Labor Market Analysis for Program Recommendation: 0614.20/Electronic Game Design
(*Game and IMA Design, Production Management*)
(*Game Design and Interactive Media Arts*)
Orange County Center of Excellence, November 2022

Summary

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

Program LMI Endorsement Criteria		
	Yes ☑	No ☐
Supply Gap:	*Comments:* there is projected to be **431 middle-skill annual job openings** throughout Los Angeles and Orange counties for these game design occupations, which **is more than the 231 awards conferred by educational institutions.**	
	Yes ☑	No ☐
Living Wage: (Entry-Level, 25ᵗʰ)	*Comments:* **entry-level wages for *web and digital interface designers*,** the sole middle-skill occupation, **are $22,67, which is above the OC living wage of $20.63.**	
	Yes ☑	No ☐
Education:	*Comments:* The typical entry-level education for *web and digital interface designers* **is a bachelor's degree. However, a significant number 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: Video and electronic game design is an emerging field for which a single Standard Occupational Classification (SOC) code does not currently exist. However, there is one related emerging occupation: Video Game Designers (15-1255.01). Data for this emerging occupation is collected and reported under the broader Web and Digital Interface Designers (15-1255) SOC code. To better understand the knowledge, skills, and abilities for Video Game Designers, this report includes an analysis of online job postings specifically for that emerging occupation.	

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 game design occupations:

- Middle-Skill
  - Web and Digital Interface Designers (15-1255)
    - Includes the emerging occupation Video Game Designers (15-1255.01)
- Above Middle-Skill – denoted with an asterisk (*) throughout this report.
  - Special Effects Artists and Animators (27-1014)*

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

Based on the available data, there appears to be a supply gap for these game design occupations in the region and all middle-skill annual job openings have entry-level wages above the living wage. Though these occupations typically require a bachelor's degree, a significant number of workers in the field have completed some college or an associate degree as their highest level of education. **Therefore, due to all 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: Occupational Demand and Supply in Los Angeles/Orange Counties

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 and Digital Interface Designers (15-1255)	431	231	OC: $22.67	Bachelor's degree	25%
Middle-Skill Total	**431**	**231**	**N/A**	**N/A**	**N/A**
Special Effects Artists and Animators (27-1014)*	814	552	OC: $15.46	Bachelor's degree	27%
Above Middle-Skill Total	**814**	**552**	**N/A**	**N/A**	**N/A**
Total	**1,245**	**783**	**N/A**	**N/A**	**N/A**

Demand:

- The number of jobs related to *web and digital interface designers* are projected to increase 7% through 2026, equating to 431 annual job openings.
- Hourly entry-level wages for *web and digital interface designers* are $22.67 in Orange County, which is above the living wage of $20.63.
- There were 1,730 online job postings for *web and digital interface designers* over the past 12 months. Of those, 99% (1,715) were for the emerging occupation *video game designers*.
- The typical entry-level education for *web and digital interface designers* is a bachelor's degree.
- Approximately 25% of *web and digital interface designers* have completed some college or an associate degree as their highest level of education.

Supply:

- There was an average of 43 awards conferred by 23 community colleges in Los Angeles and Orange Counties from 2018 to 2021.
- There was an average of 188 awards conferred by 25 non-community college institutions from 2017 to 2020.

- Orange County community college students that exited electronic game design programs in the 2018-2019 academic year had a median annual wage of $23,456 after exiting the program; there is insufficient data to determine the percentage of students that attained the regional living wage.
- Due to the small number of students enrolled in electronic game design programs throughout Orange County, there is insufficient data to report the percentage of exiting students working in a job closely related to their field of study.

Demand

Occupational Projections:

Exhibit 2 shows the annual percent change in jobs for the two game design occupations researched in this report from 2016 through 2026. Notably, employment in these game design occupations in Orange County decreased 2% from 2019 to 2020 while employment across all occupations in Los Angeles and Orange Counties declined 7% due to the COVID-19 pandemic.

Employment for these two game design occupations is projected to continue to increase at a slightly higher rate than all occupations through 2026. Employment for *web and digital interface designers* is projected to increase at a higher rate than *special effects artists and animators*.

Exhibit 2: Annual Percent Change in Jobs for Game Design Occupations, 2016-2026
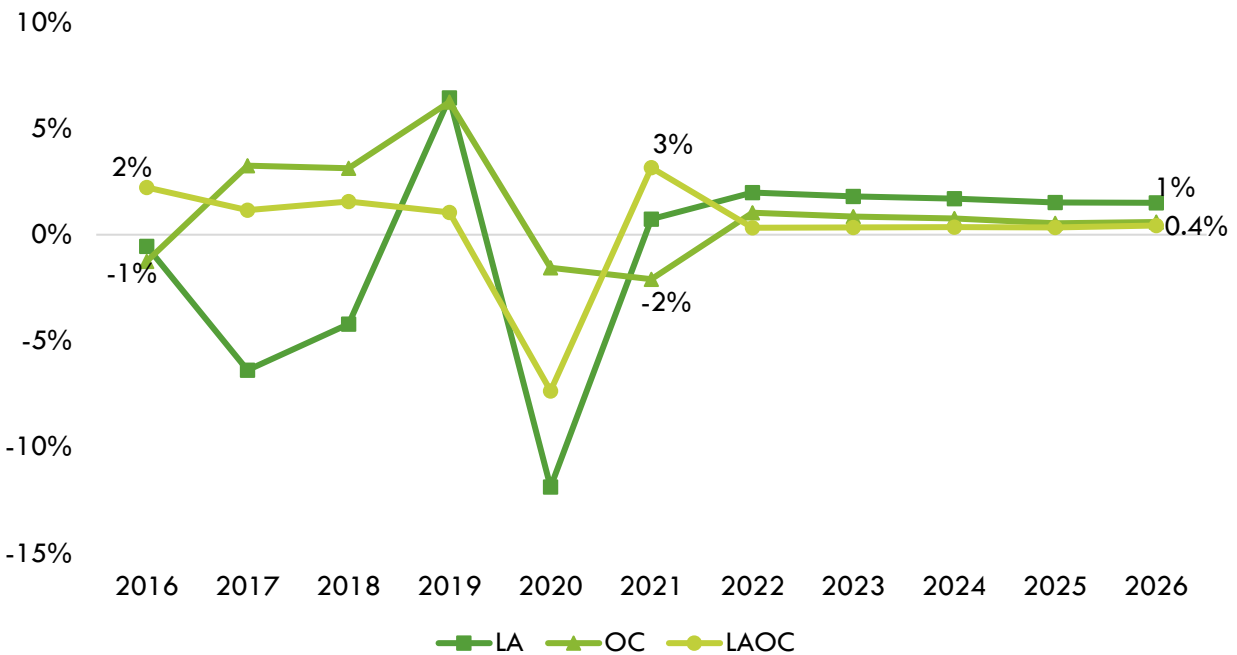
Exhibit 3 shows the five-year occupational demand projections for *web and digital interface designers*, the sole middle-skill occupation in this report. In Los Angeles/Orange County, the number of jobs related to this occupation is projected to increase 7% through 2026. There is projected to 431 jobs available annually.

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

Geography	2021 Jobs	2026 Jobs	2021-2026 Change	2021-2026 % Change	Annual Openings
Los Angeles	3,620	3,876	255	7%	320
Orange	1,299	1,373	74	6%	111
Total	**4,919**	**5,248**	**329**	**7%**	**431**

Exhibit 4 shows the five-year occupational demand projections for *special effects artists and animators*, the sole above middle-skill occupation in this report In Los Angeles/Orange County, the number of jobs related to this occupation is projected to increase by 9% through 2026. There is projected to be 814 jobs available annually.

Exhibit 4: Above Middle-Skill Occupational Demand in Los Angeles and Orange Counties

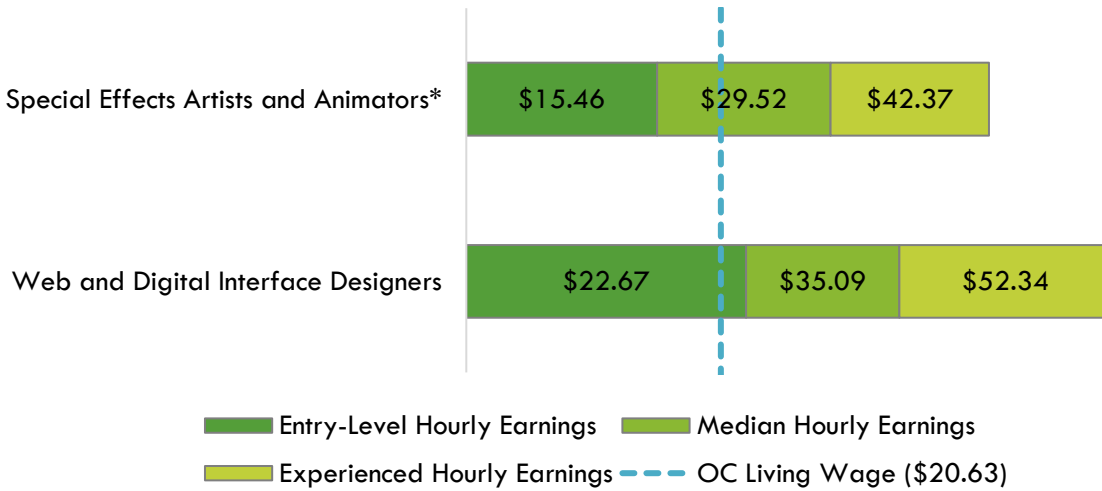| Geography	2021 Jobs	2026 Jobs	2021-2026 Change	2021-2026 % Change	Annual Openings
Los Angeles	5,993	6,583	590	10%	748
Orange	639	640	1	0.1%	66
Total	**6,632**	**7,223**	**591**	**9%**	**814**

Wages:

The labor market endorsement in this report considers the entry-level hourly wages for *web and digital interface designers* 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.

Typical entry-level hourly wages for *web and digital interface designers* are $22.67, which is above the living wage for one adult ($20.63 in Orange County). Orange County's average wages are below the average statewide wage of $47.06 for this occupation. Exhibit 5, on the following page, shows the wage range for each of these game design occupations in Orange County and how they compare to the regional living wage, sorted from lowest to highest entry-level wage. Notably, entry-level wages for *web and digital interface designers* are higher than those for *special effects artists and animators*, which is an above middle-skill occupation.
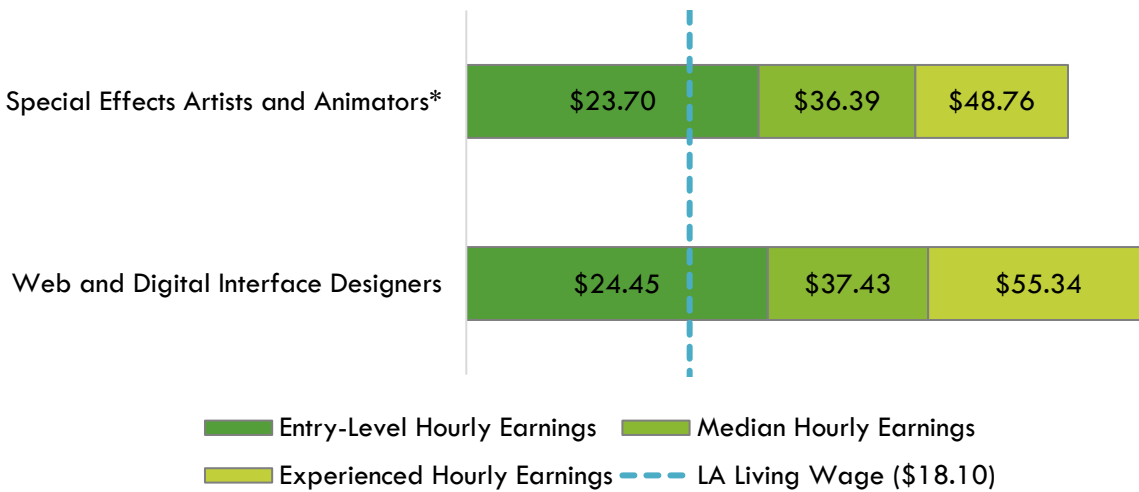
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[1] Five-year change represents new job additions to the workforce. Annual openings include new jobs and replacement jobs that result from retirements and separations.

Exhibit 5: Wages by Occupation in Orange County

Occupation	Entry-Level	Median	Experienced
Special Effects Artists and Animators*	$15.46	$29.52	$42.37
Web and Digital Interface Designers	$22.67	$35.09	$52.34

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

Typical entry-level hourly wages for *web and digital interface designers* are $24.45, which is above the living wage for one adult ($18.10 in Los Angeles County). Los Angeles County's average wages are below the average statewide wage of $47.06 for this occupation. Exhibit 6 shows the wage range for each of these game design occupations in Los Angeles County and how they compare to the regional living wage, sorted from lowest to highest entry-level wage. Notably, entry-level wages for *web and digital interface designers* are higher than those for *special effects artists and animators*.

Exhibit 6: Wages by Occupation in Los Angeles County

Occupation	Entry-Level	Median	Experienced
Special Effects Artists and Animators*	$23.70	$36.39	$48.76
Web and Digital Interface Designers	$24.45	$37.43	$55.34

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

Job Postings:

There were 3,024 online job postings related to these game design occupations listed in the past 12 months. Of those, 56.7% (1,715) were for the emerging occupation *video game designers* and 42.8% (1,294) were for *special effects artists and animators*. Only 0.5% (15) Exhibit 7 shows the number of job postings by occupation.

Exhibit 7: Number of Job Postings by Occupation (n=3,024)

Occupation	Job Postings	Percentage of Job Postings
Video Game Designers	1,715	56.7%
Special Effects Artists and Animators	1,294	42.8%
Web and Digital Interface Designers	15	0.5%
Total Postings	**3,024**	**100%**

The top employers for *video game designers* and *web and digital interface designers*, by number of job postings, are shown in Exhibit 8.

Exhibit 8: Top Middle-Skill Employers by Number of Job Postings (n=1,730)

Employer	Job Postings	Percentage of Job Postings
Canteen Vending	90	5%
Electronic Arts	61	4%
Riot Games	58	3%
Jobot	43	2%
Activision Blizzard	35	2%
CyberCoders	30	2%
Gungho Online Entertainment America	27	2%
Amazon	26	2%
Skydance Media Limited	24	1%
PricewaterhouseCoopers	21	1%

The top employers for *special effects artists and animators*, by number of job postings, are shown in Exhibit 9.

Exhibit 9: Top Above Middle-Skill Employers by Number of Job Postings (n=1,294)

Employer	Job Postings	Percentage of Job Postings
Robert Half	177	3%
Disney	106	2%
Onward Search	76	1%
Canteen Vending	58	1%
Creative Circle	45	1%
Electronic Arts	45	1%
NBC	43	1%
Amazon	39	1%
Aquent	36	1%
Randstad	36	1%

The top specialized, soft, and computer skills listed by those most frequently mentioned in job postings (denoted in parentheses) are shown for *video game designers* and *web and digital interface designers* in Exhibit 10.

Exhibit 10: Top Skills for Middle-Skill Occupations by Number of Job Postings (n=1,730)

Top Specialized Skills	Top Soft Skills	Top Computer Skills
Adobe Photoshop (285)	Communications (615)	Adobe Photoshop (285)
Game Design (256)	Management (302)	Autodesk Maya (198)
Marketing (244)	Leadership (278)	Unreal Engine (195)
Content Creation (236)	Research (234)	Unity Engine (174)
Video Game Development (200)	Writing (234)	TikTok (166)
Autodesk Maya (198)	Self-Motivation (232)	C++ (Programming Language) (165)
Workflow Management (196)	Problem Solving (228)	ZBrush (123)
Unreal Engine (191)	Planning (211)	AAA Video Games (97)
Unity Engine (172)	Detail Oriented (197)	JIRA (89)
Concept Arts (168)	Editing (182)	C# (Programming Language) (84)

The top specialized, soft, and computer skills listed by those most frequently mentioned in job postings (denoted in parentheses) are shown for *special effects artists and animators* in Exhibit 11.

Exhibit 11: Top Skills for Above Middle-Skill Occupations by Number of Job Postings (n=1,294)

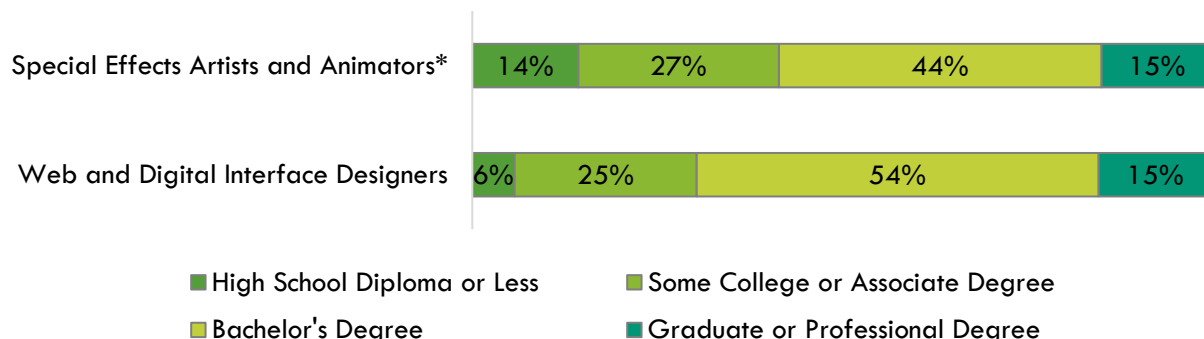| Top Specialized Skills	Top Soft Skills	Top Computer Skills
Animations (667)	Communications (479)	Autodesk Maya (410)
Autodesk Maya (410)	Detail Oriented (228)	Adobe Photoshop (405)
Visual Effects (406)	Time Management (177)	Adobe After Effects (291)
Adobe Photoshop (405)	Self-Motivation (172)	Adobe Illustrator (165)
Adobe After Effects (291)	Problem Solving (167)	Unity Engine (127)
Storyboarding (238)	Ability To Meet Deadlines (143)	Adobe Creative Suite (124)
Motion Graphics (219)	Editing (134)	Houdini (3D Animation Software) (119)
Workflow Management (212)	Writing (119)	Unreal Engine (86)
Marketing (171)	Multitasking (117)	Python (Programming Language) (82)
Scripting (166)	Innovation (100)	Autodesk 3DS Max (3D Graphics Software) (79)

Educational Attainment:

The Bureau of Labor Statistics (BLS) lists a bachelor's degree as the typical entry-level education for both game design occupations in this report. The national-level educational attainment data indicates approximately 25% of *web and digital interface designers* have completed some college or an associate degree as their highest level of education. Approximately 27% of *special effects artists and animators* have completed some college or an associate degree. Exhibit 12 shows the educational attainment for each occupation, sorted by highest community college educational attainment to lowest.

Of the 33% of the cumulative job postings for *video game designers* and *web and digital interface designers* that listed a minimum education requirement in Los Angeles/Orange County, 78% (442) requested a

bachelor's degree and 16% (91) requested a high school diploma or an associate degree. Similarly, of the 33% of the postings for *special effects artists and animators* that listed a minimum education requirement, 86% (366) requested a bachelor's degree and 12% (52) requested a high school diploma or an associate degree.

Exhibit 12: National-level Educational Attainment for Occupations

Occupation	High School Diploma or Less	Some College or Associate Degree	Bachelor's Degree	Graduate or Professional Degree
Special Effects Artists and Animators*	14%	27%	44%	15%
Web and Digital Interface Designers	6%	25%	54%	15%

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

Educational Supply

Community College Supply:

Exhibit 13 shows the three-year average number of awards conferred by community colleges in the related TOP codes: Digital Media (0614.00), Electronic Game Design (0614.20), Website Design and Development (0614.30), and Animation (0614.40). The colleges with the most completions in the region are: Santa Monica, Mt. San Antonio, Golden West. Over the past 12 months, there were two other related program recommendation requests from regional community colleges.

Exhibit 13: Regional Community College Awards (Certificates and Degrees), 2018-2021

TOP Code	Program	College	2018-2019 Awards	2019-2020 Awards	2020-2021 Awards	3-Year Award Average
0614.00	Digital Media	Glendale	0	1	0	0
		LA Mission	1	4	5	3
		LA Trade	19	11	18	16
		Pasadena	0	0	3	1
		Rio Hondo	0	2	1	1
		LA Subtotal	**20**	**18**	**27**	**21**
		Coastline	3	0	3	2
		Cypress	0	0	2	1
		Golden West	10	10	7	8
		Irvine	9	1	6	5
		Saddleback	0	0	1	0
		Santa Ana	0	1	6	2
		OC Subtotal	**22**	**12**	**25**	**18**
		Supply Subtotal/Average	**42**	**30**	**52**	**39**

TOP Code	Program	College	2018-2019 Awards	2019-2020 Awards	2020-2021 Awards	3-Year Award Average
0614.10	Multimedia	East LA	0	2	0	1
		LA Mission	21	18	23	21
		Pasadena	6	1	0	2
		Santa Monica	5	5	9	6
		LA Subtotal	**32**	**26**	**32**	**30**
		Cypress	0	1	1	1
		Orange Coast	1	2	4	2
		Santiago Canyon	9	3	4	5
		OC Subtotal	**10**	**6**	**9**	**8**
	Supply Subtotal/Average		**42**	**32**	**41**	**38**
0614.20	Electronic Game Design	Pasadena	0	1	1	1
		LA Subtotal	**0**	**1**	**1**	**1**
		Golden West	3	2	0	2
		OC Subtotal	**3**	**2**	**0**	**2**
	Supply Subtotal/Average		**3**	**3**	**1**	**3**
0614.30	Website Design and Development	LA Pierce	3	2	4	3
		Mt San Antonio	9	7	6	7
		Pasadena	0	1	1	1
		Santa Monica	0	2	3	2
		LA Subtotal	**12**	**12**	**14**	**13**
		Coastline	1	1	1	1
		Fullerton	3	0	1	2
		Irvine	3	0	5	2
		Orange Coast	0	9	7	5
		Saddleback	7	2	7	5
		Santa Ana	0	2	1	1
		Santiago Canyon	24	3	6	11
		OC Subtotal	**38**	**17**	**28**	**27**
	Supply Subtotal/Average		**50**	**29**	**42**	**40**
0614.40	Animation	Cerritos	7	13	4	8
		East LA	14	12	12	13
		El Camino	5	5	4	5
		Glendale	2	6	2	3
		LA City	0	0	1	0
		LA Mission	8	11	5	8
		Mt San Antonio	67	58	43	56
		Pasadena	2	1	6	3

TOP Code	Program	College	2018-2019 Awards	2019-2020 Awards	2020-2021 Awards	3-Year Award Average
		Rio Hondo	11	9	9	10
		Santa Monica	9	19	69	32
		LA Subtotal	**125**	**134**	**155**	**138**
		Coastline	0	0	1	0
		Cypress	7	1	0	2
		Fullerton	0	1	0	0
		Irvine	1	1	3	2
		Orange Coast	0	1	0	0
		Santa Ana	15	0	0	5
		OC Subtotal	**23**	**4**	**4**	**9**
	Supply Subtotal/Average		**148**	**138**	**159**	**147**
	Supply Total/Average		**282**	**232**	**295**	**267**

Exhibit 14 shows the annual average community college awards by type from 2018-19 through 2020-21. The plurality of the awards are for associate degrees, followed by certificates between 16 and less than 30 semester units and certificates between 30 and less than 60 semester units.

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

Award Type	Value
Associate Degree	192
Certificate 30 < 60 semester units	75
Certificate 18 < 30 semester units	8
Certificate 16 < 30 semester units	97
Certificate 12 < 18 semester units	6
Certificate 8 < 16 semester units	10
Certificate 6 < 18 semester units	73
Noncredit award 480 < 960 hours	5
Noncredit award 288 < 480 hours	6
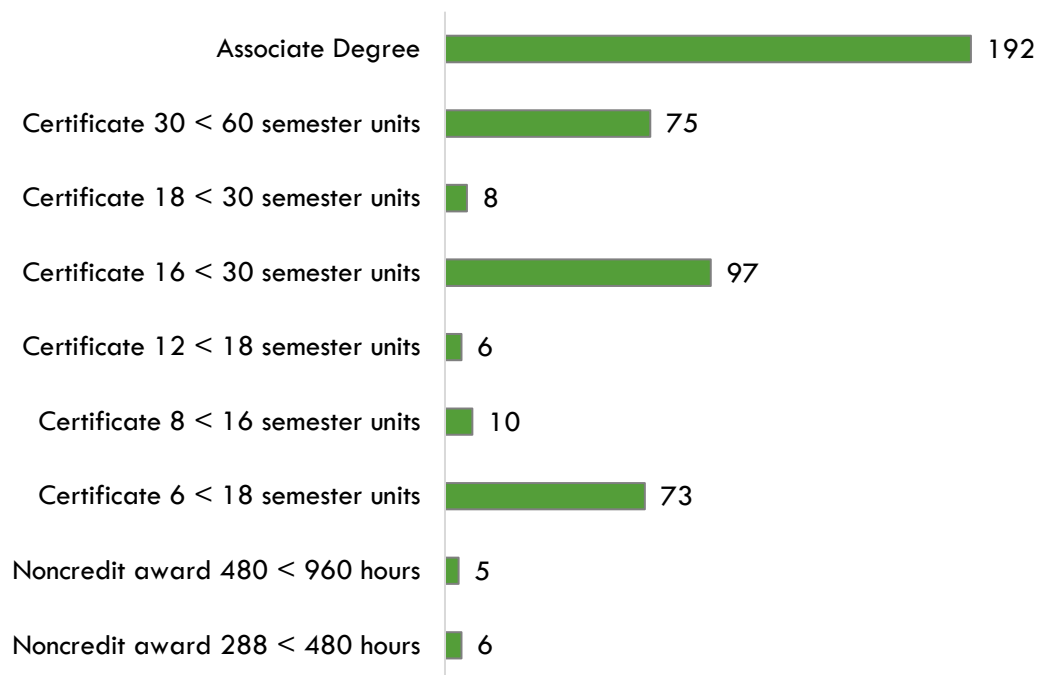
Community College Student Outcomes:

Exhibit 15 shows the Strong Workforce Program (SWP) metrics for electronic game design programs in South Orange Community College District (SOCCCD), the Orange County Region, and California. Of the 344 electronic game design students in Orange County, 35% (121) attended a SOCCCD college.

Additionally, SOCCCD students that exited game design programs in the 2018-19 academic year had median annual earnings of $22,576 after exiting the program, which is slightly lower when compared to the Orange County Region ($23,456) and California ($24,320).

Exhibit 15: Electronic Game Design (0614.20) Strong Workforce Program Metrics, 2019-20.[2]

SWP Metric	SOCCCD	OC Region	California
SWP Students	121	344	2,088
SWP Students Who Earned 9 or More Career Education Units in the District in a Single Year	26%	21%	29%
SWP Students Who Completed a Noncredit CTE or Workforce Preparation Course	Insufficient Data	Insufficient Data	81%
SWP Students Who Earned a Degree or Certificate or Attained Apprenticeship Journey Status	Insufficient Data	Insufficient Data	46
SWP Students Who Transferred to a Four-Year Postsecondary Institution (2018-19)	Insufficient Data	15	74
SWP Students with a Job Closely Related to Their Field of Study (2017-18)	Insufficient Data	Insufficient Data	50%
Median Annual Earnings for SWP Exiting Students (2018-19)	$22,576 ($10.85)	$23,456 ($11.28)	$24,320 ($11.69)
Median Change in Earnings for SWP Exiting Students (2018-19)	0%	20%	34%
SWP Exiting Students Who Attained the Living Wage (2018-19)	Insufficient Data	Insufficient Data	32%

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 game design occupations. Exhibit 16 shows the annual and three-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); Animation, Interactive Technology, Video Graphics, and Special Effects (10.0304); Digital Arts (50.0102); and Game and Interactive Media Design (50.0411).

Due to different data collection periods, the most recent three-year period of available data is from 2017 to 2020. Between 2017 and 2020, eight colleges in the region conferred an average of 516 awards annually in related training programs.

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[2] All SWP metrics are for 2019-20 unless otherwise noted.

Exhibit 16: Regional Non-Community College Awards, 2017-2020

CIP Code	Program	College	2017-2018 Awards	2018-2019 Awards	2019-2020 Awards	3-Year Award Average
09.0702	Digital Communication and Media/ Multimedia	California State University-Dominguez Hills	41	58	41	47
		Fremont College	1	1	1	1
		Marymount California University	0	3	10	4
		Vanguard University of Southern California	7	8	2	6
	Supply Subtotal/Average		**49**	**70**	**54**	**58**
10.0304	Animation, Interactive Technology, Video Graphics, and Special Effects	Art Center College of Design	9	18	36	21
		California Institute of the Arts	0	0	39	13
		Chapman University	0	0	20	7
		Gnomon	36	40	66	48
		Laguna College of Art and Design	11	37	33	27
		Los Angeles Film School	44	51	47	48
		Loyola Marymount University	20	15	21	19
		New York Film Academy	14	19	24	19
	Supply Subtotal/Average		**134**	**180**	**286**	**202**
50.0102	Digital Arts	Los Angeles Academy of Figurative Art	0	3	4	2
		Los Angeles Pacific College	0	0	4	1
		Marymount California University	17	15	3	12
		Otis College of Art and Design	92	69	48	70
		University of Southern California	16	14	15	15
		Woodbury University	4	1	2	2
	Supply Subtotal/Average		**129**	**102**	**76**	**102**
50.0411	Game and Interactive Media Design	Chapman University	0	1	0	0
		Laguna College of Art and Design	29	20	34	27
		Los Angeles Film School	27	9	0	12
		New York Film Academy	4	4	7	5
		University of California-Irvine	0	0	0	0
		University of Southern California	23	30	28	27

| CIP Code	Program	College	2017-2018 Awards	2018-2019 Awards	2019-2020 Awards	3-Year Award Average
		Woodbury University	1	3	6	3
		Supply Subtotal/Average	84	67	75	74
		Supply Subtotal/Average	456	476	615	516

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 17 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 the two game design occupations included in this report. Notably, 65% of workers employed in these game design occupations are White, which is significantly higher than the population (40%) and community college game design students (34%). Conversely, 31% of community college game design students are Hispanic or Latino, which is nearly equivalent to the Orange County population (34%) but significantly higher than workers in these game design occupations (13%).
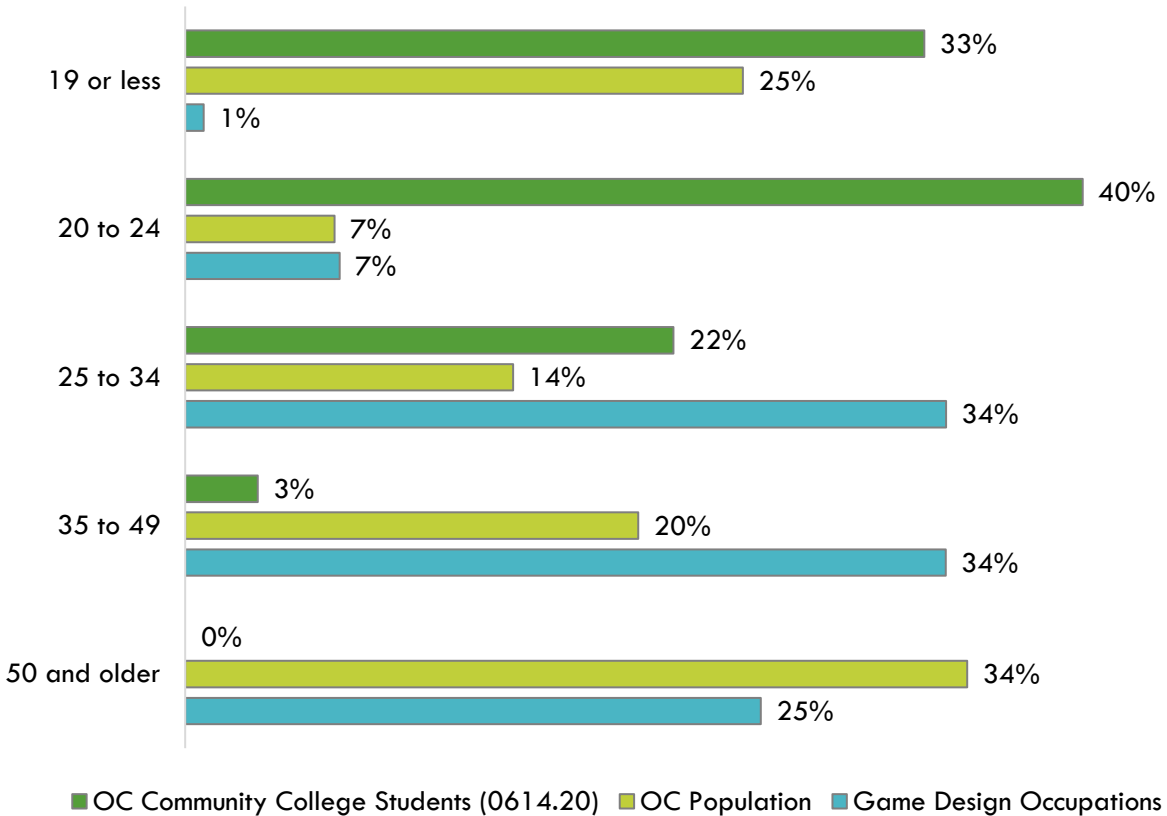
Exhibit 17: Program and County Demographics by Ethnicity

Legend: ■ OC Community College Students (0614.20) ■ OC Population ■ Game Design Occupations
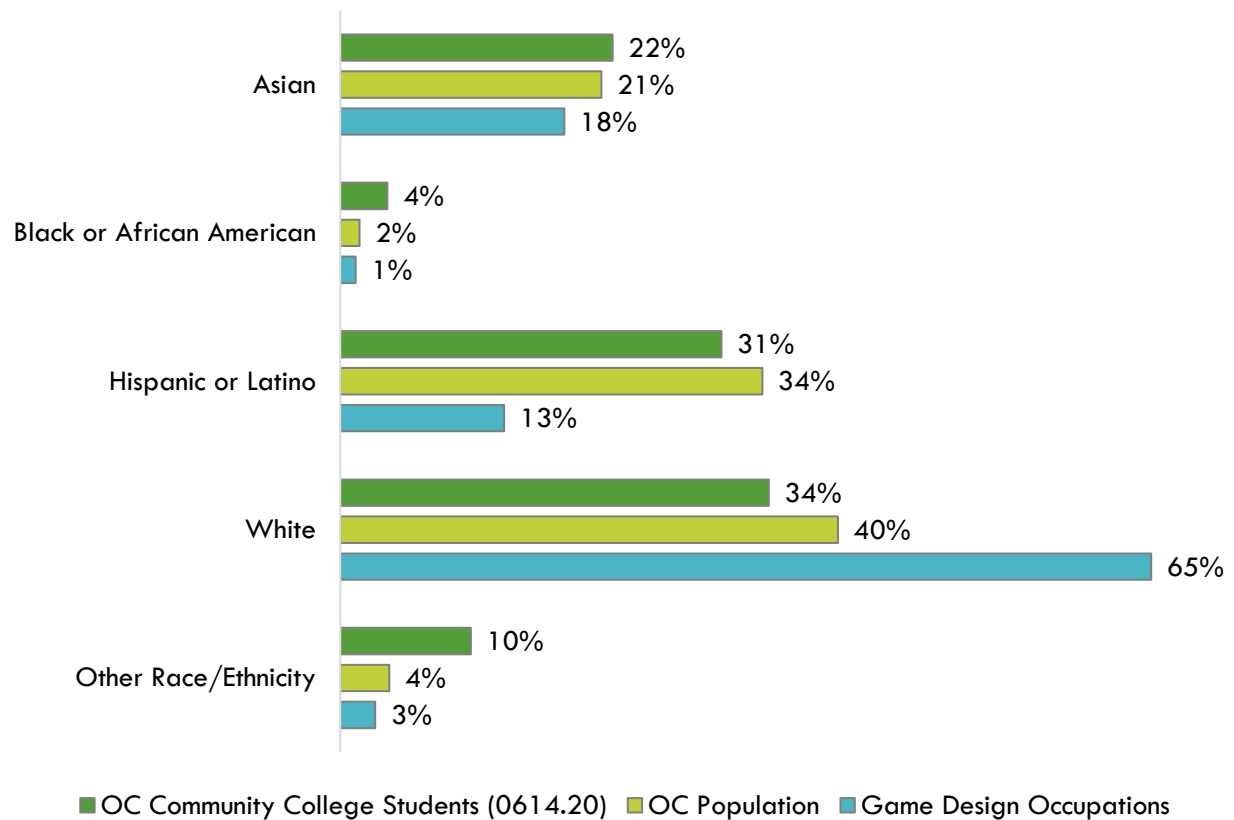
Age:

Exhibit 18 shows the age of Orange County community college students enrolled in game design programs compared to the overall Orange County population, as well as the two game design occupations included in this report. The majority of workers in these game design occupations are age 25 to 49 (68%), which is significantly higher than the population (34%) and community college game design students (25%). Additionally, the vast majority (73%) of community college game design students are age 24 or less, which is significantly higher than the population (32%) and these game design occupation (8%).

Exhibit 18: Program and County Demographics by Age

19 or less
- OC Community College Students (0614.20): 33%
- OC Population: 25%
- Game Design Occupations: 1%

20 to 24
- OC Community College Students (0614.20): 40%
- OC Population: 7%
- Game Design Occupations: 7%

25 to 34
- OC Community College Students (0614.20): 22%
- OC Population: 14%
- Game Design Occupations: 34%

35 to 49
- OC Community College Students (0614.20): 3%
- OC Population: 20%
- Game Design Occupations: 34%

50 and older
- OC Community College Students (0614.20): 0%
- OC Population: 34%
- Game Design Occupations: 25%

■ OC Community College Students (0614.20) ■ OC Population ■ Game Design Occupations
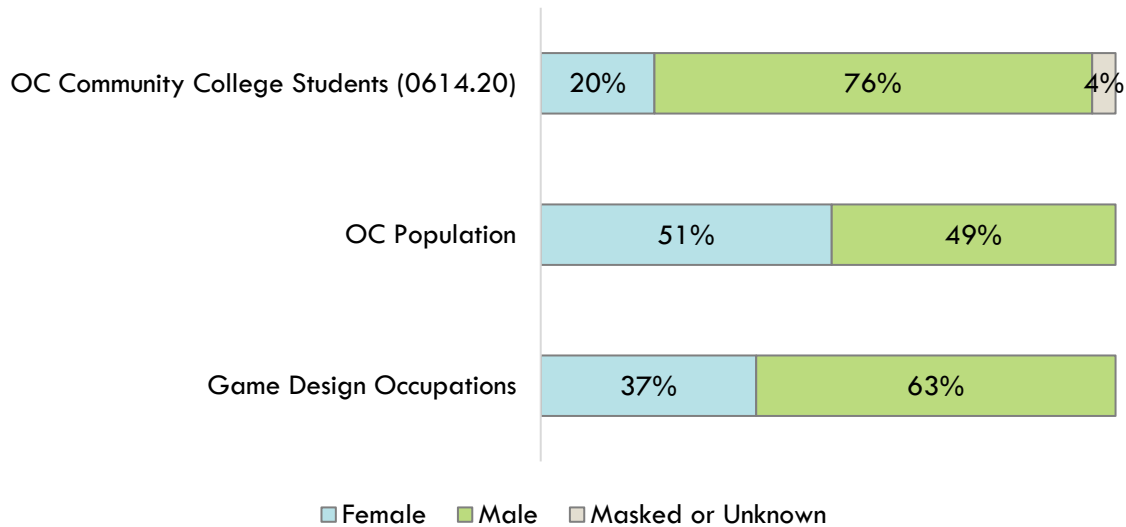
Sex:

Exhibit 19 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 these game design occupations.

Though the Orange County population is split nearly evenly between men and women, 76% of electronic game design students and 63% workers in these game design occupations are men. Examining disaggregated data for each occupation (not shown), *web and digital interface designers* has a high percentage of men (74%) and also has the highest entry-level wages for these two game design occupations ($22.67). *Special effects artists and animators* also has a higher percentage of men (55%) than women (45%).

Exhibit 19: Program and County Demographics by Sex

	Female	Male	Masked or Unknown
OC Community College Students (0614.20)	20%	76%	4%
OC Population	51%	49%	
Game Design Occupations	37%	63%	

□ Female   □ Male   □ Masked or Unknown

Appendix A: Methodology A

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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