BLURRING LINES

How Business and Technology Skills Are Merging to Create High Opportunity Hybrid Jobs

INTRODUCTION

Over the last several years, new tools have made programming and data analysis accessible to users with far less training and technical expertise than ever before. This has had a democratizing effect on these fields, with technical and analytical functions no longer the exclusive domain of "experts" but rather undertaken within a range of business and marketing roles. A new class of hybrid jobs, which combine programming skills and "offline skills" such as analysis, design, or marketing, have emerged or assumed increasingly important functions in the digital economy.

Many of these hybrid roles, such as Product Managers and User Experience Designers, focus on translating the needs of increasingly connected users into a compelling online experience. Today, Americans interact with a broad range of software applications on a daily basis, both at work and at home. In 2013, the average American spent nearly 2.5 hours per day online or engaging in interactive media, up 15% from just two years before.[1] With so many online options, consumers place a premium on the design, accessibility, and usability of the software tools they use.

Changes in programming technologies have facilitated the rapid growth of these roles and lowered the barriers to entry. New web frameworks and development tools such as Ruby on Rails allow users without a software engineering background to build increasingly complex websites and mobile apps. Google Analytics, marketing automation software tools, and the accessibility of ever-growing volumes of data have raised employers' expectations that a broader set of employees – not just statisticians or business analysts – will drive analytic insights. Roles such as Digital Marketer, Data Analyst and Mobile Application Developer are often times accessible to job seekers with technical training short of a computer science degree.

While these roles are critical to those software and innovation sector firms driving much economic growth following the Great Recession, the training ecosystem preparing job seekers for these roles is relatively weak. As a result of their diverse and dynamic skill requirements, these roles do not typically align well with established higher education programs of study. A new class of accelerated learning programs has emerged to fill this void, offering short-term training designed to address entry-level skill needs.

This report provides context on the occupational demand, growth, and salaries for a set of hybrid IT roles. Within each occupation, we provide data on the skills which employers require, as well as on those skills that are growing quickly within those jobs.

The roles covered in the report are in high demand by employers, pay well, and, importantly, are accessible with technical training less than a computer science degree.

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[1] http://www.nielsen.com/content/dam/corporate/us/en/reports-downloads/2014%20Reports/nielsen-crossplatform-report-march-2014.pdf

Key Findings

» **These roles are in high demand:** More than 250,000 positions were open in the last year for these hybrid technical roles.

» **These jobs pay well:** Advertised salaries for these roles range from $65,000 to $111,000 per year. This range is well above the national average starting salary, and in line with IT roles requiring more significant technical training.

» **These roles are highly concentrated in "tech hubs":** A small number of cities with technology focused economies comprise the vast majority of employer demand for these roles. San Jose, for example, has seven times the number of postings per capita compared to the national average. The top 10 cities for hybrid technical role demand account for 50% of all postings in these fields, but only 25% of the total national population.

» **These roles are within reach for job seekers with common software skills:** The technical skill requirements for these roles include web programming skills such as HTML5; database skills such as SQL; and programming languages such as Python and Java. While these skills are growing in demand, they also can be learned without an extensive background in computer science.

» **Web development and mobile development positions are in the highest demand:** More than 100,000 positions for web and mobile developers have been available over the past year.

» **Mobile development, data analytics, and product management positions pay the highest salaries:** These roles each have an average advertised salary of more than $100,000, demonstrating both their high value to employers and the shortage of qualified talent.

» **Data analytics, digital marketing, and mobile development are growing especially fast:** Demand for data science skills has tripled over the past five years, while demand for digital marketing and mobile skills has more than doubled.
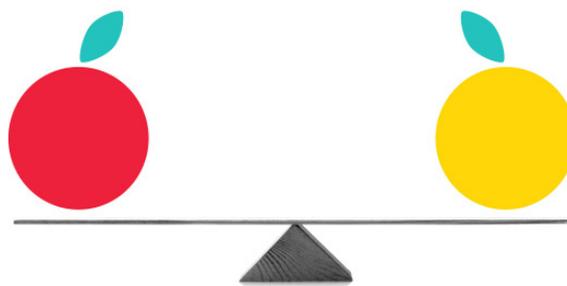
TOTAL DEMAND
BY SKILL CLUSTER

Web Development & Design

67,250
Job Counts
Last 12 Months

3%
Change
From 2011

$87,217
Average
Advertised Salary

Digital Marketing & Marketing Automation

45,991
Job Counts
Last 12 Months

145%
Change
From 2011
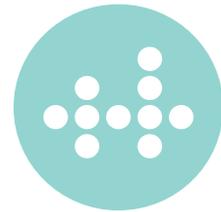
$76,783
Average
Advertised Salary

Mobile Development

41,032
Job Counts
Last 12 Months

135%
Change
From 2011

$111,380
Average
Advertised Salary

Data Analytics

41,000
Job Counts
Last 12 Months

372%
Change
From 2011

$105,540
Average
Advertised Salary

Product Management

40,752
Job Counts
Last 12 Months

7%
Change
From 2011

$106,471
Average
Advertised Salary

User Interface/ User Experience (UI/UX)

29,825
Job Counts
Last 12 Months

15%
Change
From 2011

$99,177
Average
Advertised Salary

All Hybrid Jobs

265,850
Job Counts
Last 12 Months

53%
Change
From 2011

$96,206
Average
Advertised Salary

All IT Jobs

1,975,788
Job Counts
Last 12 Months

7%
Change
From 2011

$86,475
Average
Advertised Salary

OCCUPATION & SKILL CLUSTER ANALYSIS

In this section, we discuss the demand within each job and skill cluster. These data demonstrate the top skills in demand, as well as the growth of certain critical skills within the occupation vs. overall, providing context into the increased demand for skills to fill these roles.

Web Development & Design

67,250
Job Count
Last 12 Months

3%
Change
From 2011

$87,217
Average
Advertised Salary

As websites become a primary method for consuming services and as they replace direct human interaction, the developers who build and maintain sites are critically important for businesses. Web development roles bring together programming skills such as JavaScript and PHP and the broad communication and research skills needed to design appealing applications for consumers. In web development jobs, we see major growth in in skills such as HTML5 and Python. In addition to JAVA, many of these roles require skills built on Java, including jQuery and AJAX. Web development roles pay well, with an average advertised salary of nearly $90,000. These jobs also require broad skills related to web development, with the major growth coming from implementing development methodology such as Agile Development and Scrum.

Web Design jobs involve blending graphic design skills with basic programming in order to craft websites. The role focuses on the visual aspects of the website, rather than the underlying development. These roles provide an entry into the tech market for individuals with project and graphic design skills. Basic web design and Photoshop skills, as well as HTML5, are key to these roles. HTML5 and Adobe Creative Suite are the fastest growing skills in demand for web designers.

Highest Demand Web Development & Design Skills

Skill	Highest Demand (By Total Postings)	% of Positions Specifically Requesting Skill
Javascript	42,914	64%
jQuery	26,285	39%
Hypertext Preprocessor	23,262	35%
HTML5	19,587	29%
Web Application	15,985	24%
SQL	14,510	22%
JAVA	13,770	20%
Web Site Design	13,685	20%
MySQL	13,512	20%

Fastest Growing Skills for Web Development & Design Jobs

Skill	Total Postings	% of Web Development & Design Roles	Growth since 2011
HTML5	19,587	29%	317%
Scrum	2,815	6%	101%
Agile Development	3,628	5%	70%
jQuery	26,285	39%	66%
Python	4,490	7%	60%

Digital Marketing and Marketing Automation

45,991
Job Count
Last 12 Months

145%
Change
From 2011

$76,783
Average
Advertised Salary

As marketing increasingly becomes a data-driven discipline and firms adopt quantitative approaches to targeting customers and measuring campaigns, statistical and technical skills are increasingly in demand. These digital marketing and marketing automation roles require the sort of analytic or data skills more commonly found in statistical or IT roles together with traditional marketing skills such as communication and creativity.

Technical marketing positions have more than doubled in demand (a 145% increase since 2011), while advertising an average salary of $77,000 – a 25% wage premium over those without technical skills. In fact, the top five skills in digital marketing and automation have grown at an astounding average of 500%. Traditional marketing roles, on the other hand, have grown only 16% over this time.

Highest Demand Digital Marketing & Automation Skills

Skill	Total Postings	% of Marketing Postings
Social Media	16,841	37%
Marketing Automation Software (e.g. Marketo, Eloqua, Hubspot)	15,233	34%
Marketing	9,206	15%
Optimization	6,762	13%
Market Strategy	5,972	13%
Google Analytics	5,851	13%
Content Management	5,474	12%
Email Marketing	5,362	12%

Fastest Growing Skills for Digital Marketing & Automation Jobs

Skill	Total Postings	% of Marketing Postings	Growth since 2011
Google Analytics	5,851	12%	553%
Google AdWords	2,323	5%	533%
Key Performance Indicators	3,301	6%	517%
Content Development	2,409	5%	449%
Oracle	2,566	5%	444%
Marketing Automation (e.g. Marketo, Eloqua, Hubspot)	15,233	34%	398%
Content Management	5,474	7%	348%

Mobile Development Skills

41,032
Job Count
Last 12 Months

135%
Change
From 2011

$111,380
Average
Advertised Salary

Mobile developers create programs specifically for use on handheld devices such as phones and tablets, which now account for 25% of all web usage.[2] Not surprisingly, mobile development jobs have more than doubled in demand over five years, while paying well over $100,000 per year. While mobile application development typically requires a relatively low threshold of programming skill, designing complex applications for small screens raises a set of other challenges. Further, the rapid emergence of mobile computing has resulted in an undersupplied job market. In addition to HTML5 – one of the new baseline tech skills – large growth is seen here with Scrum and development on iOS, reflecting the growth in demand related to the iPhone. Growth is also seen in JSON, which enables data from various sites and databases to be merged into mobile applications, allowing custom data-powered content to reach users.

2   http://kpcbweb2.s3.amazonaws.com/files/85/Internet_Trends_2014_vFINAL_-_05_28_14-_PDF.pdf?1401286773

Highest Demand Mobile Development Skills

Skill	Total Postings	% of Mobile Development Roles
JAVA	16,310	40%
Mobile Application Design	14,872	36%
JavaScript	12,009	29%
Objective C	11,582	28%
Android	10,067	25%
HTML5	8,077	20%
Object-Oriented Analysis	7,830	19%
Software Engineering	7,080	17%
C++	7,000	17%
JSON	6,778	17%

Fastest Growing Skills for Mobile Development Jobs

Skill	Total Postings	% of Marketing Postings	Growth since 2011
JSON	6,778	17%	387%
iOS Software Development Kit (SDK)	2,639	6%	371%
HTML5	8,077	20%	333%

Data Analytics

41,000
Job Count
Last 12 Months

372%
Change
From 2011

$105,540
Average
Advertised Salary
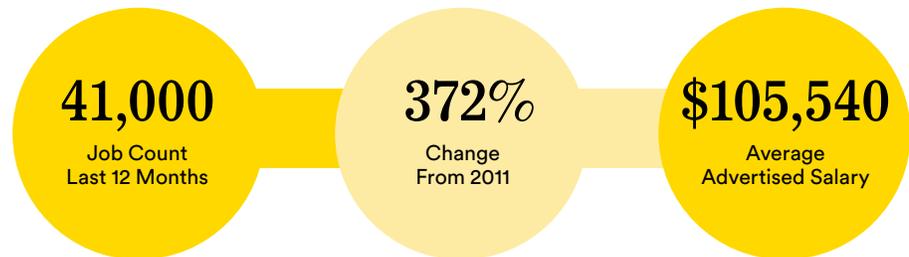
With the rise in "big data," data analytics roles have shown correspondingly rapid growth. Data analysts use database and quantitative programming roles to analyze large data sets and translate findings to broader audiences. Analysts are typically expected to use data to drive insights and make a business case by generating hypotheses, developing creative problem solving approaches, and using data visualization to communicate results and strategy implications. Analytics roles, defined here as those requiring data analysis and machine learning skills, but requiring less than a Ph.D., are in high demand, with more than 50,000 job postings in the last year. These roles advertise salaries over $100,000 per year. The baseline technical skills required for these roles include statistical and database packages such as R, SAS, and SQL. These roles have evolved to require a number of skills that scarcely existed five years ago. These include tools for organizing and manipulating big data such as Hadoop and Hive; Tableau, a tool for creating interactive visualizations; and Python, a scripting language particularly valued for its versatility. Although all of these skills are technical, the combination of functions represented by each of these software packages is noteworthy in that it illustrates well the amalgamation of once insular functions: these analysts are expected to structure databases (via SQL et al.), organize big datasets (via Hadoop et al.), run analyses (via R and SAS et al.), and build visualizations (via Tableau et al.).

Highest Demand Data Analytics Skills

Skill	Total Postings	% of Analytics Roles
R	19,198	47%
Machine Learning	17,721	43%
SAS	16,340	40%
SQL	16,284	40%
Python	13,545	33%
JAVA	12,265	30%
Apache Hadoop	11,012	27%
Big Data	10,222	25%
Data Mining	9,739	24%

Fastest Growing Skills for Data Analytics Jobs

Skill	Total Postings	% of Data Analytics Roles	Growth since 2011
Data Science	7,049	17%	70x
Big Data	10,222	25%	29x
Tableau	4,279	10%	25x
Apache Hive	5,241	13%	20x
Data Visualization	3,775	9%	11x
Apache Hadoop	11,012	27%	8x
Python	13,545	33%	6x

Product Management Skills

| 40,752 Job Count Last 12 Months | 7% Change From 2011 | $106,471 Average Advertised Salary |

Product Managers are responsible for orchestrating the development of software products, setting the direction of the product, then organizing engineering, marketing and sales capabilities needed to build the product and take it to market. These roles call for a mix of technical and business skills; they rely heavily on communication and presentation, along with management processes such as agile development. Product management roles pay well, with an average advertised salary of $107,000.

Highest Demand Product Management Skills

Skill	Total Postings	% of Analytics Roles
Product Development	11,804	29%
Product Marketing	7,976	20%
Competitive Analysis	3,818	9%
Market Research	3,789	9%
Business Development	3,675	9%
Collaboration	3,632	9%
Market Strategy	3,614	9%
Product Sale and Delivery	3,368	8%
Business Planning	2,617	6%

Fastest Growing Skills for Product Management Jobs

Skill	Total Postings	% of Product Management Postings	Growth since 2011
Scrum	2,198	5%	161%
Agile Development	2,521	6%	141%
E-Commerce	2,088	5%	25%
Business Case Analysis	2,231	5%	15%

User Interface/User Experience

29,825	15%	$99,177
Job Count Last 12 Months	Change From 2011	Average Advertised Salary

User Interface and User Experience jobs focus on the layout and feel of products, requiring a combination research and communication skills to understand how users expect to engage with software and design and programming skills to execute solutions. They pay well, advertising salaries close to $100,000, while relying on a mix of advanced technical skills along with proficiency in graphic design software such as Photoshop and Illustrator. Also reflected in the growth of these jobs is a scaling up of UI/UX projects with an increase in Agile Development skill requirements.

Highest Demand UI/UX Skills

Skill	Total Postings	% of UI/UX Postings
Javascript	13,611	46%
User Interface (UI) Design	10,463	35%
HTML5	8,324	28%
Adobe Photoshop	7,511	25%
jQuery	7,473	25%
Visual Design	6,489	22%
Information Architecture	5,266	18%
Prototyping	5,201	17%
Web Site Design	4,594	15%
JAVA	3,965	13%

Fastest Growing Skills for UI/UX Jobs

Skill	Total Postings	% of UI/UX Postings	Growth since 2011
HTML5	8,324	28%	225%
Adobe Creative Suite	3,510	12%	137%
InDesign	1,787	8%	125%
Agile Development	2,578	10%	65%
Scrum	1,977	9%	61%
Prototyping	5,201	17%	60%
Visual Design	6,489	22%	55%

GEOGRAPHY: WHERE ARE THE JOBS?

The positions reflected within this report are frequently found in the major technical hubs. The top 10 cities with greatest demand for these hybrid technical roles together account for 50% of all postings, but only 25% of the total national population. These roles offer robust opportunities for job seekers living in these urban areas. Conversely, it may be much harder to find opportunities in these emerging hybrid fields outside of these select urban areas.

The top locations asking for these positions include New York, the Bay Area, Los Angeles, Chicago and Boston. On a per capita basis, demand is by far highest in San Jose (seven times the national average) followed by San Francisco, Seattle, Austin, Boston, and Washington D.C.

- ■ Total Postings Across All Skills Group
- ■ Opportunities Per Capita (% of National Average)

SEATTLE
- ■ 10,008
- ■ 270%

PORTLAND
- ■ 3,285
- ■ 150%

CHICAGO
- ■ 12,685
- ■ 140%

BOSTON
- ■ 11,875
- ■ 220%

NEW YORK
- ■ 29,787
- ■ 160%

SAN JOSE
- ■ 14,646
- ■ 710%

SAN FRANCISCO
- ■ 21,412
- ■ 480%

DENVER
- ■ 4,130
- ■ 150%

WASHINGTON
- ■ 11,412
- ■ 180%

LOS ANGELES
- ■ 14,702
- ■ 130%

ATLANTA
- ■ 6,797
- ■ 130%

DALLAS
- ■ 7,373
- ■ 110%
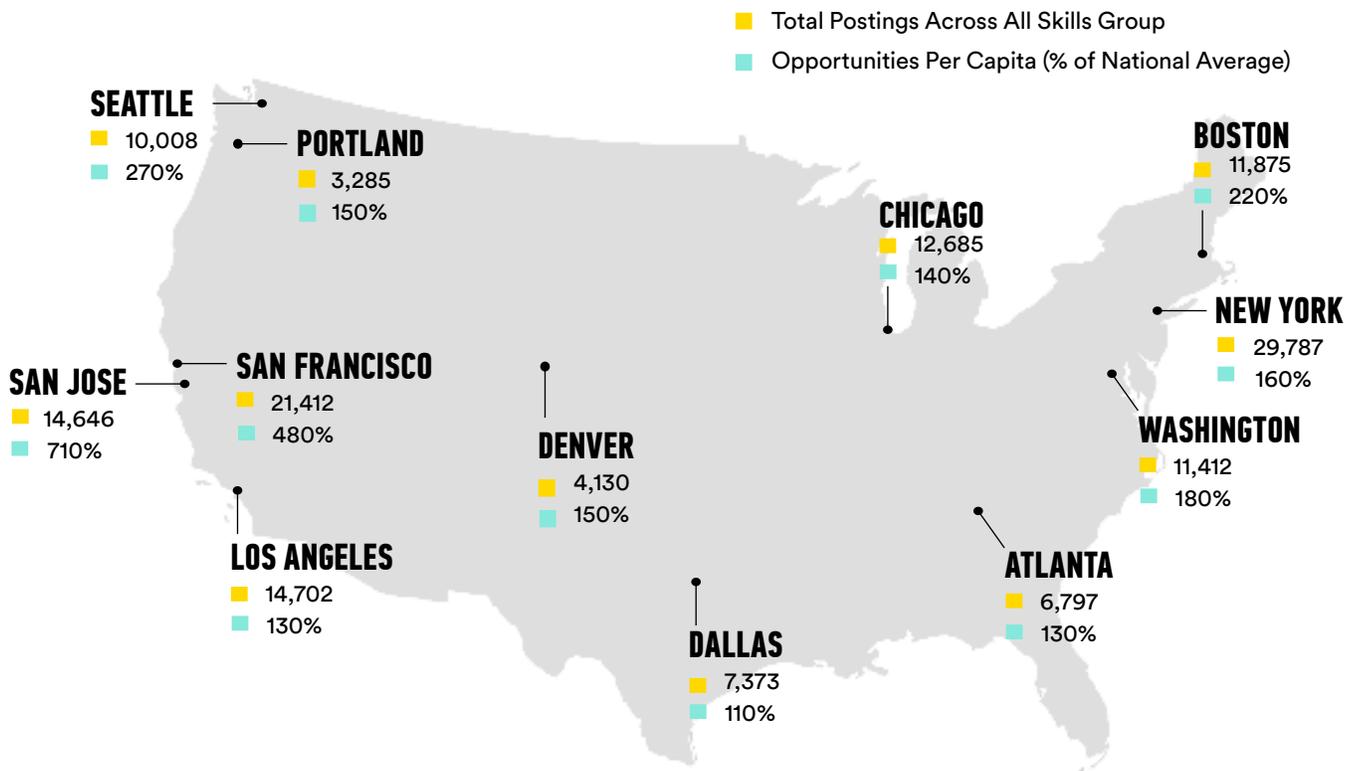
Locations with the Highest Demand	Locations with the Highest Concentration
1. New York	1. San Jose
2. San Francisco	2. San Francisco
3. Los Angeles	3. Seattle
4. San Jose	4. Austin
5. Chicago	5. Boston
6. Boston	6. Washington
7. Washington	7. New York
8. Seattle	8. Denver
9. Dallas	9. Portland
10. Atlanta	10. Chicago

DISCUSSION AND IMPLICATIONS

The emerging technologies described in this report have created a new class of jobs that hardly existed a generation ago, and are critical to the success of a broad swath of businesses.[3] The rapid emergence of these jobs has left employers without a large base of workers with the skills to take on these roles, and also left job seekers without a fully developed ecosystem of training programs.

» **Opening up accessible entry points into the technology workforce:**
The hybrid roles explored in this analysis can serve as key gateways into the tech workforce. Traditionally, tech opportunities have been dominated by advanced programming jobs on the one hand and middle-skill roles in computer support on the other. However, these hybrid positions are a new pathway to jobs accessible to those without intensive programming training.

» **These jobs are not well addressed by traditional higher education system:**
The jobs described in this report blend skills from disciplines which are typically found in disparate silos of higher education. For example, Marketing Automation blends marketing with information technology, Product Managers draw from both business / marketing and computer programming, and UI/UX Designers call on skill sets from design, programming and even psychology or anthropology. While the market increasingly demands these skill cocktails, higher education programs have been slower to package learning in such cross-disciplinary ways.

» **The talent shortage is resulting in heightened competition amongst employers:**
Hybird roles are critical to businesses and have proven hard for employers to fill. The absence of a robust talent pipeline for these roles has exacerbated the supply shortage in the market. As such, employers have to find creative ways to fill these functions, which becomes a question of driving up the cost of recruitment, or investing in their current workforce via training programs.

» **The emergence of alternative sources of training:**
Non-degreed workforce focused training programs have emerged to address these needs and to supply the pipeline more rapidly with talent to fill hybrid jobs. These programs are typically designed to select students with the "offline" skills needed for a given role, provide intensive short-term technical training, and to prepare their students to take entry-level positions in these fast-growing occupations.

» **The geography of these jobs will expand:**
As with many other jobs that involve emerging technologies, skills, or functions, these roles are currently highly concentrated in a handful of technology-focused economies such as Silicon Valley, Seattle, Austin, Boston, and Washington D.C. However, as this new-economy role becomes a mainstay and training pipelines develop, these jobs will become integrated into a wider swath of industries. We expect to see these roles become commonplace across the nation, bringing compelling and accessible opportunities to job seekers throughout the nation.

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3   The Bureau of Labor Statistics' O*NET taxonomy, last updated in 2010 based on a study of jobs in the 2000s, includes only one of the six hybrid job categories discussed in this report.

METHODOLOGY

About the Data

To provide the detailed and fully up-to-date information contained in this report, Burning Glass has mined its comprehensive database of nearly 100 million unique online job postings dating back to 2007. Burning Glass's spidering technology extracts information from close to 40,000 online job boards, newspapers, and employer sites on a daily basis and de-duplicates postings for the same job, whether it is posted multiple times on the same site or across multiple sites. Burning Glass's proprietary data is supplemented and contextualized by additional indicators from the Bureau of Labor Statistics and other published sources. All data is sourced Burning Glass except where indicated. All Burning Glass data in this report reflects all job postings collected in the US between April 1, 2014 and March 31, 2015.

AUTHORSHIP

Burning Glass Technologies

Burning Glass's tools and data are playing a growing role in informing the global conversation on education and the workforce by providing researchers, policy makers, educators, and employers with detailed real-time awareness into skill gaps and labor market demand. Burning Glass's job seeker applications power numerous government workforce systems and have been shown to have substantive impact on reemployment outcomes and on labor market literacy.

With headquarters in Boston's historic North End, Burning Glass is proud to serve a client base that spans six continents, including education institutions, government workforce agencies, academic research centers, global recruitment and staffing agencies, major employers, and leading job boards.

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General Assembly

At General Assembly, we are creating a global community of individuals empowered to pursue work they love, by offering full-time immersive programs, long-form courses, and classes and workshops on the most relevant skills of the 21st century – from web development and user experience design, to business fundamentals, to data science, to product management and digital marketing.

Established in early 2011 as an innovative community in New York City for entrepreneurs and startup companies, General Assembly is an educational institution that transforms thinkers into creators through education in technology, business and design at fourteen campuses across four continents.

APPENDIX

Top 25 Locations

Location with the Highest Demand	Total Postings Across All Skills Groups	Opportunities Per Capita (% of National Average)
New York	29,787	160%
San Francisco	21,412	480%
Los Angeles	14,702	130%
San Jose	14,646	710%
Chicago	12,685	140%
Boston	11,875	220%
Washington	11,412	180%
Seattle	10,008	270%
Dallas	7,373	110%
Atlanta	6,797	130%
Philadelphia	4,929	90%
Austin	4,254	230%
Phoenix	4,200	110%
Denver	4,130	150%
Miami	4,001	80%
San Diego	3,729	130%
Portland	3,285	150%
Minneapolis	3,181	80%
Detroit	2,760	70%
Charlotte	2,177	110%
Houston	2,168	40%
Baltimore	2,161	80%
Tampa	1,921	80%
Columbus	1,897	90%
St. Louis	1,769	60%