

Augmented Reality & Virtual Reality Immersion Design

August 2018

Research Summary

The Los Angeles/Orange County Center of Excellence (COE) compiled this report to provide regional labor market supply and demand data related to **augmented reality & virtual reality immersion design**.

The following list summarizes key findings from this brief for augmented reality & virtual reality immersion design.

- The number of jobs for occupations selected is expected to increase by 8% through 2022, resulting in nearly 5,000 annual openings. **NOTE: Not all workers in the occupations selected may have the skills necessary for augmented reality/virtual reality jobs.**
- The entry-level hourly wage for multimedia artists and animators is **below** the MIT Living Wage¹ estimate for both Los Angeles and Orange Counties.
- No awards (associate degrees and certificates) have been conferred in Other Media and Communication programs between 2014 and 2017. However, 70 awards have been conferred in animation.

¹ MIT Living Wage Calculator. <http://livingwage.mit.edu/>

Occupation Codes and Descriptions

Currently, there are three occupation in the standard occupational classification (SOC) system and one emerging occupation in the ONET² database of occupational information that are related to augmented reality and virtual reality. The occupation titles, descriptions, and reported job titles are included in Exhibit 1.

Exhibit 1 – Occupations, description, and sample job titles

SOC Code	Title	Description	Sample of Reported Job Titles
15-1132	Software Developers, Applications	Develop, create, and modify general computer applications software or specialized utility programs. Analyze user needs and develop software solutions. Design software or customize software for client use with the aim of optimizing operational efficiency. May analyze and design databases within an application area, working individually or coordinating database development as part of a team. May supervise computer programmers.	Application Developer, Application Integration Engineer, Applications Developer, Computer Consultant, Information Technology Analyst (IT Analyst), Software Architect, Software Developer, Software Development Engineer, Software Engineer, Technical Consultant
15-1133	Software Developers, Systems Software	Research, design, develop, and test operating systems-level software, compilers, and network distribution software for medical, industrial, military, communications, aerospace, business, scientific, and general computing applications. Set operational specifications and formulate and analyze software requirements. May design embedded systems software. Apply principles and techniques of computer science, engineering, and mathematical analysis.	Developer, Infrastructure Engineer, Network Engineer, Publishing Systems Analyst, Senior Software Engineer, Software Architect, Software Developer, Software Engineer, Systems Coordinator, Systems Engineer

² New and emerging occupations (N&E) are incorporated into the O*NET-SOC classification system based on the evolving nature of workforce requirements stemming from changes in technology, society, law, and business practices. Incorporating N&E occupations into the O*NET system makes O*NET information more beneficial and responsive. <https://www.onetcenter.org/reports/NewEmerging.html>

15-1199.11	Video Game Designers	Design core features of video games. Specify innovative game and role-play mechanics, story lines, and character biographies. Create and maintain design documentation. Guide and collaborate with production staff to produce games as designed.	Design Director, Designer/Writer, Game Designer, Game Designer/Creative Director, Lead Designer, Lead Game Designer, Lead Level Designer, Mid-Level Game Designer, Senior Game Designer, World Designer
27-1014	Multimedia Artists and Animators	Create special effects, animation, or other visual images using film, video, computers, or other electronic tools and media for use in products or creations, such as computer games, movies, music videos, and commercials.	3D Animator, 3D Artist, Animation Director, Animator, Art Director, Artist, Creative Director, Graphic Artist, Graphic Designer, Illustrator

Source: O*NET Online

Current and Future Employment

In Los Angeles and Orange Counties, the number of jobs related to the field of interest is expected to increase by 8% over the next five years. Nearly 5,000 job opportunities will be available annually for these occupations through 2022 due to new job growth and replacement need (e.g., retirements).

Exhibit 2 contains detailed employment projections data for the occupations. ***There is no traditional LMI data for video game designers, since it is an emerging occupation.***

Exhibit 2 – Five-year projections for virtual reality-related occupations

SOC	Occupation	2017 Jobs	2022 Jobs	2017 - 2022 Change	2017 - 2022 % Change	Annual Openings
15-1132	Software Developers, Applications	27,604	31,668	4,064	15%	2,669
15-1133	Software Developers, Systems Software	22,557	22,750	193	1%	1,477
27-1014	Multimedia Artists and Animators	8,406	8,950	544	6%	785
		58,567	63,367	4,800	8%	4,930

Source: EMSI 2018.3 – QCEW, non-QCEW, Self-Employed

Earnings

In Los Angeles County, the entry-level average wage for multimedia artists and animators is \$12.23 per hour, which is below the MIT Living Wage estimate of \$13.54 (Los Angeles County) and \$15.31 (Orange County) per hour for a single adult. The average annual earnings for multimedia artists and animators in the region is \$70,000 per year, assuming full-time employment.

Exhibit 3 contains hourly wages and annual average earnings for the occupations studied in this report. Entry-level hourly earnings is represented by the 10th percentile of wages, median hourly earnings is represented by the 50th percentile of wages, and experienced hourly earnings is represented by the 90th percentile of wages, demonstrating various levels of employment.

Exhibit 3 – Earnings for virtual reality-related occupations

SOC	Occupation	Entry-Level Hourly Earnings	Median Hourly Earnings	Experienced Hourly Earnings	Average Annual Earnings
15-1133	Software Developers, Systems Software	\$32.25	\$56.44	\$84.05	\$119,000
15-1132	Software Developers, Applications	\$29.98	\$53.05	\$79.32	\$112,000
27-1014	Multimedia Artists and Animators	\$12.23	\$31.62	\$58.72	\$70,000

Source: EMSI 2018.3 – QCEW, non-QCEW, Self-Employed

Employer Job Postings

In this research brief, real-time labor market information is used to provide a more nuanced view of the current job market, as it captures job advertisements for occupations relevant to the field of study. Employer job postings are consulted to understand who is employing in the field of augmented reality and virtual reality, and what they are looking for in potential candidates. To identify relevant job postings, the occupations in Exhibit 1 and the following key words and job titles were used:

Key words: augmented reality and virtual reality

Job titles: virtual reality*, VR*, virtual reality developer, VR developer, virtual reality specialist, VR specialist, virtual reality artist, VR artist, and game design*

Top Titles

The most common titles for augmented reality and virtual reality-related jobs are listed in Exhibit 4. Graphic designer was mentioned in 20% of all relevant job postings (190 of 945 postings).

Exhibit 4 –Job titles (n=945)

Title	Job Postings, Last 12 months
Graphic Designer	190
Game Designer	94
Junior Designer	83
Junior Architect/Designer	33
Virtual Reality Designer	32
UX Designer	28
Virtual reality Expert	26
Digital Designer	25
Product Designer	22
Android Developer	19

Source: Labor Insight/Jobs (Burning Glass)

Top Employers

Exhibit 5 lists the major employers hiring professionals in fields related to augmented reality and virtual reality. Top employers postings job ads included Activision, Blizzard Entertainment, and Age of Learning. The top worksite cities in the region for these occupations were Los Angeles, Irvine, Santa Monica, El Segundo, Culver City, Glendale, and Burbank.

Exhibit 5 – Top employers (n=667)

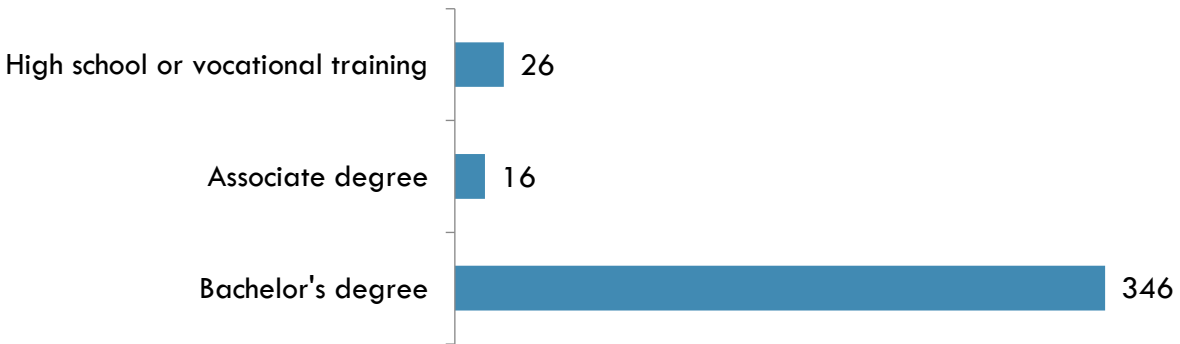
Employer	Job Postings, Last 12 months
Activision	28
Blizzard Entertainment	19
Age of Learning	18
SMCI	12
Disney	12
The Art Institutes	10
VR 360 Adventures	8

Source: Labor Insight/Jobs (Burning Glass)

Advertised Education Levels

Exhibit 6 displays the education level requested by employers in online job ads. The majority of employers were looking for a candidate with a Bachelor’s degree. Approximately 59% of job postings did not specify a level of education.

Exhibit 6 – Advertised education requirements for augmented reality and virtual reality-related occupations (n=388)



Source: Labor Insight/Jobs (Burning Glass)

Education and Training

Exhibit 7 shows the typical entry-level education requirement for the occupations of interest, along with the typical on-the-job training, and percentage of workers in the field who hold a community college award or have completed some postsecondary courses. Between 13% and 27% of the workforce has completed some community college training as their highest level of education.

Exhibit 7 – Education and training requirements

SOC	Occupation	Typical entry-level education	Typical on-the-job training	% of Community College Award Holders or Some Postsecondary Coursework
15-1132	Software Developers, Applications	Bachelor's degree	None	13%
15-1133	Software Developers, Systems Software	Bachelor's degree	None	13%
27-1014	Multimedia Artists and Animators	Bachelor's degree	Moderate-term	27%

Source: EMSI, Bureau of Labor Statistics Employment Projections (Educational Attainment)

In Los Angeles County, 11 community colleges have conferred awards in animation. Between 2014 and 2017, there was an average of 70 community college awards conferred. It is important to note that an award is not equivalent to a single person in search of a job opening, since a student may earn more than one award (e.g. an associate degree and a certificate).

Exhibit 8 – CCC Student Awards (by TOP and College)

TOP Code	Program	College	2014-15 Awards	2015-16 Awards	2016-2017 Awards	3-Year Award Average
0614.40	Animation	Cerritos	1	3	4	3
		Cypress	3	1	9	4
		East LA	3	9	3	5
		El Camino	-	1	-	1
		Glendale	4	3	4	4
		Irvine	1	-	-	1
		LA Mission	2	3	4	3
		Mt San Antonio	29	26	19	25
		Rio Hondo	7	10	11	9
		Santa Ana	3	2	5	3
		Santa Monica	15	13	12	13
Total		68	71	71	70	

Source: California Community Colleges Chancellor's Office MIS Data Mart

***No awards were conferred in 0699.00 – Other Media and Communications**

Sources

O*Net Online, Labor Insight/Jobs (Burning Glass), Economic Modeling Specialists International (EMSI), MIT Living Wage Calculator, Bureau of Labor Statistics (BLS) Education Attainment, and California Community Colleges Chancellor's Office Management Information Systems (MIS) Data Mart

Notes

Data included in this analysis represents the labor market demand for positions most closely related to augmented reality & virtual reality immersion design. Standard occupational classification (SOC) codes were chosen based on the national education level required for employment (associate degree and postsecondary certificate) as well as the proportion of current workers who hold a community college award or have had some community college training. This selection process narrows the labor market analysis to the most relevant employment opportunities for students with community college education and/or training.

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 and should not be used to establish current job openings, because the numbers may include duplicate job postings or postings intended to gather a pool of applicants. Real-time labor market information 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.