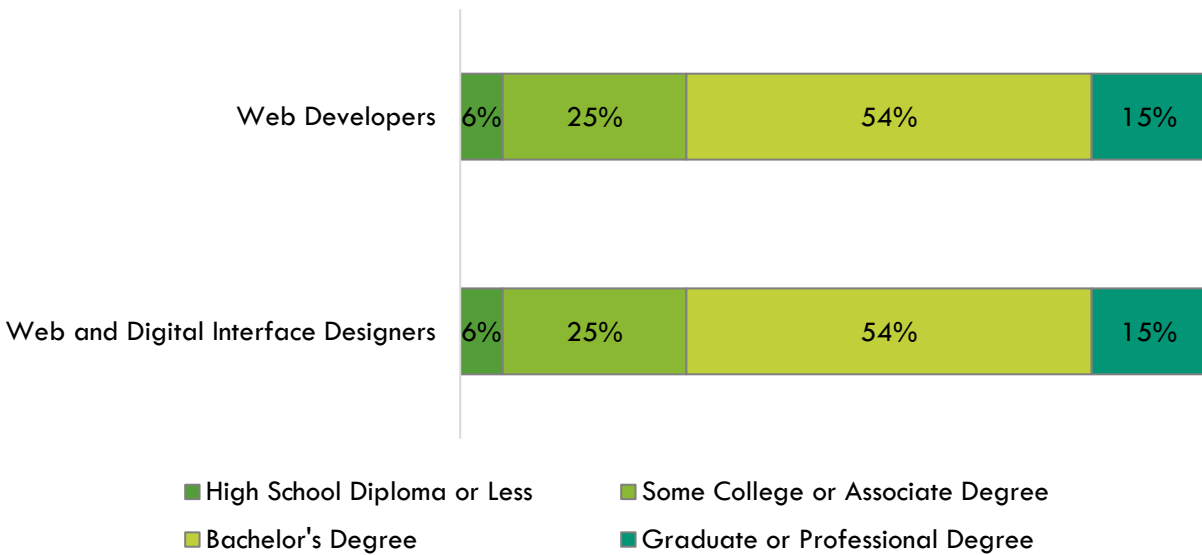
Educational Supply

Community College Supply:

Exhibit 10 shows the three-year average number of awards conferred by community colleges in the related TOP codes: Digital Media (0614.00), Website Design and Development (0614.30), Information Technology, General (0701.00), Computer Information Systems (0702.00), Software Applications (0702.10), Computer Software Development (0707.00), Computer Programming (0707.10), World Wide Web Administration (0709.00), and E-Commerce (technology emphasis) (0709.10). The colleges with the most completions in the region are Mt. San Antonio, Orange Coast, Long Beach, and Santa Monica. Over the past 12 months, there were four other related program recommendation requests from regional community colleges.

Exhibit 10: Regional Community College Awards (Certificates and Degrees), 2019-2022

TOP Code	Program	College	2019-2020 Awards	2020-2021 Awards	2021-2022 Awards	3-Year Award Average
0614.00	Digital Media	Glendale	1	0	0	0
		LA Mission	4	5	5	5
		LA Trade	11	18	12	14
		Pasadena	0	3	15	6
		Rio Hondo	2	1	1	1
		Santa Monica	0	0	19	6
		LA Subtotal	**18**	**27**	**52**	**32**
		Coastline	0	3	3	2
		Cypress	0	2	7	3
		Golden West	10	7	0	6
		Irvine	1	6	3	3
		Saddleback	0	1	1	1
		Santa Ana	1	6	34	13
		OC Subtotal	**12**	**25**	**48**	**28**
		Supply Subtotal/Average	**30**	**52**	**100**	**60**
0614.30	Website Design and Development	Citrus	0	0	1	0
		LA Pierce	2	4	5	4
		Mt San Antonio	7	6	1	5
		Pasadena	1	1	7	3
		Santa Monica	2	3	2	2
		West LA	0	0	3	1
		LA Subtotal	**12**	**14**	**19**	**15**
		Coastline	1	1	0	1
		Fullerton	0	1	2	1
		Irvine	0	5	4	2
		Orange Coast	9	7	13	10
		Saddleback	2	7	4	5
		Santa Ana	2	1	0	1

TOP Code	Program	College	2019-2020 Awards	2020-2021 Awards	2021-2022 Awards	3-Year Award Average
		Santiago Canyon	3	6	5	5
		OC Subtotal	**17**	**28**	**28**	**25**
	Supply Subtotal/Average		**29**	**42**	**47**	**40**
0701.00	Information Technology, General	East LA	10	4	30	15
		Glendale	0	3	17	7
		LA Harbor	0	1	2	1
		LA Mission	3	1	4	3
		LA Southwest	0	2	12	5
		Long Beach	64	106	88	85
		Mt San Antonio	90	49	23	53
		Santa Monica	0	1	0	0
		West LA	5	0	6	4
		LA Subtotal	**172**	**167**	**182**	**173**
		Santa Ana	0	3	9	4
		OC Subtotal	**0**	**3**	**9**	**4**
	Supply Subtotal/Average		**172**	**170**	**191**	**177**
0702.00	Computer Information Systems	Citrus	8	4	6	6
		Compton	0	0	12	4
		East LA	15	23	11	16
		El Camino	21	11	28	20
		Glendale	5	6	8	6
		LA City	1	4	3	3
		LA Harbor	0	0	1	0
		LA Mission	1	1	1	1
		LA Southwest	0	0	21	7
		LA Trade	20	15	17	17
		Long Beach	0	3	0	1
		Mt San Antonio	79	6	68	51
		Rio Hondo	10	6	15	11
		West LA	10	9	14	11
		LA Subtotal	**170**	**88**	**205**	**154**
		Coastline	0	0	2	0
		Cypress	4	0	0	1
		Fullerton	11	31	49	30
		Irvine	2	0	0	1
		Orange Coast	2	0	1	1
		Saddleback	0	1	0	0
		Santa Ana	2	16	18	12
		Santiago Canyon	4	1	1	2
		OC Subtotal	**25**	**49**	**71**	**47**

TOP Code	Program	College	2019-2020 Awards	2020-2021 Awards	2021-2022 Awards	3-Year Award Average
		Supply Subtotal/Average	**195**	**137**	**276**	**201**
0702.10	Software Applications	Cerritos	6	2	8	5
		LA City	1	1	0	1
		LA Mission	0	3	0	1
		LA Southwest	0	0	3	1
		Long Beach	7	0	0	2
		Mt San Antonio	2	0	1	1
		Santa Monica	13	6	12	11
		LA Subtotal	**29**	**12**	**24**	**22**
		Coastline	8	8	14	10
		Cypress	0	0	2	0
		Irvine	48	50	89	62
		Saddleback	7	11	10	9
		OC Subtotal	**63**	**69**	**115**	**81**
		Supply Subtotal/Average	**92**	**81**	**139**	**103**
0707.00	Computer Software Development	LA City	0	0	1	0
		LA Harbor	0	0	2	1
		LA Mission	0	0	2	1
		LA Pierce	0	4	7	4
		Santa Monica	0	1	1	1
		West LA	0	0	6	2
		LA Subtotal	**0**	**5**	**19**	**9**
		Cypress	1	0	0	0
		Golden West	2	6	4	4
		Orange Coast	2	2	0	2
		Saddleback	3	10	15	10
		OC Subtotal	**8**	**18**	**19**	**16**
		Supply Subtotal/Average	**8**	**23**	**38**	**25**
0707.10	Computer Programming	Cerritos	2	3	7	4
		Citrus	1	3	9	4
		East LA	4	1	0	2
		Glendale	3	0	0	1
		LA City	6	8	10	8
		LA Harbor	0	2	4	2
		LA Mission	4	7	7	7
		LA Pierce	4	5	5	4
		LA Southwest	1	2	2	2
		LA Valley	6	13	8	9
		Long Beach	5	3	7	5
		Mt San Antonio	114	83	125	107
		Pasadena	21	23	23	22

TOP Code	Program	College	2019-2020 Awards	2020-2021 Awards	2021-2022 Awards	3-Year Award Average
		Santa Monica	46	65	71	61
		LA Subtotal	**217**	**218**	**278**	**238**
		Coastline	0	0	1	0
		Cypress	20	6	5	11
		Fullerton	28	24	28	27
		Irvine	4	0	0	1
		Orange Coast	157	206	160	175
		Santa Ana	1	0	0	0
		Santiago Canyon	3	2	2	2
		OC Subtotal	**213**	**238**	**196**	**216**
	Supply Subtotal/Average		**430**	**456**	**474**	**454**
0709.00	World Wide Web Administration	Cerritos	0	0	3	1
		Glendale	7	10	7	8
		LA Pierce	0	2	0	0
		Long Beach	24	34	44	34
		Santa Monica	0	16	0	5
		West LA	9	6	7	7
		LA Subtotal	**40**	**68**	**61**	**55**
		Fullerton	0	1	0	0
		Saddleback	2	2	3	2
		OC Subtotal	**2**	**3**	**3**	**2**
	Supply Subtotal/Average		**42**	**71**	**64**	**57**
0709.10	E-Commerce (technology emphasis)	East LA	1	1	2	1
		LA Subtotal	**1**	**1**	**2**	**1**
		Saddleback	1	0	2	1
		OC Subtotal	**1**	**0**	**2**	**1**
	Supply Subtotal/Average		**2**	**1**	**4**	**2**
	Supply Total/Average		**1,000**	**1,033**	**1,333**	**1,119**

Exhibit 11 shows the annual average community college awards by type from 2019-20 through 2021-22. The plurality of the awards are for associate degrees (391), followed by certificates between 6 and less than 18 semester units (297) and certificates between 16 and less than 30 semester units (246).

Exhibit 11: Annual Average Community College Awards by Type, 2019-2022

Award Type	Value
Associate Degree	391
Certificate 30 < 60 semester units	68
Certificate 16 < 30 semester units	246
Certificate 6 < 18 semester units	297
Certificate 8 < 16 semester units	84
Noncredit award 480 < 960 hours	4
Noncredit award 288 < 480 hours	7
Noncredit award 192 < 288 hours	13
Noncredit award 96 < 144 hours	7
Noncredit award 48 < 96 hours	2
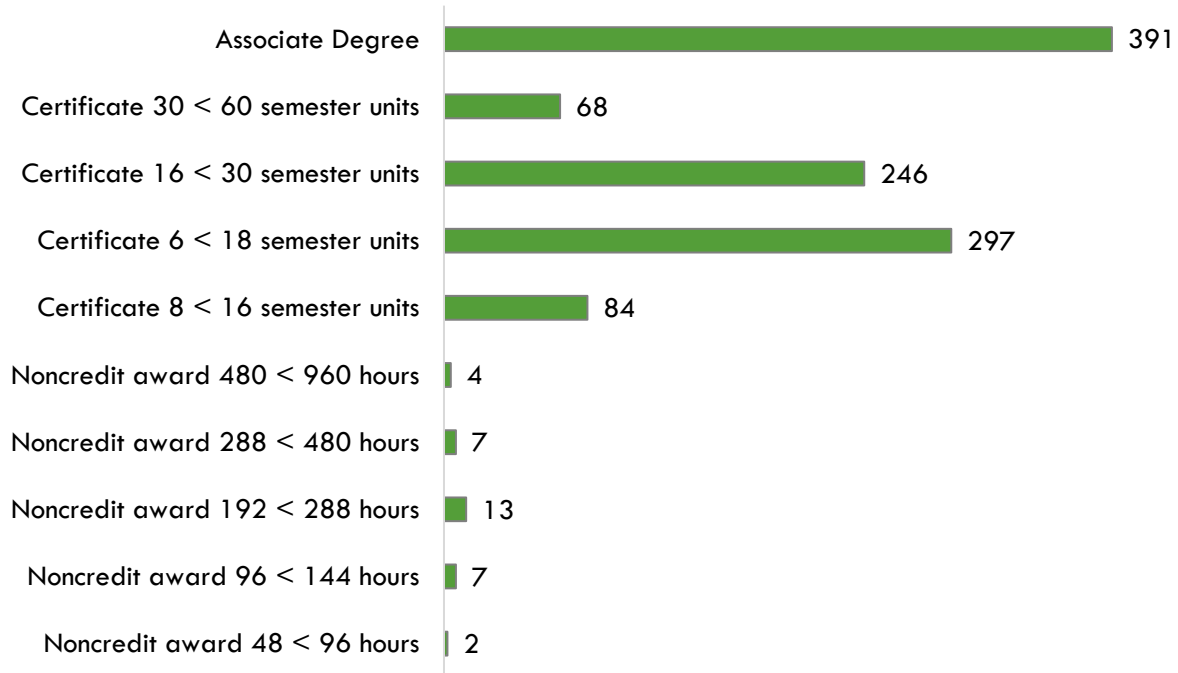
Community College Student Outcomes:

Exhibit 12 shows the Strong Workforce Program (SWP) metrics for website design and development programs in Rancho Santiago Community College District (RSCCD), the Orange County Region, and California. Of the 350 website design and development students in the 2020-21 academic year, 29% (103) attended an RSCCD college.

Additionally, RSCCD students that exited website design and development programs in the 2020-21 academic year had higher median annual earnings ($59,048) compared to all website design and development students in Orange County ($40,472). Approximately 43% of website design and development students in Orange County attained the living wage. Data on the number of RSCCD students who attained the living wage were unavailable for 2019-2020 or 2020-2021.

Exhibit 12: Website Design and Development (0614.30) Strong Workforce Program Metrics, 2020-21[3]

SWP Metric	RSCCD	OC Region	California
SWP Students	103	350	3,951
SWP Students Who Earned 9 or More Career Education Units in the District in a Single Year	Insufficient Data	29%	37%
SWP Students Who Completed a Noncredit CTE or Workforce Preparation Course	78%	77%	91%
SWP Students Who Earned a Degree or Certificate or Attained Apprenticeship Journey Status	Insufficient Data	24	364

[3] All SWP metrics are for 2020-21 unless otherwise noted.

SWP Metric	RSCCD	OC Region	California
SWP Students Who Transferred to a Four-Year Postsecondary Institution (2019-20)	Insufficient Data	Insufficient Data	215
SWP Students with a Job Closely Related to Their Field of Study (2019-20)	50%	50%	52%
Median Annual Earnings for SWP Exiting Students	$59,048 ($28.39)	$40,472 ($19.46)	$44,146 ($21.22)
Median Change in Earnings for SWP Exiting Students	10%	22%	26%
SWP Exiting Students Who Attained the Living Wage	Insufficient Data	43%	54%l

Non-Community College Supply:

For a comprehensive regional supply analysis, it is also important to consider the supply from other institutions in the region that provide training programs for these website design and development occupations. Exhibit 13 shows the annual and two-year average number of awards conferred by these institutions in the related Classification of Instructional Programs (CIP) Codes: Digital Communication and Media/Multimedia (09.0702), Computer and Information Sciences, General (11.0101), Computer Programming/Programmer (11.0201), Web Page, Digital/Multimedia and Information Resources Design (11.0801) and Web/Multimedia Management and Webmaster (11.1004). Due to different data collection periods, the most recent two-year period of available data is presented, from 2019 to 2021. Between 2019 and 2021, non-community colleges in the region conferred an average of 3,384 awards annually in related training programs.

Exhibit 13: Regional Non-Community College Awards, 2019-2021

CIP Code	Program	College	2019-2020 Awards	2020-2021 Awards	2-Year Award Average
09.0702	Digital Communication and Media/Multimedia	California State University-Dominguez Hills	41	57	49
		Columbia College Hollywood	0	28	14
		Fremont College	1	0	0
		Marymount California University	10	9	10
		Vanguard University of Southern California	2	1	2
		Supply Subtotal / Average	**54**	**95**	**75**
11.0101	Computer and Information Sciences, General	Azusa Pacific University	21	25	23
		Los Angeles Pacific College	6	2	4
		Loyola Marymount University	27	45	36
		Mount Saint Mary's University	0	0	0
		Pacific States University	0	0	0
		Pitzer College	0	1	0
		The Master's University and Seminary	11	5	8
		University of La Verne	23	36	30

CIP Code	Program	College	2019-2020 Awards	2020-2021 Awards	2-Year Award Average
		University of the People	203	292	248
		Chapman University	18	23	20
		University of California-Irvine	0	1	0
		University of Massachusetts Global	30	36	33
		Westcliff University	0	0	0
		Supply Subtotal / Average	**339**	**466**	**402**
11.0201	Computer Programming/Programmer, General	ABCO Technology	46	34	40
		Platt College-Anaheim	4	0	2
		Supply Subtotal / Average	**50**	**34**	**42**
11.0701	Computer Science	Biola University	18	19	18
		California Institute of Technology	72	83	78
		California State Polytechnic University-Pomona	238	270	254
		California State University-Dominguez Hills	57	66	62
		California State University-Long Beach	220	221	220
		California State University-Los Angeles	119	152	136
		California State University-Northridge	160	214	187
		Claremont McKenna College	35	17	26
		Harvey Mudd College	47	48	48
		Occidental College	18	18	18
		Pitzer College	10	5	8
		Pomona College	34	33	34
		Scripps College	11	5	8
		The Master's University and Seminary	0	0	0
		University of California-Los Angeles	287	342	314
		University of Southern California	247	293	270
		California State University-Fullerton	264	308	286
		Chapman University	30	45	38
		Southern California Institute of Technology	10	7	8
		University of California-Irvine	805	822	814
		Supply Subtotal / Average	**2,682**	**2,968**	**2,827**
11.0801	Web Page, Digital/Multimedia and	Los Angeles Pacific College	0	4	2
		Westcliff University	0	0	0

CIP Code	Program	College	2019-2020 Awards	2020-2021 Awards	2-Year Award Average
	Information Resources Design				
		Supply Subtotal / Average	0	4	2
11.1004	Web/Multimedia Management and Webmaster	ABCO Technology	37	35	36
		Los Angeles Pacific College	1	1	0
		Supply Subtotal / Average	38	36	36
		Supply Total /Average	3,163	3,603	3,384

Regional Demographics

This section analyzes demographic data for Orange County community college students enrolled in website design and development programs compared to the OC population, as well occupational data, for the purpose of identifying potential diversity and equity issues that can be addressed by community college programs.

Ethnicity:

Exhibit 14 shows the ethnicity of Orange County community college students enrolled in website design and development programs compared to the overall Orange County population, as well as the two full stack web development occupations included in this report. Notably, 57% of workers employed in these full stack web development occupations are white, which is much higher than the population (40%) and community college web design and development students (29%).

Examining disaggregated data for each occupation (not shown), while *web developers* have a slightly higher percentage of Hispanic or Latino workers (19%) compared to *web and digital interface designers* (17%), both are lower than their percentage of the population at 34%. White workers comprise the largest group of workers among both web developers and web and digital interface designers, at 58% and 55%, respectively.

Exhibit 14: Program and County Demographics by Ethnicity

Asian
- OC Community College Students (0614.30): 31%
- OC Population: 21%
- Full Stack Web Development Occupations: 21%

Black or African American
- OC Community College Students (0614.30): 5%
- OC Population: 2%
- Full Stack Web Development Occupations: 1%

Hispanic or Latino
- OC Community College Students (0614.30): 28%
- OC Population: 34%
- Full Stack Web Development Occupations: 18%

White
- OC Community College Students (0614.30): 29%
- OC Population: 40%
- Full Stack Web Development Occupations: 57%

Other Race/Ethnicity
- OC Community College Students (0614.30): 8%
- OC Population: 4%
- Full Stack Web Development Occupations: 3%

■ OC Community College Students (0614.30) ■ OC Population
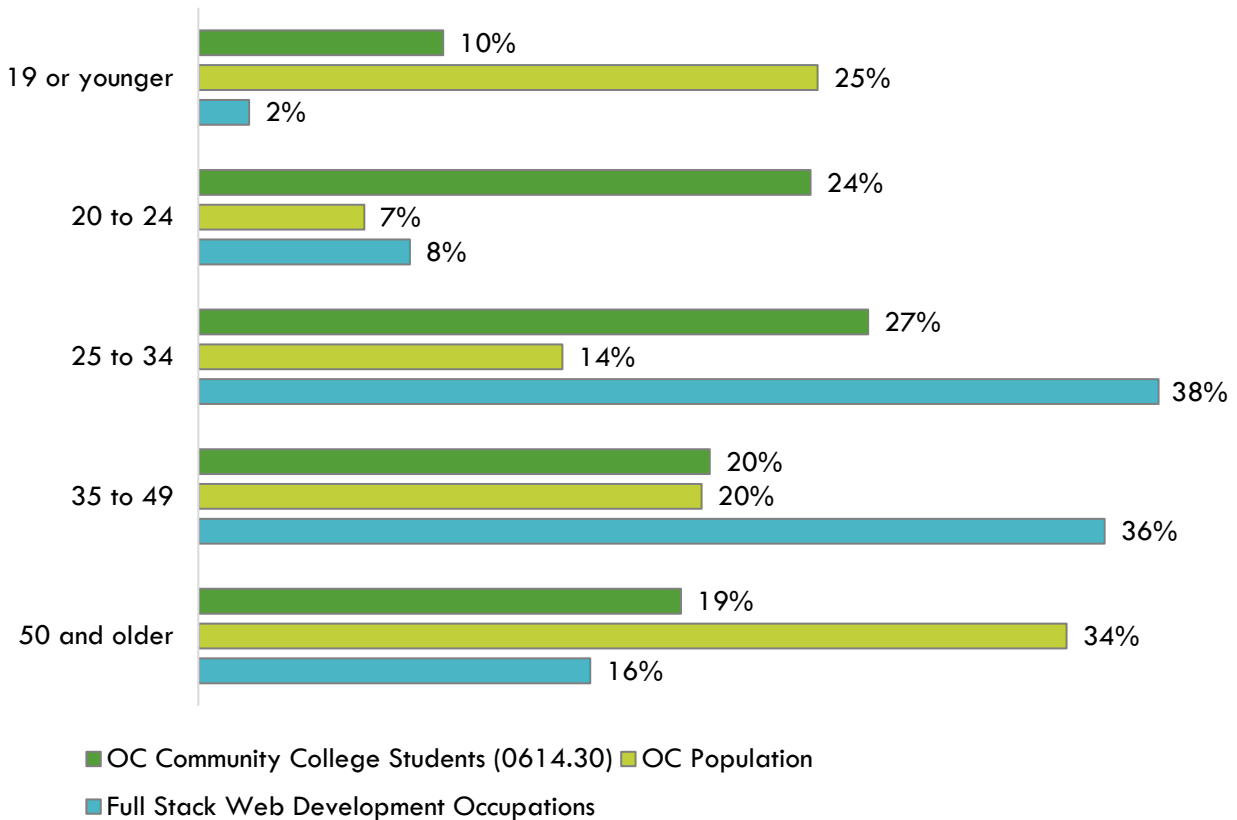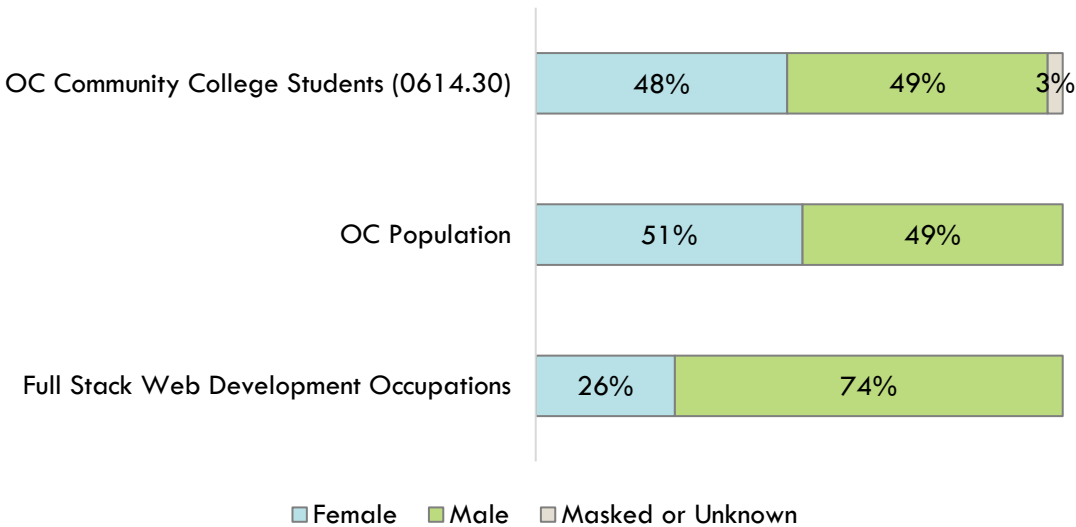■ Full Stack Web Development Occupations

Age:

Exhibit 15 shows the age of Orange County community college students enrolled in website design and development programs compared to the overall Orange County population, as well as the two full stack web development occupations included in this report. Nearly three-quarters (74%) of workers in these full stack web development occupations are aged between 25 and 49 years, which is more than twice the population (34%) and also more than community college website design and development students (47%).

Examining disaggregated data for each occupation (not shown), *web and digital interface designers* are slightly younger, with more than half of workers (52%) age 34 or younger, while 54% of *web developers* are age 35 and older.

Exhibit 15: Program and County Demographics by Age

Age group	OC Community College Students (0614.30)	OC Population	Full Stack Web Development Occupations
19 or younger	10%	25%	2%
20 to 24	24%	7%	8%
25 to 34	27%	14%	38%
35 to 49	20%	20%	36%
50 and older	19%	34%	16%

■ OC Community College Students (0614.30) ■ OC Population
■ Full Stack Web Development Occupations

Sex:

Exhibit 16 shows the sex of Orange County community college students enrolled in website design and development programs compared to the overall Orange County population as well as these full stack web development occupations.

While men and women are almost evenly represented among the population and website design and development students, men comprise almost three-quarters (74%) of workers in full stack web development occupations. Examining disaggregated data for each occupation (not shown) also indicate that men represent greater numbers of workers in both occupations, though men make up a slightly larger proportion of *web developers* (80%) compared to *web and digital interface designers* (62%).

Exhibit 16: Program and County Demographics by Sex

	Female	Male	Masked or Unknown
OC Community College Students (0614.30)	48%	49%	3%
OC Population	51%	49%	
Full Stack Web Development Occupations	26%	74%	

Appendix A: Methodology

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

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

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

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

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

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

Appendix B: Data Sources

Data Type	Source
Occupational Projections, Wages, and Job Postings	Traditional labor market information data is sourced from Lightcast, a labor market analytics firm. Lightcast occupational employment data are based on final Lightcast industry data and final Lightcast staffing patterns. Wage estimates are based on Occupational Employment Statistics and the American Community Survey. For more information, see https://lightcast.io/
Living Wage	The living wage is derived from the Insight Center's California Family Needs Calculator, which measures the income necessary for an individual of family to afford basic expenses. The data assesses the cost of housing, food, child care, health care, transportation, and taxes. For more information, see: https://insightcced.org/family-needs-calculator/ The living wage for one adult in Orange County is $20.63 per hour ($42,910.40 annually). This figure is used by the CCCCO to calculate the percentage of students that attained the regional living wage.
Typical Education and Training Requirements, and Educational Attainment	The Bureau of Labor Statistics (BLS) provides information about education and training requirements for hundreds of occupations. BLS uses a system to assign categories for entry-level education, work experience in a related occupation, and typical on-the-job training to each occupation for which BLS publishes projections data. For more information, see https://www.bls.gov/emp/documentation/education/tech.htm
Emerging Occupation Descriptions, Additional Education Requirements, and Employer Preferences	The O*NET database includes information on skills, abilities, knowledges, work activities, and interests associated with occupations. For more information, see https://www.onetonline.org/help/online/
Educational Supply	The CCCCO Data Mart provides information about students, courses, student services, outcomes and faculty and staff. For more information, see: https://datamart.cccco.edu The National Center for Education Statistics (NCES) Integrated Postsecondary Integrated Data System (IPEDS) collects data on the number of postsecondary awards earned (completions). For more information, see https://nces.ed.gov/ipeds/use-the-data/survey-components/7/completions
Student Metrics and Demographics	LaunchBoard, a statewide data system supported by the California Community Colleges Chancellor's Office and hosted by Cal-PASS Plus, provides data on progress, success, employment, and earnings outcomes for California community college students. For more information, see: https://www.calpassplus.org/LaunchBoard/Home.aspx

Data Type	Source
Population and Occupation Demographics	The Census Bureau's American Community Survey (ACS) is the premier source for detailed population and housing information. For more information, see: https://www.census.gov/programs-surveys/acs

Data is sourced from IPUMS USA, a database providing access to ACS and other Census Bureau data products. For more information, see: https://usa.ipums.org/usa/about.shtml |

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