Maker Studies Occupations
Labor Market Information Report
City College of San Francisco

Prepared by the San Francisco Bay Center of Excellence
for Labor Market Research
January 2019

Recommendation

Based on all available data, there appears to be a significant undersupply of Maker Studies workers compared to the demand for this cluster of occupations in the Bay region and in the Mid-Peninsula sub-region (San Francisco and San Mateo Counties). The gap is about 1,791 students annually in the Bay region and 556 students annually in the Mid-Peninsula Sub-Region.

This report also provides student outcomes data on employment and earnings for programs on TOP 1099.00 - Other Fine and Applied Arts in the state and region. It is recommended that these data be reviewed to better understand how outcomes for students taking courses on this TOP code compare to potentially similar programs at colleges in the state and region, as well as to outcomes across all CTE programs at City College of San Francisco and in the region.

Introduction

This report profiles Maker Studies Occupations in the 12 county Bay region and in the Mid-Peninsula sub-region for a proposed new program at City College of San Francisco.

- **Commercial and Industrial Designers (SOC 27-1021):** Develop and design manufactured products, such as cars, home appliances, and children's toys. Combine artistic talent with research on product use, marketing, and materials to create the most functional and appealing product design.
    Entry-Level Educational Requirement: Bachelor's degree
    Training Requirement: None
    Percentage of Community College Award Holders or Some Postsecondary Coursework: 29%

- **Fine Artists, Including Painters, Sculptors, and Illustrators (SOC 27-1013):** Create original artwork using any of a wide variety of media and techniques.
    Entry-Level Educational Requirement: Bachelor's degree
    Training Requirement: Long-term on-the-job training
    Percentage of Community College Award Holders or Some Postsecondary Coursework: 27%

- **Computer Network Support Specialists (SOC 15-1152):** Analyze, test, troubleshoot, and evaluate existing network systems, such as local area network (LAN), wide area network (WAN), and Internet systems or a segment of a network system. Perform network maintenance to ensure networks operate correctly with minimal interruption. Excludes "Network and Computer Systems Administrators" (15-1142) and "Computer Network Architects" (15-1143).
    Entry-Level Educational Requirement: Associate's degree
    Training Requirement: None
    Percentage of Community College Award Holders or Some Postsecondary Coursework: 41%

- **Computer Programmers (SOC 15-1131)**: Create, modify, and test the code, forms, and script that allow computer applications to run. Work from specifications drawn up by software developers or other individuals. May assist software developers by analyzing user needs and designing software solutions. May develop and write computer programs to store, locate, and retrieve specific documents, data, and information.

  Entry-Level Educational Requirement: Bachelor's degree

  Training Requirement: None

  Percentage of Community College Award Holders or Some Postsecondary Coursework: 22%

- **Career/Technical Education Teachers**, Secondary School (SOC 25-2032): Teach occupational, career and technical, or vocational subjects at the secondary school level in public or private schools. Substitute teachers are included in "Teachers and Instructors, All Other" (25-3099). Excludes "Special Education Teachers, Secondary School" (25-2054).

  Entry-Level Educational Requirement: Bachelor's degree

  Training Requirement: None

  Percentage of Community College Award Holders or Some Postsecondary Coursework: 5%

Occupational Demand

Table 1. Employment Outlook for Maker Studies Occupations in Bay Region

Occupation	2017 Jobs	2022 Jobs	5-Yr Change	5-Yr % Change	5-Yr Open-ings	Annual Open-ings	10% Hourly Wage	Median Hourly Wage
Commercial and Industrial Designers	1,908	1,942	34	2%	187	177	$20.19	$28.08
Fine Artists, Including Painters, Sculptors, and Illustrators	2,088	2,139	51	2%	179	165	$7.76	$10.26
Computer Network Support Specialists	6,612	7,503	891	13%	680	501	$22.43	$37.05
Computer Programmers	14,212	14,794	583	4%	1,061	892	$27.67	$48.82
Career/Technical Education Teachers, Secondary School	826	901	75	9%	73	58	$23.76	$32.71
Total	**25,646**	**27,279**	**1,633**	**6%**	**2,181**	**1,792**	**$24.01**	**$40.58**

Source: EMSI 2018.4

Bay Region includes Alameda, Contra Costa, Marin, Monterey, Napa, San Benito, San Francisco, San Mateo, Santa Clara, Santa Cruz, Solano and Sonoma Counties

Table 2. Employment Outlook for Maker Studies Occupations in Mid-Peninsula Sub-Region

Occupation	2017 Jobs	2022 Jobs	5-Yr Change	5-Yr % Change	5-Yr Open-ings	Annual Open-ings	10% Hourly Wage	Median Hourly Wage
Commercial and Industrial Designers	641	649	9	1%	63	59	$21.68	$29.56
Fine Artists, Including Painters, Sculptors, and Illustrators	542	539	(3)	(1%)	44	42	$7.79	$10.24
Computer Network Support Specialists	1,825	2,243	417	23%	227	143	$22.07	$36.78
Computer Programmers	4,782	5,205	423	9%	400	306	$27.21	$49.42
Career/Technical Education Teachers, Secondary School	75	89	14	18%	8	5	$22.64	$30.32
TOTAL	**7,865**	**8,725**	**860**	**11%**	**742**	**556**	**$24.18**	**$41.98**

Source: EMSI 2018.4

Mid-Peninsula Sub-Region includes San Francisco and San Mateo Counties

Maker Studies Occupations in 12 County Bay Region and in Mid-Peninsula Sub-Region, 2019

Table 3. Number of Job Postings by Occupation for latest 12 months (Jan 2018 - Dec 2018)

Occupation	Bay Region	Mid-Peninsula
Computer Programmers (15-1131.00)	4,395	854
Commercial and Industrial Designers (27-1021.00)	4,292	410
Computer Network Support Specialists (15-1152.00)	1,088	241
Fine Artists, Including Painters, Sculptors, and Illustrators (27-1013.00)	752	158
Career/Technical Education Teachers, Secondary School (25-2032.00)	183	59
Total	**10,710**	**1,722**

Source: Burning Glass

Table 4. Top Job Titles for Maker Studies Occupations for latest 12 months (Jan 2018 - Dec 2018)

Common Title	Bay	Mid-Peninsula	Common Title	Bay	Mid-Peninsula
Product Designer	2,553	217	Network Engineer	62	9
Programmer/Analyst	534	171	Systems Programmer	62	12
Product Design Engineer	252	12	Entry Programmer	55	21
Product Engineer	197	30	Network Technician	53	15
Product Development Engineer	166	25	Technical Artist	52	4
Customer Engineer	148	18	Senior Programmer/Analyst	49	10
Industrial Designer	143	6	Systems Engineer	49	
Artist	142	41	Senior Programmer	48	3
Programmer	131	26	Devops Lead	47	4
Senior Product Engineer	111	10	Systems Analyst	46	21
Network Specialist	90	48	SAS Programmer	42	14
Applications Programmer	84	34	3D Artist	40	2
User Interface (UX)/User Experience (UX) Designer	84	13	Developer	39	5
Driving Instructor	62	14	Java	38	4

Source: Burning Glass

Industry Concentration

Table 5. Industries hiring Maker Studies Workers in Bay Region

Industry – 6 Digit NAICS (No. American Industry Classification) Codes	Jobs in Industry (2017)	Jobs in Industry (2022)	% Change (2017-22)	% in Industry (2017)
Custom Computer Programming Services (541511)	5,400	5,389	7%	21.0%
Computer Systems Design Services (541512)	3,506	3,425	3%	13.4%
Software Publishers (511210)	1,966	1,982	12%	7.7%
Independent Artists, Writers, and Performers (711510)	1,225	1,222	(1%)	4.8%
Internet Publishing and Broadcasting and Web Search Portals (519130)	939	945	28%	3.7%
Data Processing, Hosting, and Related Services (518210)	899	932	33%	3.6%
Elementary and Secondary Schools (Local Government) (903611)	847	848	8%	3.3%
Other Computer Related Services (541519)	780	773	10%	3.0%
Corporate, Subsidiary, and Regional Managing Offices (551114)	614	629	3%	2.5%
Colleges, Universities, and Professional Schools (State Government)	369	378	8%	1.5%

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Industry				
Graphic Design Services (541430)	373	363	(9%)	1.4%
Wired Telecommunications Carriers (517311)	334	326	(6%)	1.3%
Electronic Computer Manufacturing (334111)	321	322	3%	1.3%
Interior Design Services (541410)	301	305	7%	1.2%
Local Government, Excluding Education and Hospitals (903999)	277	276	1%	1.1%
Research and Development in the Physical, Engineering, and Life Sciences (except Nanotechnology and Biotechnology) (541715)	267	270	(8%)	1.1%
Colleges, Universities, and Professional Schools (611310)	261	265	8%	1.0%

Source: EMSI 2018.4

Table 6. Top Employers Posting Maker Studies Occupations in Bay Region and Mid-Peninsula Sub-Region (Jan 2018 - Dec 2018)

Employer	Bay	Employer	Bay	Employer	Mid-Peninsula
Apple Inc.	166	Intel Corporation	29	Capital Markets Placement	30
Facebook	132	Walmart / Sam's	27	Scoop Technologies	28
Scoop Technologies	114	Vmware Incorporated	25	Workday, Inc	26
Google Inc.	84	Western Digital	24	Lam Research Corporation	20
Capital Markets Placement	76	Wipro	24	University Of Carlifornia	18
Intuit	65	Infobahn Softworld Incorporated	23	Uc San Diego	17
KLA-Tencor	44	Asml Holding N V	22	University California	17
Asml	43	Revature	21	University Of California Berkeley	15
Cisco Systems Incorporated	43	Lam Research Corporation	20	Pandora Media	12
SAP	43	Flexton Incorporated	19	Veeva Systems	10
Salesforce	41	California State University	18	San Ramon Valley Unified School District	9
Accenture	38	Microsoft Corporation	18	US Army	9
Amazon	38	Sandisk Corporation	18	Wells Fargo	9
Estee Lauder Company	37	Square	18	Accenture	8
Workday, Inc	35	Square Incorporated	18	Anthem Blue Cross	8
IBM	34	Techfetch Com	18	Estee Lauder Company	8
Redpoint Ventures	33	Uc San Diego	18	Alameda Unified School District	7
Sony Electronics Incorporated	31	University Of California	18	Contra Costa Community College District	7
University California	30	Wells Fargo	18	Curtis Instruments Incorporated	7

Source: Burning Glass

Educational Supply

There is one community college in the Bay Region issuing one award annually on TOP 1099.00 - Other Fine and Applied Arts. There are no colleges issuing awards on this TOP code in the Mid-Peninsula Sub-Region.

Table 7. Awards on TOP 1099.00 - Other Fine and Applied Arts in the Bay Region

College	Sub-Region	Headcount	Associates	Certificates	Total
Berkeley City	East Bay	n/a		1	1
Contra Costa	East Bay	61			
Laney	East Bay	1			
San Francisco	Mid-Peninsula	29			
West Valley	Silicon Valley	53			
Total Bay Region		**144**	**0**	**1**	**1**
Total Mid-Peninsula Sub-Region		**29**	**0**	**0**	**0**

Source: IPEDS, Data Mart and Launchboard

NOTE: Headcount of students who took one or more courses is for 2016-17. The annual average for awards is 2014-17 unless there are only awards in 2016-17. The annual average for other postsecondary is for 2013-16.

Gap Analysis

Based on the data included in this report, there is a large labor market gap in the Bay region with 1,792 annual openings for the Maker Studies occupational cluster and one annual award for an annual undersupply of 1,791 students. In the Mid-Peninsula Sub-Region, there is also a gap with 556 annual openings and no annual awards for an annual undersupply of 556 students.

Student Outcomes

Table 8. Four Employment Outcomes Metrics for Students Who Took Courses on TOP 1099.00 - Other Fine and Applied Arts

2015-16	Bay (All CTE Programs)	City College of San Francisco (All CTE Programs)	State (1099.00)	Bay (1099.00)	Mid-Peninsula (1099.00)	City College of San Francisco (1099.00)
% Employed Four Quarters After Exit	74%	72%	55%	n/a	n/a	n/a
Median Quarterly Earnings Two Quarters After Exit	$10,550	$27,271	$12.050	n/a	n/a	n/a
Median % Change in Earnings	46%	31%	40%	n/a	n/a	n/a
% of Students Earning a Living Wage	63%	65%	25%	n/a	n/a	n/a

Source: Launchboard Pipeline (version available on 1/16/19)

Skills, Certifications and Education

Table 9. Top Skills for Maker Studies Occupations in Bay Region (Jan 2018 - Dec 2018)

Skill	Postings	Skill	Postings	Skill	Postings
Java	1,740	Customer Contact	459	Mechanical Engineering	252
Product Design	1,709	Graphic Design	431	jQuery	252
Prototyping	1,386	DevOps	424	AngularJS	250
Visual Design	1,332	Typesetting	423	Salesforce	249
Adobe Photoshop	1,122	Microsoft C#	414	Relational Databases	244

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JavaScript	1,112	Object-Oriented Analysis and Design (OOAD)	407	Maya	238
SQL	1,096	Git	405	Agile Development	236
Python	1,069	Data Analysis	392	Apache Hadoop	234
Product Development	1,038	Industrial Engineering Industry Expertise	388	Data Structures	230
Interaction Design	977	Debugging	362	Business Process	229
User Research	953	PERL Scripting Language	361	Machine Learning	226
Software Development	882	E-Commerce	354	Shell Scripting	226
UX Wireframes	838	Scrum	350	Web Site Design	226
Linux	801	Software as a Service (SaaS)	350	Physics	225
Product Management	762	Web Application Development	350	Cisco	223
Customer Service	751	Industrial Design	347	Kubernetes	223
Process Design	751	Design Thinking	345	NoSQL	223
Software Engineering	673	Experiments	344	JavaScript Object Notation (JSON)	222
C++	661	Information Architecture	335	Apache Webserver	221
Project Management	657	Teaching	319	Repair	220
Adobe Indesign	609	Information Technology Industry Knowledge	308	Illustration	218
Technical Support	562	HTML5	299	Atlassian JIRA	217
Adobe Acrobat	556	Human Computer Interaction	299	Failure Analysis	216
Adobe Creative Suite	550	Information Systems	297	.NET	215
Quality Assurance and Control	543	Description and Demonstration of Products	294	Continuous Integration (CI)	213
UNIX	538	Extensible Markup Language (XML)	292	Docker Software	210
Oracle	533	Product Sales	292	MySQL	204
Adobe Illustrator	525	Budgeting	284	Packaging	204
User Interface (UI) Design	500	Unit Testing	271	Sales	204
Scheduling	470	Manufacturing Processes	266	Big Data	200

Source: Burning Glass

Table 10. Certifications for Maker Studies Occupations in the Bay Region (Jan 2018 - Dec 2018)

Note: 93% of records have been excluded because they do not include a certification. As a result, the chart below may not be representative of the full sample.

Certification	Postings	Certification	Postings
Driver's License	180	Certified Wireless Network Administrator (CWNA)	12
Security Clearance	117	Microsoft Certified Solutions Associate (MCSA)	11
IT Infrastructure Library (ITIL) Certification	93	ITIL Foundation	9
Cisco Certified Network Associate (CCNA)	58	Food Handler Certification	8
ITIL Certification	50	Epic Certification	7
Certified A+ Technician	42	First Aid Cpr Aed	7
Cisco Certified Network Professional (CCNP)	41	Juniper Networks Certified Internet Professional	7
Makeup Artist	41	Registered Health Information Administrator	7
Driving Instructor	37	Vmware Certified Professional (VCP)	7
Project Management Certification	31	Certified Information Systems Auditor (CISA)	6

Six Sigma Certification	23	Certified Scrum Trainer (CST)	6
Microsoft Certified Professional (MCP)	22	Cisco Certified Design Professional (CCDP)	6
Project Management Professional (PMP)	22	CompTIA Server+	6
Certified Information Systems Security Professional (CISSP)	21	Capability Model Maturity Integration (CMMI) Certification	5
Cisco Certified Internetwork Expert (CCIE)	21	Certified Regulatory Compliance Manager (CRCM)	5
Microsoft Certified Solutions Expert (MCSE)	20	Cosmetology License	5
CompTIA Security+	16	Cross-Cultural Language and Academic Development	5
Six Sigma Yellow Belt	16	Electric Vehicle Technician (EVT)	5
CompTIA Network+	15	Linux Professional Institute Certification	5

Source: Burning Glass

Table 11. Education Requirements for Maker Studies Occupations in Bay Region

Note: 55% of records have been excluded because they do not include a degree level. As a result, the chart below may not be representative of the full sample.

Education (minimum advertised)	Latest 12 Mos. Postings
High school or vocational training	284 (6%)
Associate Degree	111 (2%)
Bachelor's Degree or Higher	4,456 (92%)

Source: Burning Glass

Methodology

Occupations for this report were identified by use of skills listed in O*Net descriptions and job descriptions in Burning Glass. Labor demand data is sourced from Economic Modeling Specialists International (EMSI) occupation data and Burning Glass job postings data. Educational supply and student outcomes data is retrieved from multiple sources, including CTE Launchboard and CCCCO Data Mart.

Sources

O*Net Online
Labor Insight/Jobs (Burning Glass)
Economic Modeling Specialists International (EMSI)
CTE LaunchBoard www.calpassplus.org/Launchboard/
Statewide CTE Outcomes Survey
Employment Development Department Unemployment Insurance Dataset
Living Insight Center for Community Economic Development
Chancellor's Office MIS system

Contacts

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