

# Labor Market Analysis for Noncredit Program Recommendation

## 0614.20/Electronic Game Design (Video Game Usability Testers)

Orange County Center of Excellence, January 2024



This labor market analysis report was produced in response to a request for labor market information related to video game usability testers. The OC COE analyzed a variety of sources, including Indeed’s Career Guide, online job postings, and traditional labor market information, to determine that *software quality assurance analysts and testers* - an above middle skill occupation - is the occupation that is most closely related to video game usability testers; however that occupation is beyond the scope of the proposed video game usability testers proposed program which focuses solely on testing video games, not on the backend programming of video games. An analysis of traditional labor market information and online job postings data shows that though there is demand for software testing jobs, there is little to no demand specifically for video game testing.

### Summary

Program LMI Endorsement	Endorsed: All LMI Criteria Met <input type="checkbox"/>	Endorsed: Some LMI Criteria Met <input checked="" type="checkbox"/>	Not LMI Endorsed <input type="checkbox"/>
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#### Program LMI Endorsement Criteria

	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Supply Gap:	<i>Comments:</i> The OC COE predicates endorsement only for middle-skill occupations. <b>Since this proposed new program includes above middle-skill occupations only, we are unable to evaluate the labor market information endorsement criteria.</b>	
Living Wage: (Entry-Level, 25 <sup>th</sup> )	Yes <input type="checkbox"/>	No <input type="checkbox"/>
	<i>Comments:</i> See comment above.	
Education:	Yes <input type="checkbox"/>	No <input type="checkbox"/>
	<i>Comments:</i> See comment above.	

#### Emerging Occupation(s)

	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
	<i>Comments:</i> Currently, there is no singular occupation specifically for video game usability testers in the federal Bureau of Labor Statistics (BLS) Standard Occupational Classification System (SOC). Additionally, video game usability falls under the larger umbrella of software quality assurance and software testing. The occupation most closely related to these areas are <i>Software Quality Assurance Analysts and Testers</i> (15-1253), an above middle-skill occupation that typically requires at least a bachelor’s degree.	

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 one video game testing occupation:

- Above Middle-Skill – denoted with an asterisk (\*) throughout this report.
  - Software Quality Assurance Analysts and Testers (15-1253)\*

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

Currently, there is no single Standard Occupational Classification (SOC) code for video game usability testers. However, *software quality assurance analysts and testers* is most closely related to this emerging area. Generally, video game testing is a subset of the broader software quality assurance and testing field. According to Indeed's Career Guide, a bachelor's degree is typically required for software testers. For video game usability testers specifically, Indeed notes

A game tester, or quality assurance tester, plays video games that are under development to check for errors, also known as glitches or bugs. Game testers normally work for video game companies, often in close connection with programmers and other technical members of the development team. They are expected to test extensively, often repeating game levels multiple times to make sure they have tested every possible permutation of play. As well as playing games, game testers take note of any gameplay errors they find along with steps on how to recreate those errors. They communicate these problems to the development team so they can correct them. <sup>1</sup>

Indeed also notes that a bachelor's degree in animation, game development, and computer science is typically required for video game testers.

This report analyzes traditional labor market information for *software quality assurance analysts and testers* occupation most closely related to software testing and video game testing. However, demand for video game testers is overstated because this occupation includes a variety of roles and not solely video game testers. Additionally, this report includes two analyses of online job postings. The first analysis includes all job postings related to software testing while the second focuses specifically on video game testing. These analyses show that there is demand for software testing as a whole, but limited demand specifically for video game usability testing.

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 Summary**

Occupation (SOC)	Demand (Annual Openings)	Supply (CC and Non-CC)	Entry-Level Hourly Earnings (25 <sup>th</sup> Percentile)	Typical Entry-Level Education	Community College Educational Attainment
Software Quality Assurance Analysts and Testers (15-1253)*	LA: 401 OC: 200	LA: 3,175 OC: 1,805	OC: \$37.59	Bachelor's degree	12%
<b>Total</b>	<b>601</b>	<b>4,980</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>

## Demand:

- The number of jobs related to *software quality assurance analysts and testers* is projected to increase 9% through 2027; there is projected to be 601 annual job openings due to retirements and replacements.
  - It is important to note demand for video game testers is overstated because the related occupations include a variety of roles and not solely video game testers

<sup>1</sup> <https://www.indeed.com/career-advice/career-development/how-to-become-a-game-tester>

- Hourly entry-level wages for *software quality assurance analysts and testers* are \$37.59 in Orange County, which is above the living wage of \$20.63.
- There were 3,519 online job postings related to software testing over the past 12 months. The top job titles were software engineers, software test engineers, and quality assurance managers.
  - There were only 31 online job postings specifically for video game testing. The top job titles were quality assurance testers, compliance managers, and game masters.
- The typical entry-level education for *software quality assurance analysts and testers* is a bachelor's degree.
- Approximately 12% of *software quality assurance analysts and testers* have completed some college or an associate degree as their highest level of educational attainment.

## Supply:

- There was an average of 1,470 awards conferred by 28 community colleges in Los Angeles and Orange Counties from 2019 to 2022.
  - Though these community college programs are most closely related to *software quality assurance analysts and testers*, it is important to note that they train for a variety of occupations, including middle-skill occupations. However, *software quality assurance analysts and testers* occupations has high education requirements and employers typically require more than a community college education for these occupations. Therefore, community college programs do not align with the education requirements requested by employers and community college supply does not directly correspond to these above middle-skill occupations. However, the COE includes community college supply so regional community colleges can address potential pathways for advancement to these above middle-skill occupations.
- There were 3,510 awards conferred by non-community college institutions from 2019 to 2021.
- Orange County community college students that exited electronic game design programs in the 2020-21 academic year had a median annual wage of \$28,664 after exiting the program. There was insufficient data to determine the percentage that attained the living wage.
- There was insufficient data to determine the percentage of electronic game design students that exited their program in 2019-20 and 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 *software quality assurance analysts and testers* from 2017 through 2027. Despite a 7% decline in employment from 2019 to 2020 in Orange County, employment for *software quality assurance analysts and testers* increased 4% during the same period. Employment for *software quality assurance analysts and testers* is projected to increase at a similar rate to all occupations through 2027.

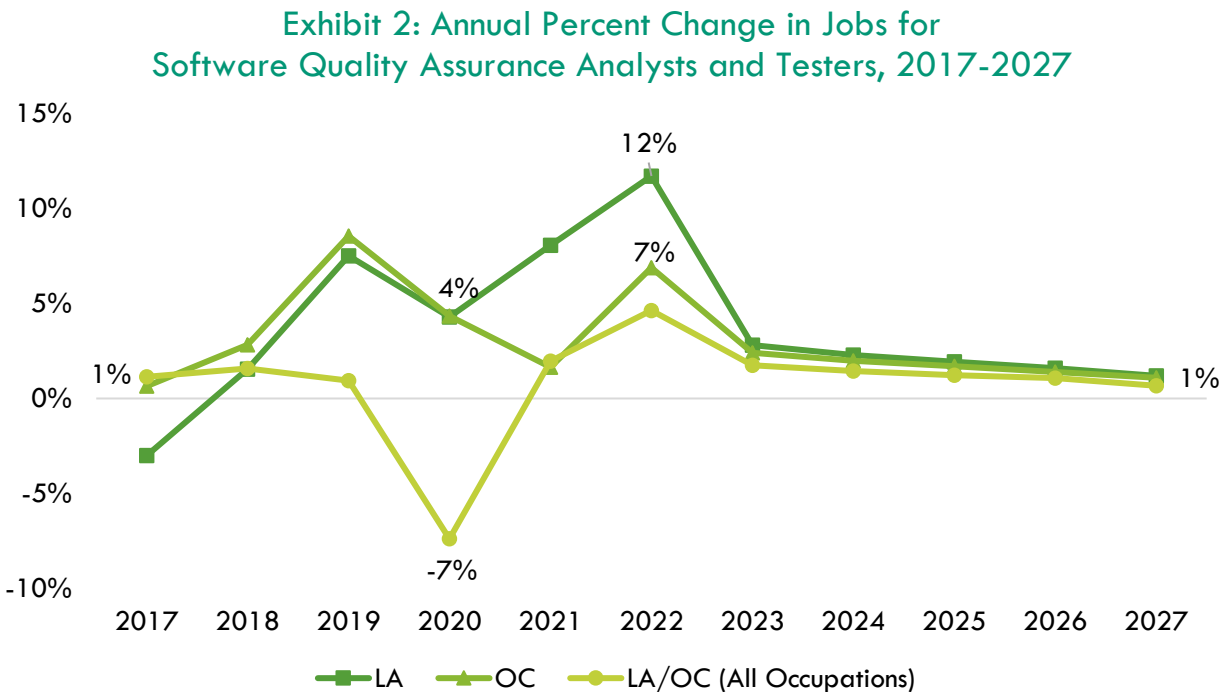


Exhibit 3 shows the five-year occupational demand projections *software quality assurance analysts and testers*. In Los Angeles/Orange County, the number of jobs related to this occupation is projected to increase 9% through 2027. There is projected to be 601 jobs available annually.

**Exhibit 3: Occupational Demand in Los Angeles and Orange Counties**

Geography	2022 Jobs	2027 Jobs	2022-2027 Change	2022-2027 % Change	Annual Openings
Los Angeles	4,378	4,766	388	9%	401
Orange	2,194	2,383	189	9%	200
<b>Total</b>	<b>6,572</b>	<b>7,149</b>	<b>576</b>	<b>9%</b>	<b>601</b>

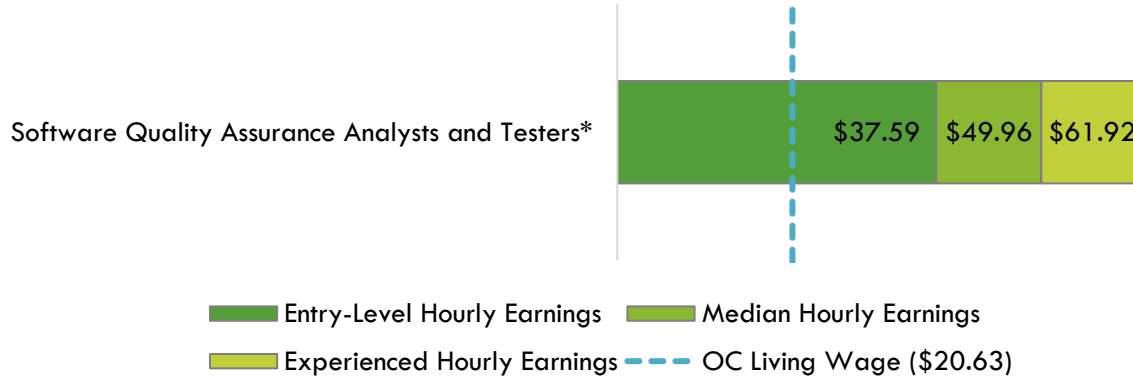
### Wages:

The labor market endorsement in this report considers the entry-level hourly wages for *software quality assurance analysts and testers* 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.

Entry-level hourly earnings for *software quality assurance analysts and testers* are \$37.59, which is above the living wage for one adult (\$20.63 in Orange County). Orange County's average wages (\$53.16) are below the average statewide wage of \$66.12 for this occupation. Exhibit 4, shows the wage range for

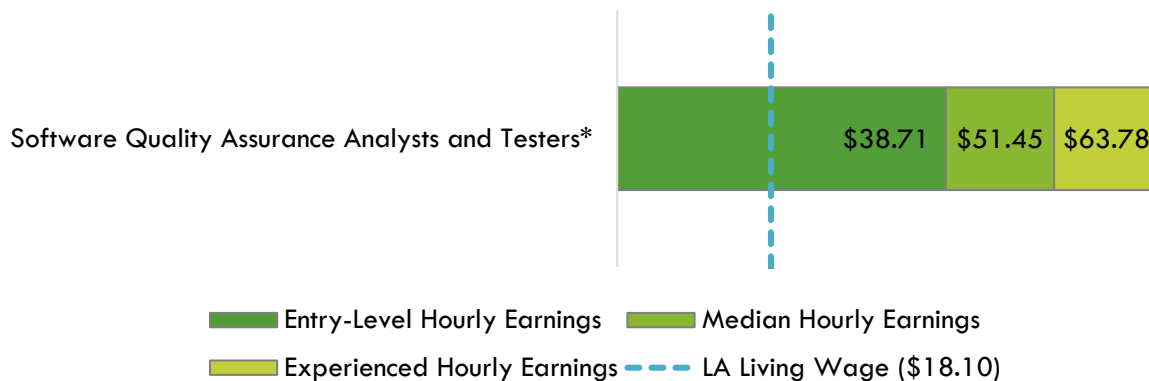
software quality assurance analysts and testers in Orange County and how it compares to the regional living wage.

### Exhibit 4: Wages by Occupation in Orange County



Entry-level hourly earnings for software quality assurance analysts and testers are \$38.71, which is above the living wage for one adult (\$18.10 in Los Angeles County). Los Angeles County’s average wages (\$54.75) are below the average statewide wage of \$66.12 for this occupation. Exhibit 5 shows the wage range for software quality assurance analysts and testers in Los Angeles County and how it compares to the regional living wage.

### Exhibit 5: Wages by Occupation in Los Angeles County



### 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.<sup>2</sup> 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

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

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.

As noted in the summary section of this report, the OC COE conducted two analyses of online job postings to address the fact that video game testing is a subset of software testing. The first analysis examines online job postings that requested software testing skills across all occupations. To better understand employer needs for video game testing, the second analysis focuses solely on roles that specifically requested video game testing skills. Notably, there were 3,519 online job postings that requested software testing skills, but only 31 postings that specifically requested video game testing skills.

### Software Testing Job Postings

There were 3,519 online job postings that requested software testing skills listed in the past 12 months. Exhibit 6 shows the number of job postings by occupation.

**Exhibit 6: Number of Job Postings by Occupation (n=3,519)**

Occupation	Job Postings	Percentage of Job Postings
Software Developers	770	22%
Software Quality Assurance Analysts and Testers	632	18%
Computer Occupations, All Other	242	7%
Web Developers	241	7%
Marketing Managers	139	4%
Computer Systems Analysts	101	3%
Commercial and Industrial Designers	100	3%
Industrial Production Managers	86	2%
Management Analysts	78	2%
Electrical Engineers	63	2%
<b>Total Postings</b>	<b>3,519</b>	<b>100%</b>

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

**Exhibit 7: Top Employers by Number of Job Postings (n=3,519)**

Employer	Job Postings	Percentage of Job Postings
Boeing	194	6%
Northrop Grumman	124	4%
SpaceX	66	2%
Medtronic	60	2%
Actalent	46	1%
Randstad	46	1%
Supernal	42	1%
Leidos	38	1%
L3Harris Technologies	36	1%
CyberCoders	32	1%

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

### Exhibit 8: Top Skills by Number of Job Postings (n=3,519)

Top Specialized Skills	Top Soft Skills	Top Computer Skills
Software Testing (2,510)	Communication (1,611)	Python (Programming Language) (842)
Computer Science (1,357)	Management (1,021)	JIRA (674)
Agile Methodology (1,065)	Problem Solving (821)	C++ (Programming Language) (604)
Usability Testing (976)	Troubleshooting (Problem Solving) (817)	SQL (Programming Language) (527)
Software Development (963)	Leadership (773)	Java (Programming Language) (505)
Automation (881)	Research (754)	C (Programming Language) (503)
Python (Programming Language) (842)	Writing (722)	JavaScript (Programming Language) (409)
Software Engineering (794)	Planning (675)	Linux (391)
Test Planning (779)	Operations (630)	Git (Version Control System) (385)
Test Automation (698)	Safety Assurance (579)	Software Systems (355)

### Video Game Testing Job Postings

There were only 31 online job postings that requested video game testing skills listed in the past 12 months. Exhibit 9 shows the top occupations for job postings related to video game testing.

### Exhibit 9: Top Video Game Testing Occupations (n=31)

Job Title	Job Postings	Percentage of Job Postings
Software Quality Assurance Analysts and Testers	10	32%
Managers, All Other	3	10%
Educational, Guidance, and Career Counselors and Advisors	3	10%
Management Analysts	2	6%
Web Developers	2	6%
Operations Research Analysts	2	6%
Marketing Managers	1	3%
Data Scientists	1	3%
Producers and Directors	1	3%
Writers and Authors	1	3%

The top employers for video game testing, by number of job postings, are shown in Exhibit 10.

**Exhibit 10: Top Video Game Testing Employers by Number of Job Postings (n=31)**

Employer	Job Postings	Percentage of Job Postings
Activision Blizzard	4	13%
Estsoft Corp.	4	13%
Velvix	4	13%
Disney	3	10%
Yoh Services	3	10%
Sega USA Ltd	2	6%
Tencent	2	6%
Eastridge	1	3%
Moonbug Entertainment	1	3%
Netease	1	3%

The top specialized, soft, and computer skills listed by those most frequently mentioned in job postings (denoted in parentheses) are shown for these video game testing postings in Exhibit 11.

**Exhibit 11: Top Video Game Testing Skills by Number of Job Postings (n=1,112)**

Top Specialized Skills	Top Soft Skills	Top Computer Skills
Game Testing (31)	Communication (18)	Microsoft Excel (7)
Test Planning (11)	Management (14)	Microsoft Outlook (7)
Project Management (10)	Safety Assurance (14)	Database Systems (6)
Video Game Development (10)	Detail Oriented (11)	JIRA (6)
Database Systems (6)	Research (11)	Microsoft Word (4)
JIRA (6)	Verbal Communication Skills (10)	Python (Programming Language) (4)
Software Quality (SQA/SQC) (6)	Writing (10)	Apple Xcode (3)
Localization (5)	English Language (8)	Charles Proxy (3)
Python (Programming Language) (4)	Interpersonal Communications (8)	Cucumber (Software) (3)
Quantitative Research (4)	Microsoft Excel (7)	Dashboard (3)

## Educational Attainment:

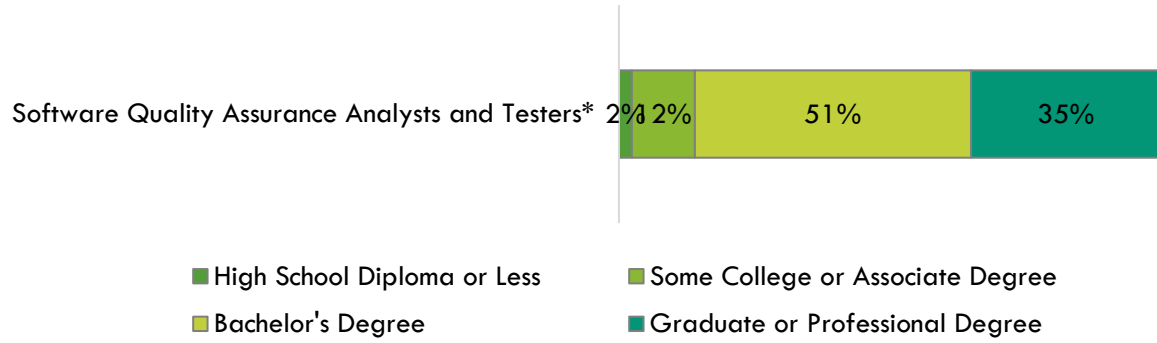
The Bureau of Labor Statistics (BLS) lists a bachelor's degree as the typical entry-level education for *software quality assurance analysts and testers*. The national-level educational attainment data indicates approximately 12% of *software quality analysts and testers* have completed some college or an associate degree as their highest level of education. Exhibit 12 shows the educational attainment for this occupation.

Of the 75% of the cumulative job postings for software testing that listed a minimum education requirement in Los Angeles/Orange County, 91% (2,424) requested a bachelor's, master's, or doctoral degree and 9% (230) requested a high school diploma or an associate degree.

There was an insufficient number of postings for video game testing to determine the education level requested by employers.



## Exhibit 12: National-level Educational Attainment for Occupations



# Educational Supply

## Community College Supply:

Exhibit 13 shows the three-year average number of awards conferred by community colleges in the related TOP codes:

- Electronic Game Design (0614.20)
- Information Technology, General (0701.00)
- Computer Information Systems (0702.00)
- Computer Software Development (0707.00)
- Computer Programming (0707.10)
- Database Design and Administration (0707.20)
- Computer Systems Analysis (0707.30)
- Computer Infrastructure and Support (0708.00)
- Computer Networking (0708.10)

Over the past 12 months, there were no other related program recommendation requests from regional community colleges.

Though these programs are most closely related to *software quality assurance analyst testers*, it is important to note that they train for a variety of occupations, including middle-skill occupations such as *computer network support specialists*, *computer network architects*, and *computer user support specialists*. However, *software quality assurance analyst testers* has high education requirements and employers typically require more than a community college education for these occupations. Therefore, community college programs do not align with the education requirements requested by employers and community college supply does not directly correspond to these above middle-skill occupations. However, the COE includes community college supply so regional community colleges can address potential pathways for advancement to this above middle-skill occupation.

**Exhibit 13: 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
0614.20	Electronic Game Design	Pasadena	1	1	5	3
		<b>LA Subtotal</b>	<b>1</b>	<b>1</b>	<b>5</b>	<b>3</b>
		Golden West	2	0	0	0
		<b>OC Subtotal</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Supply Subtotal/Average</b>			<b>3</b>	<b>1</b>	<b>5</b>	<b>3</b>
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

TOP Code	Program	College	2019-2020 Awards	2020-2021 Awards	2021-2022 Awards	3-Year Award Average		
		<b>LA Subtotal</b>	<b>172</b>	<b>167</b>	<b>182</b>	<b>173</b>		
		Santa Ana	0	3	9	4		
		<b>OC Subtotal</b>	<b>0</b>	<b>3</b>	<b>9</b>	<b>4</b>		
		<b>Supply Subtotal/Average</b>	<b>172</b>	<b>170</b>	<b>191</b>	<b>177</b>		
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		
				<b>LA Subtotal</b>	<b>170</b>	<b>88</b>	<b>205</b>	<b>154</b>
				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
		<b>OC Subtotal</b>	<b>25</b>	<b>49</b>	<b>71</b>	<b>47</b>		
		<b>Supply Subtotal/Average</b>	<b>195</b>	<b>137</b>	<b>276</b>	<b>201</b>		
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		
				<b>LA Subtotal</b>	<b>0</b>	<b>5</b>	<b>19</b>	<b>9</b>
				Cypress	1	0	0	0
				Golden West	2	6	4	4

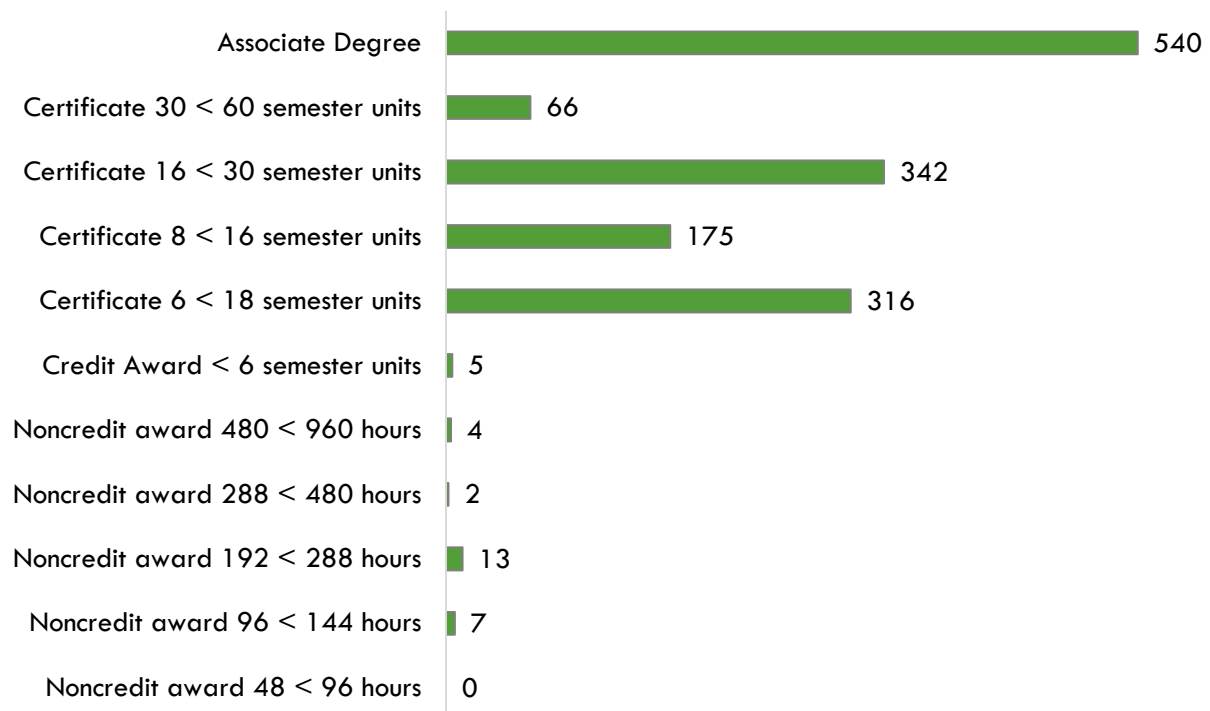
TOP Code	Program	College	2019-2020 Awards	2020-2021 Awards	2021-2022 Awards	3-Year Award Average
		Orange Coast	2	2	0	2
		Saddleback	3	10	15	10
		<b>OC Subtotal</b>	<b>8</b>	<b>18</b>	<b>19</b>	<b>16</b>
<b>Supply Subtotal/Average</b>			<b>8</b>	<b>23</b>	<b>38</b>	<b>25</b>
0707.10	Computer Programming	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
		Santa Monica	46	65	71	61
		<b>LA Subtotal</b>	<b>217</b>	<b>218</b>	<b>278</b>	<b>238</b>
		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		
<b>OC Subtotal</b>	<b>213</b>	<b>238</b>	<b>196</b>	<b>216</b>		
<b>Supply Subtotal/Average</b>			<b>430</b>	<b>456</b>	<b>474</b>	<b>454</b>
0707.20	Database Design and Administration	Citrus	1	0	1	1
		Long Beach	1	13	11	8
		Mt San Antonio	12	8	16	12
		Pasadena	4	24	14	14
		Santa Monica	5	2	4	3
		<b>LA Subtotal</b>	<b>23</b>	<b>47</b>	<b>46</b>	<b>38</b>
		Santa Ana	8	2	2	4
		<b>OC Subtotal</b>	<b>8</b>	<b>2</b>	<b>2</b>	<b>4</b>
<b>Supply Subtotal/Average</b>			<b>31</b>	<b>49</b>	<b>48</b>	<b>42</b>

TOP Code	Program	College	2019-2020 Awards	2020-2021 Awards	2021-2022 Awards	3-Year Award Average
0707.30	Computer Systems Analysis	Cerritos	3	0	5	2
		East LA	1	0	0	0
		LA City	0	1	6	2
		LA Harbor	0	1	1	1
		LA Mission	1	1	1	1
		LA Pierce	0	6	5	4
		Mt San Antonio	0	0	9	3
		Rio Hondo	0	0	3	1
		<b>LA Subtotal</b>	<b>5</b>	<b>9</b>	<b>30</b>	<b>14</b>
		-	-	-	-	-
		<b>OC Subtotal</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>
		<b>Supply Subtotal/Average</b>			<b>5</b>	<b>9</b>
0708.00	Computer Infrastructure and Support	Cerritos	4	4	9	5
		East LA	0	0	3	1
		El Camino	0	0	5	2
		Glendale	3	4	11	6
		LA City	3	5	12	6
		LA Harbor	1	1	2	1
		LA Mission	12	17	32	20
		LA Valley	2	4	3	3
		Long Beach	8	8	2	6
		Mt San Antonio	24	24	36	28
		Pasadena	1	24	8	11
		Rio Hondo	10	11	19	13
		West LA	15	16	7	13
		<b>LA Subtotal</b>	<b>83</b>	<b>118</b>	<b>149</b>	<b>115</b>
		Coastline	46	73	91	70
		Cypress	3	1	1	1
		Orange Coast	7	5	7	6
		Saddleback	0	3	13	5
		Santa Ana	0	27	14	13
		<b>OC Subtotal</b>	<b>56</b>	<b>109</b>	<b>126</b>	<b>95</b>
<b>Supply Subtotal/Average</b>			<b>139</b>	<b>227</b>	<b>275</b>	<b>210</b>
0708.10	Computer Networking	Cerritos	9	8	6	8
		Glendale	3	0	2	1
		LA City	0	4	8	4

TOP Code	Program	College	2019-2020 Awards	2020-2021 Awards	2021-2022 Awards	3-Year Award Average
		LA Pierce	20	12	19	16
		Long Beach	47	48	52	49
		Mt San Antonio	11	4	25	13
		Rio Hondo	7	2	5	5
		West LA	48	58	24	43
		<b>LA Subtotal</b>	<b>145</b>	<b>136</b>	<b>141</b>	<b>139</b>
		Coastline	59	92	49	67
		Cypress	95	61	71	76
		Fullerton	0	1	0	0
		Irvine	21	10	18	16
		Saddleback	21	19	15	19
		Santa Ana	12	23	45	27
		<b>OC Subtotal</b>	<b>208</b>	<b>206</b>	<b>198</b>	<b>205</b>
		<b>Supply Subtotal/Average</b>	<b>353</b>	<b>342</b>	<b>339</b>	<b>344</b>
		<b>Supply Subtotal/Average</b>	<b>1,336</b>	<b>1,414</b>	<b>1,676</b>	<b>1,470</b>

Exhibit 14 shows the annual average community college awards by type from 2019-20 through 2021-22. The plurality of the awards are for associate degrees, followed by certificates between 16 and less than 30 semester units.

### Exhibit 14: Annual Average Community College Awards by Type, 2018-2021



## Community College Student Outcomes:

Exhibit 15 shows the Strong Workforce Program (SWP) metrics for electronic game design programs in Rancho Santiago Community College District (RSCCD), the Orange County Region, and California. Currently, RSCCD colleges do not offer electronic game design courses. Therefore, student outcomes data for RSCCD is not available.

Orange County students that exited electronic game design programs in the 2020-21 academic year had a 28% median change in earnings, which is lower than students throughout the state (55%). Median annual earnings for Orange County students (\$28,664) were slightly lower than students throughout the state (\$30,984).

### Exhibit 15: Electronic Game Design (0614.20) Strong Workforce Program Metrics, 2020-21<sup>3</sup>

SWP Metric	RSCCD	OC Region	California
SWP Students	N/A	309	1,919
SWP Students Who Earned 9 or More Career Education Units in the District in a Single Year	N/A	27%	32%
SWP Students Who Completed a Noncredit CTE or Workforce Preparation Course	N/A	Insufficient Data	69%
SWP Students Who Earned a Degree or Certificate or Attained Apprenticeship Journey Status	N/A	Insufficient Data	38
SWP Students Who Transferred to a Four-Year Postsecondary Institution (2019-20)	N/A	17	100
SWP Students with a Job Closely Related to Their Field of Study (2019-20)	N/A	Insufficient Data	59%
Median Annual Earnings for SWP Exiting Students	N/A	\$28,664 (\$13.78)	\$30,984 (\$14.90)
Median Change in Earnings for SWP Exiting Students	N/A	28%	55%
SWP Exiting Students Who Attained the Living Wage	N/A	Insufficient Data	37%

<sup>3</sup> All SWP metrics are for 2020-21 unless otherwise noted.

## 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 immersive media and emerging technologies occupations. Exhibit 16 shows the annual and two-year average number of awards conferred by these institutions in the related Classification of Instructional Programs (CIP) Codes:

- Computer and Information Sciences, General (11.0101)
- Information Technology (11.0103)
- Computer Programming/Programmer, General (11.0201)
- Computer Science (11.0701)
- Computer Engineering Technology/Technician (15.1201)
- Computer/Computer Systems Technology/Technician (15.1202)

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 college institutions in the region conferred an average of 3,510 awards annually in related training programs.

**Exhibit 16: Regional Non-Community College Awards, 2019-2021**

CIP Code	Program	College	2019-2020 Awards	2020-2021 Awards	2-Year Award Average
11.0101	Computer and Information Sciences, General	Azusa Pacific University	21	25	23
		Chapman University	18	23	20
		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 California-Irvine	0	1	0
		University of La Verne	23	36	30
		University of Massachusetts Global	30	36	33
		University of the People	203	292	248
		Westcliff University	0	0	0
		<b>Supply Subtotal/Average</b>			<b>339</b>
11.0103	Information Technology	Bethesda University	0	0	0
		Brand College	13	17	15
		California Intercontinental University	2	0	1
		California State University-Dominguez Hills	4	10	7
		California State University-Los Angeles	166	116	141
		California State University-Northridge	29	51	40
		Platt College-Anaheim	15	17	16
		Platt College-Los Angeles	12	6	9



CIP Code	Program	College	2019-2020 Awards	2020-2021 Awards	2-Year Award Average
		University of La Verne	2	3	2
		Westcliff University	0	0	0
<b>Supply Subtotal/Average</b>			<b>243</b>	<b>220</b>	<b>231</b>
11.0201	Computer Programming/ Programmer, General	ABCO Technology	46	34	40
		Platt College-Anaheim	4	0	2
<b>Supply Subtotal/Average</b>			<b>50</b>	<b>34</b>	<b>42</b>
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-Fullerton	264	308	286
		California State University-Long Beach	220	221	220
		California State University-Los Angeles	119	152	136
		California State University-Northridge	160	214	187
		Chapman University	30	45	38
		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
		Southern California Institute of Technology	10	7	8
		The Master's University and Seminary	0	0	0
		University of California-Irvine	805	822	814
		University of California-Los Angeles	287	342	314
		University of Southern California	247	293	270
<b>Supply Subtotal/Average</b>			<b>2,682</b>	<b>2,968</b>	<b>2,827</b>
15.1201	Computer Engineering Technology/Technician	California State University-Long Beach	4	6	5
<b>Supply Subtotal/Average</b>			<b>4</b>	<b>6</b>	<b>5</b>
11.0801	Computer/Computer Systems Technology/Technician	Learnet Academy Inc	4	2	3
		University of La Verne	0	0	0
<b>Supply Subtotal/Average</b>			<b>4</b>	<b>2</b>	<b>3</b>
<b>Supply Subtotal/Average</b>			<b>3,322</b>	<b>3,696</b>	<b>3,510</b>

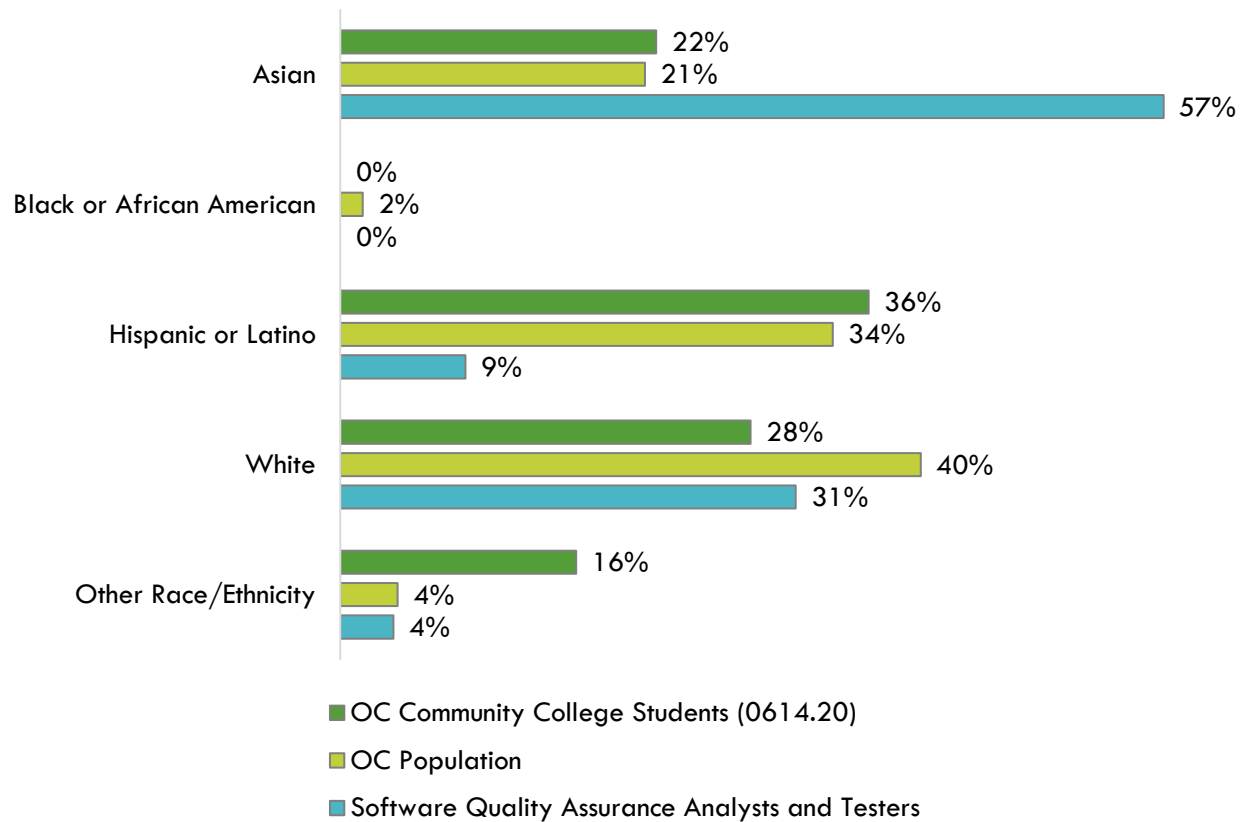
## Regional Demographics

This section analyzes demographic data for Orange County community college students enrolled in electronic game design 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 16 shows the ethnicity of Orange County community college students enrolled in electronic game design programs compared to the overall Orange County population, as well as *software quality assurance analysts and testers*. Notably, 57% of *software quality assurance analysts and testers* are Asian, which is significantly higher than the population (21%) and community college electronic game design students (22%). Conversely, 36% of community college electronic game design students are Hispanic or Latino, which is similar to the Orange County population (34%) but significantly higher than *software quality assurance analysts and testers* (9%).

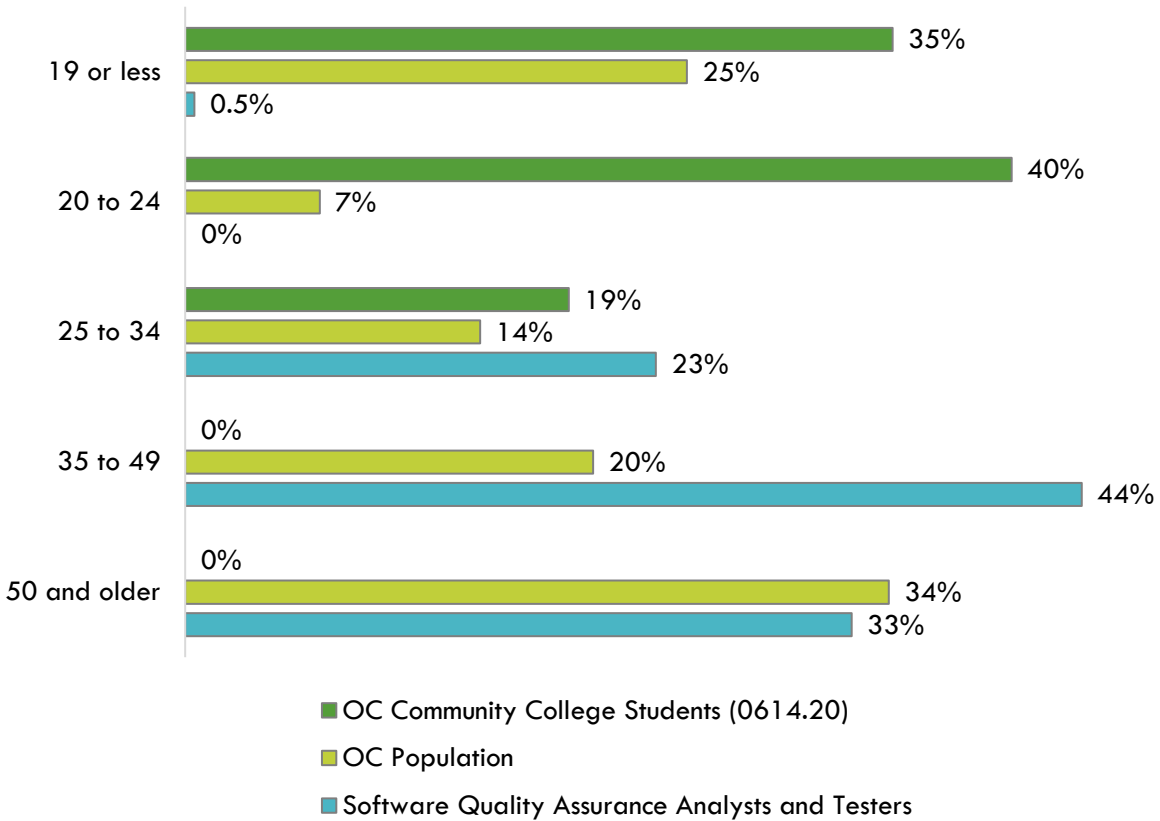
Exhibit 16: Program and County Demographics by Ethnicity



## Age:

Exhibit 17 shows the age of Orange County community college students enrolled in electronic game design programs compared to the overall Orange County population, as well as *software quality assurance analysts and testers*. The plurality of *software quality assurance analysts and testers* are 35 to 49 (44%), which is higher than the population (20%) and significantly higher than community college electronic game design students (0%). Only 0.5% of *software quality assurance analysts and testers* are 24 or less, which is significantly lower than the population (32%), and community college electronic game design students (75%).

Exhibit 17: Program and County Demographics by Age

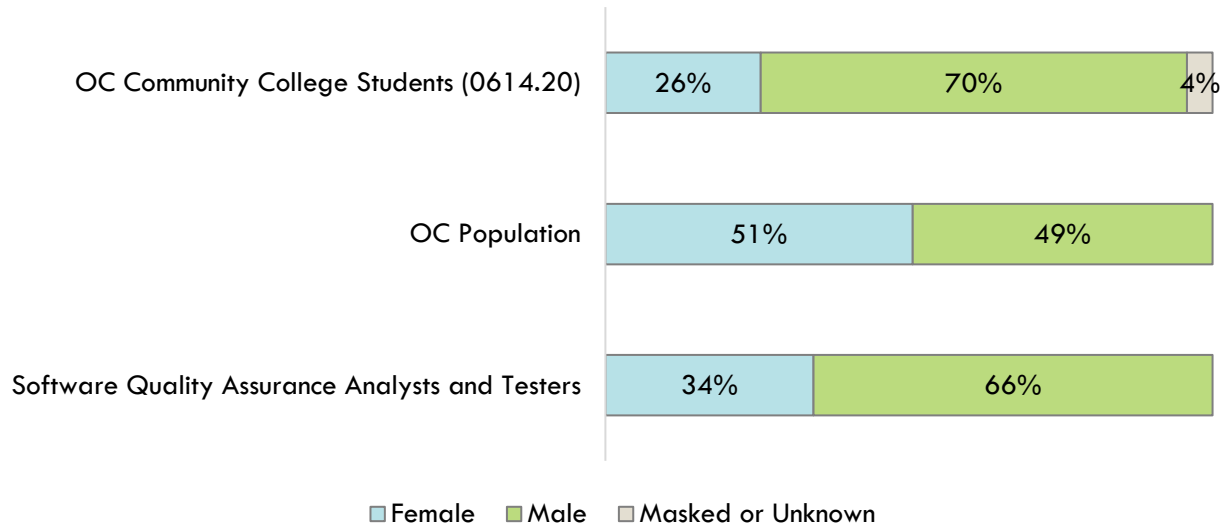


## Sex:

Exhibit 18 shows the sex of Orange County community college students enrolled in electronic game design programs compared to the overall Orange County population as well as *software quality assurance analysts and testers*.

Though the Orange County population is split nearly evenly between men and women, 66% of *software quality assurance analysts and testers* and 70% of electronic game design students are men.

**Exhibit 18: Program and County Demographics by Sex**



## 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](http://datamart.cccco.edu)) and CIP code data comes from the Integrated Postsecondary Education Data System ([nces.ed.gov/ipeds/use-the-data](http://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	<p>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 <a href="https://lightcast.io/">https://lightcast.io/</a></p>
Living Wage	<p>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: <a href="https://insightccd.org/family-needs-calculator/">https://insightccd.org/family-needs-calculator/</a></p> <p>The living wage for one adult in Orange County is \$20.63 per hour (\$42,910.40 annually). This figure is used by the CCCCCO to calculate the percentage of students that attained the regional living wage.</p>
Typical Education and Training Requirements, and Educational Attainment	<p>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 <a href="https://www.bls.gov/emp/documentation/education/tech.htm">https://www.bls.gov/emp/documentation/education/tech.htm</a></p>
Emerging Occupation Descriptions, Additional Education Requirements, and Employer Preferences	<p>The O*NET database includes information on skills, abilities, knowledges, work activities, and interests associated with occupations. For more information, see <a href="https://www.onetonline.org/help/online/">https://www.onetonline.org/help/online/</a></p>
Educational Supply	<p>The CCCCCO Data Mart provides information about students, courses, student services, outcomes and faculty and staff. For more information, see: <a href="https://datamart.cccco.edu">https://datamart.cccco.edu</a></p> <p>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 <a href="https://nces.ed.gov/ipeds/use-the-data/survey-components/7/completions">https://nces.ed.gov/ipeds/use-the-data/survey-components/7/completions</a></p>
Student Metrics and Demographics	<p>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: <a href="https://www.calpassplus.org/LaunchBoard/Home.aspx">https://www.calpassplus.org/LaunchBoard/Home.aspx</a></p>

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

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