San Diego's Talent Pipeline

An Analysis of Supply, Demand, and

Gaps in Eight Key Occupations

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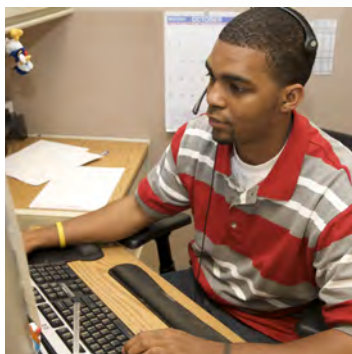
Research Conducted by:

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October 2013

LETTER TO THE READER

The Fermanian Business & Economic Institute is pleased to present its original research report, San Diego's Talent Pipeline: An Analysis of Supply, Demand, and Gaps in Eight Key Occupations commissioned by the San Diego Workforce Partnership. Our task was to research, analyze, and provide findings related to eight vital professions currently employing more than 143,000 San Diegans who are deemed critical to the vitality of the San Diego regional economy.

Within these professional categories, 43 specific occupations were analyzed in early 2013 and we have concluded that regional job demands in these professions, including accounting, education, engineering and information technology, shall exceed potential regional supplies through the year 2022. These findings should be useful for leaders in education, training, veterans transition programs, public policy, and related fields to align their academic and non-academic programs, product offerings, programs, services and support towards market demands.

As is our custom for our clients, it is our intention to provide regional leaders a highly readable economic analysis with clear conclusions and recommendations for action. For this project, San Diego stakeholders can and should use its well known spirit of collaboration and "can-do" energy among all to address this looming shortfall, enabling us to fully realize our growth potential as a region, benefitting all who live here.

We are grateful to the San Diego Workforce Partnership and all institutions, organizations, universities and individuals who participated in the survey and data collection for this project. Therefore, we are very pleased for the opportunity to present this report and look forward to additional opportunities to serve our community.

Randy M. Ataide, M.A., J.D.
Associate Dean of Business & Economic Development
Fermanian Business & Economic Institute
Point Loma Nazarene University

About the Fermanian Business & Economic Institute

About the Fermanian Business & Economic Institute at Point Loma Nazarene University

The Fermanian Business & Economic Institute is a strategic unit of Point Loma Nazarene University that specializes in expert business and economic consulting, commentary, speeches, studies, research, and related services. The FBEI also provides the San Diego region with economic forecasting events, business and economic roundtables, and special projects. Through our partnerships and in our work with clients, the FBEI represents the academic standards of the university and the professional credentials of the economics community by maintaining an objective approach and has a reputation for authoritative and objective insight regarding issues of business, economics, and policy facing our region. The Institute accepts projects and contracts only on the condition that the conclusions will be derived on the basis of data, evidence, and careful analysis. We eschew any approach calling for a study that will "support a particular desired conclusion."

The focus of the Institute since we officially began in January 2010 has been to provide economic analysis and forecasts to assist various businesses, non-profit organizations, and government organizations in San Diego. Projects we have undertaken include:

- Several studies for the San Diego Military Advisory Council, including a full economic impact of the military in San Diego County. (This study for the current year is now under way.)
- An analysis of the potential of Biomimicry (the field involved in taking solutions inspired by Nature to commercial application), commissioned by San Diego Zoo Global
- A profile and analysis of San Diego's population needing food assistance, commissioned by the Jacobs and Cushman San Diego Food Bank
- A study examining the economic impact of the proposed wind farm in Baja California, commissioned by Sempra Generation
- An analysis including survey data, examining the economic impact of the Big Bay Boom 4th of July fireworks event on the local economy
- Economic Forecasts each year from 2010 to 2013

We are currently working on a number of other projects, including:

- Providing primary economic advisory services for the State Controller of California, the Honorable John Chiang. This includes an analysis and forecast of the current and future outlook for California and its key regions and industries.
- An analysis of the economic costs of and solutions to homelessness in San Diego
- An economic structural and forecasting model of the chain link fence manufacturing industry

The Institute Staff

Randy M. Ataide, J.D.	**Lynn Reaser, Ph.D**	**Cathy L. Gallagher**
Associate Dean of Business & Economic Development	Chief Economist	Director
Peggy Crane, M.S.	**Dieter Mauerman, MBA**	**Emily Gallentine**
Economist	Business & Economic Research Associate	Manager
Cameron Foltz	**Mark Undesser, MBA**	
Department Assistant	Research Assistant	

FBEI Student Staff

> Rachel Brusca > Leah Crane > James Garcia > Luke Hoover > Billy Kailimai > Tim Marcacci > Kristen Raney > Jacy Romero > Taylor Roy > Victoria Sibingo > Kristi South > Ali Turnquist
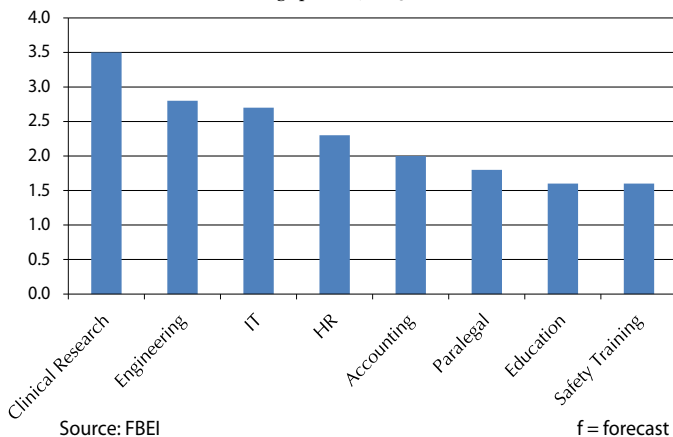
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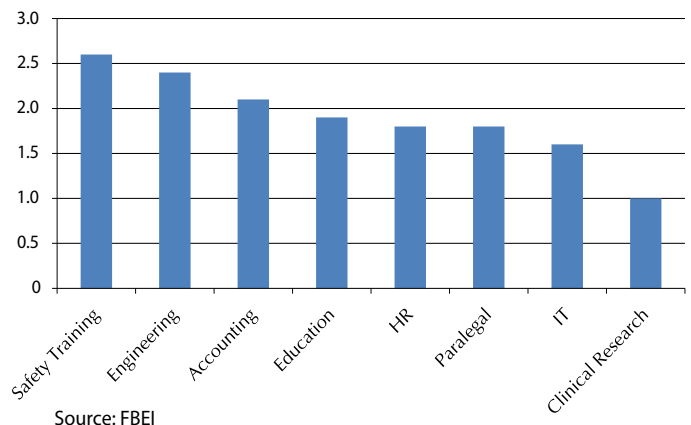www.pointloma.edu/fbei
619.849.2692

EXECUTIVE SUMMARY

> San Diego's labor market possesses a number of key professions that are vital to sustaining its economic base. This study investigates eight of them: accounting, clinical research and trials, education, engineering, human resources, informational technology, paralegal, and safety training. Including various subgroups, a total of 43 specific occupations are analyzed.

> An analysis of the demands for workers in these various occupations and the expected supply or graduates from San Diego's educational and training institutes indicates that all eight professions will experience potential supply gaps over the next decade.

> While slack demand and high unemployment may generally persist for the next two to three years, supply constraints for workers in these fields could intensify in the latter part of the coming decade. Even now, many employers are reporting shortages of various skill sets, including those of accountants, engineers, teachers, and information technology workers.

> Over the next ten years, information technology will lead the gap in the supply of workers in terms of absolute numbers, followed by engineers and education. In percentage terms or adjusting for different occupation sizes, engineering, accounting, and clinical research and trials are expected to show the greatest shortfalls.

> Forces will come into play to close these gaps if preventative actions are not taken. Wages could rise appreciably, companies could target their expansion plans outside of the region, or key personnel could be recruited from outside San Diego. However, the adoption of policies and steps to allow San Diego to meet any shortfalls of necessary talents and capabilities would clearly be of the greatest benefit to the region.

> Deficiencies in several critical basic aptitudes or skills affecting most or all of the occupational groups also exist. These include capabilities or competence in technology, writing, speaking, quantitative tools, critical reasoning, creative thinking, and speaking.

> Both employees and their employers cite the value of training after academic degrees are granted. Employees assign a particularly high value to industry conferences and workshops, which their employers also rate highly.

> A number of policies or actions are recommended to ensure that various specific occupational or general skill gaps do not limit San Diego's ability to grow. These include increases and enhancements in the programs of the region's educational facilities, more guidance from high school and college counselors on the expected market for various professions, efforts to gain a wider student endorsement of education in science and technology, and tighter linkages between employers and educational providers.
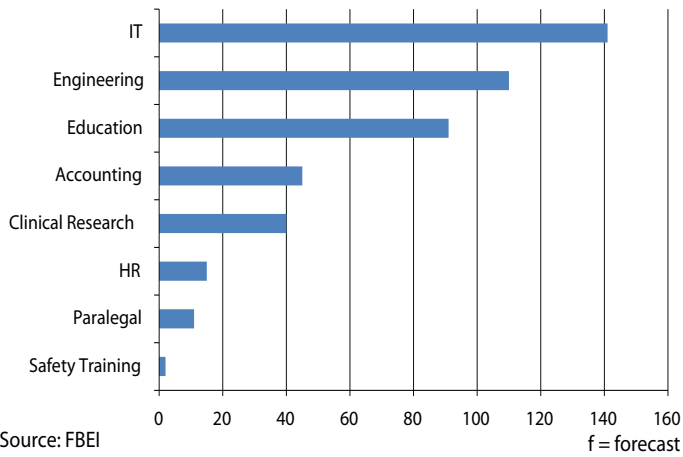
Clinical Research, Engineering, and IT Projected to Top Net Job Growth
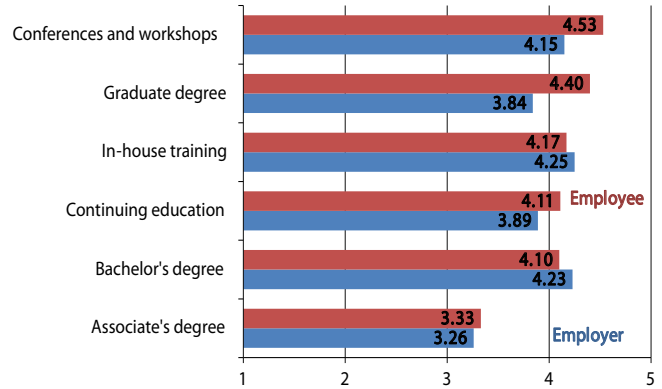Average percent, 2013-2022f

Source: FBEI   f = forecast

Attrition Rates Vary Across Occupations
Percent

Source: FBEI

IT and Engineering Lead Expected Supply Gaps in Numbers
Average number, 2013-2022f

Source: FBEI

f = forecast

Employees and Employers Value Education and Training
Average ranking on 1-5 scale

Job Demands Projected to Exceed Potential Supplies
Average, 2013 - 2022f

Occupation	No. People 2012	Net Growth Rate (%)	Attrition Rate (%)	Avg. Net Growth (no.)	Avg. Replacements (no.)	Avg. Total Openings (no.)	Avg. Supply (no.)	Avg. Supply Gap (no.)	Avg. Supply Gap (%)
Accounting	10,450	2.0	2.1	229	219	448	403	45	10
Clinical Research	7,800	3.5	1.0	319	81	401	361	40	10
Education	49,490	1.6	1.9	876	947	1,822	1,731	91	5
Engineering	19,610	2.8	2.4	626	472	1,098	988	110	10
HR	8,370	2.3	1.8	214	149	364	349	15	4
IT	43,210	2.7	1.6	1,313	698	2,011	1,871	141	7
Paralegal	3,630	1.8	1.8	71	65	136	125	11	8
Safety Training	870	1.6	2.6	15	23	38	36	2	5

Source: FBEI

f = forecast

TABLE OF CONTENTS

INDEX OF EXHIBITS

All exhibits contained herein were created by the Fermanian Business & Economic Institute at PLNU and may not be reproduced or duplicated without the express written consent of the Fermanian Business & Economic Institute or the San Diego Workforce Partnership.

I.   STUDY PURPOSE AND SCOPE

The primary purpose of this study is to investigate the demand, supply, and gaps that are likely to be evident in San Diego County over the next decade in eight key occupational groups: accounting, clinical research and trials, education, engineering, human resources, informational technology, paralegal, and safety training. The report identifies resources or facilities that will be needed to close these gaps. The study should provide important information for employers, job seekers, educational institutions, training facilities, personnel agencies, and policymakers.

The report investigates the career paths professionals have pursued, including their academic education, experience, and training after their formal degrees. Universal skill gaps, encompassing both soft and hard skills, are also analyzed.

Section II presents the key projections of the study in terms of the annual average demand for the different occupations over the period through 2022 including detailed projections by sub-occupation group. Supply numbers and the supply gaps are also identified.

Section III details the eight occupations and their subgroups in terms of wages, industries employing them, minimum educational requirements, and necessary credentials or certificates.

The educational and training facilities currently available in San Diego relevant to the eight occupations are discussed in Section IV. Section V then follows with the perspectives of employees surveyed as part of the project on issues ranging from where they received their education to how long they have been in their current position.

Section VI explores the importance of certain skills across all of the occupations, including some of the "softer skills", including creative thinking and teamwork. Section VII discusses the methodology, which relied heavily on surveys of employers, employees, personnel agencies, and educational institutions. Section VIII summarizes the study's primary conclusions and offers recommendations on steps that might be taken to narrow or close the supply gaps that are identified.

II. DEMAND, SUPPLY, AND GAPS

More than 143,000 San Diegans held one of the eight occupations investigated in this study as of 2012. This represented 11.5% of total nonfarm employment. The largest percentages of the eight-occupation total (34% and 30%, respectively) were in education and information technology. (See Exhibit 1 and Exhibit 2.)

Exhibit 1

Employment Spread Across Eight Occupations
Number, thousands, 2012
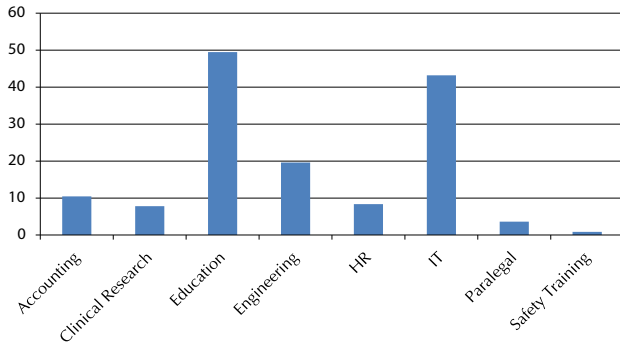
Exhibit 2

Education and IT Represent Largest Shares
Percent, 2012
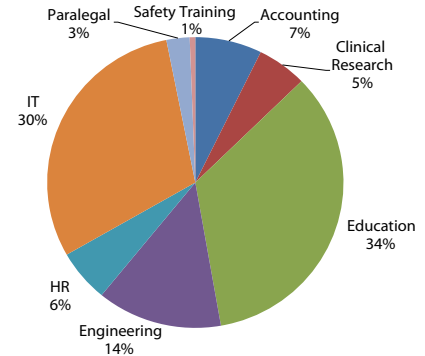
Occupation Demands

By 2022, these occupations are projected to employ a total of about 180,000 individuals. This will represent an average annual growth rate of 2.3% compared with the 2.0% average growth anticipated for the overall job market in the region over the next decade. Clinical research, engineering, and information technology are projected to record the fastest net job gains. (See Exhibit 3.)

In addition to the job increases driven by economic growth, industry gains, and technology, all of these occupations will face annual replacement needs as existing workers retire, die, or decide to pursue other professions. Attrition rates vary significantly across the eight occupations, with expectations ranging from highs in safety training and engineering to a low in clinical research and trials. (See Exhibit 4.)

Exhibit 3

Clinical Research, Engineering, and IT Projected to Top Net Job Growth
Average percent, 2013-2022f

f = forecast
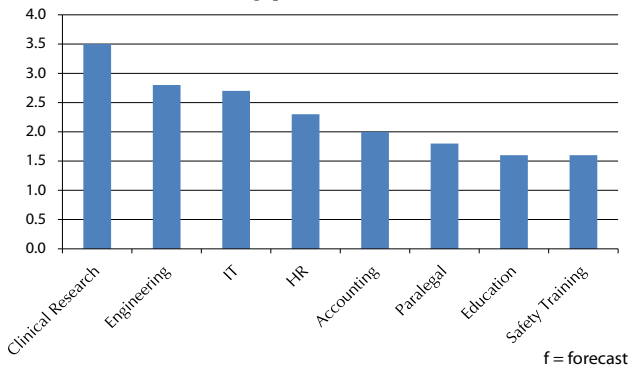
Exhibit 4

Attrition Rates Vary Across Occupations
Percent
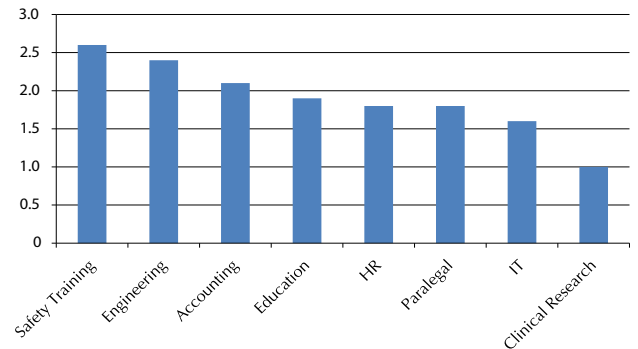
Each of the eight occupations faces significant numbers of workers who will be needed each year over the next decade to accommodate both net job growth or industry expansion and attrition. (See Exhibit 5.) **With respect to absolute numbers, information technology will show the largest number of annual job openings through 2022, averaging more than 2,000 per year. Industry and economic growth will drive this demand, with net job gains accounting for about two-thirds of that amount. Attrition or annual separations will account for only about one-third of the annual number of new openings.**

Exhibit 5

Job Demands Projected to Exceed Potential Supplies
Average, 2013 - 2022f

Occupation	No. People 2012	Net Growth Rate (%)	Attrition Rate (%)	Avg. Net Growth (no.)	Avg. Replacements (no.)	Avg. Total Openings (no.)	Avg. Supply (no.)	Avg. Supply Gap (no.)	Avg. Supply Gap (%)
Accounting	10,450	2.0	2.1	229	219	448	403	45	10
Clinical Research	7,800	3.5	1.0	319	81	401	361	40	10
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Paralegal	3,630	1.8	1.8	71	65	136	125	11	8
Safety Training	870	1.6	2.6	15	23	38	36	2	5

f = forecast

Education will also show a large number of annual job opportunities, averaging over 1,800 per year. In contrast to information technology and most of the occupations, attrition will represent more than half of the openings, as a large number of teachers are expected to retire over the period ahead.

Exhibit 6 details by industry subcategory for each of the eight occupations job demand estimates for 2012, projected net job growth over the next decade, attrition rates, and annual total average openings driven by industry growth and replacement requirements.

Occupation Supplies and Supply Gaps

Based on information collected from San Diego educational institutions reporting actual and expected graduation rates together with employer information on current and projected supplies of workers, the average numbers of individuals expected to be available with the necessary qualifications are projected over the next decade in the different occupations.

Exhibit 6

Occupation Demands by Subcategory
Average, 2013 - 2022f

	Occupation	Sub-industry data		Avg Growth Rate	Attrition Rate	Avg Net Growth	Avg Replace ments	Avg Total Openings
		No. 2012	2022f	%	%	No.	No.	No.
Accounting	Accountant	10,450	12,738	2.0%	2.1%	229	219	448
Clinical Research	Medical Scientists, Except Epidemiologists	5,310	8,013	4.2%	0.6%	270	33	303
	Medical and Clinical Lab Technologists	1,060	1,255	1.7%	1.9%	19	20	40
	Medical and Clinical Lab Technicians	1,430	1,726	1.9%	2.0%	30	28	58
Education	Postsecondary Te achers	13,000	15,847	2.0%	1.6%	285	207	492
	Preschool Teachers and Elementary School Teachers, Except Special Ed	13,140	15,250	1.5%	2.3%	211	308	519
	Middle School Teachers, Except Special and Career/Technical Education	3,420	3,892	1.3%	2.2%	47	75	123
	Secondary School Teachers, Except Special and Career/Technical Education	7,420	8,696	1.6%	2.7%	128	203	331
	Special Education Teachers	1,490	1,695	1.3%	2.5%	21	37	58
	Adult Basic and Secondary Education and Literacy Teachers and Instructors	480	585	2.0%	1.5%	11	7	18
	Self-Enrichment Education Teachers	2,100	2,486	1.7%	2.1%	39	44	83
	Teachers and Instructors, All Other	5,370	6,232	1.5%	0.0%	86	0	86
	Education, Training, and Library Workers, All Other	3,070	3,563	1.5%	2.1%	49	64	114
HR	Compensa tion and Benefits Managers	210	232	1.0%	2.4%	2	5	7
	Human Resources Managers	970	1,171	1.9%	2.4%	20	23	43
	Human Resources Specialists	4,220	5,349	2.4%	1.7%	113	71	184
	Compensation, Benefits, and Job Analysis Specialists	960	1,060	1.0%	1.7%	10	16	26
	Training and Development Specialists	2,010	2,701	3.0%	1.7%	69	34	103
Engineering	Aerospace	1,270	1,503	1.7%	2.2%	23	28	51
	Biomedical Engineers	440	866	7.0%	2.1%	43	9	52
	Chemical Engineers	240	323	3.0%	3.0%	8	7	16
	Civil Engineers	3,700	4,972	3.0%	2.0%	127	76	203
	Electrical and Electronics Engineers	5,810	7,510	2.6%	2.4%	170	140	310
	Environmental Engineers	840	1,185	3.5%	2.1%	34	18	52
	Marine Engineers and Naval Architects	30	38	2.5%	2.1%	1	1	1
	Materials Engineers	200	264	2.8%	2.8%	6	6	12
	Mechanical Engineers	3,480	4,369	2.3%	3.2%	89	112	201
	Nuclear Engineers	450	605	3.0%	2.1%	15	10	25
	Engineers, All Other	3,150	4,233	3.0%	2.1%	108	66	174
IT	Computer and Information Systems Managers	3,790	4,711	2.2%	1.5%	92	58	150
	Computer and Information Research Scientists	930	1,145	2.1%	1.9%	21	17	39
	Computer Systems Analysts	4,450	5,641	2.4%	1.9%	119	83	202
	Computer Programmers	4,190	4,863	1.5%	2.3%	67	97	164
	Software Developers, Applications	7,410	10,153	3.2%	1.0%	274	77	352
	Software Developers, Systems Software	7,150	10,382	3.8%	1.0%	323	75	398
	Database Administrators	930	1,312	3.5%	2.1%	38	20	58
	Network and Computer Systems Administrators	4,030	5,416	3.0%	1.7%	139	68	207
	Computer User Support	5,370	6,610	2.1%	1.9%	124	102	226
	Computer Network Support	1,320	1,625	2.1%	1.9%	30	25	56
	Computer Hardware Engineers	3,640	4,481	2.1%	2.1%	84	76	161
Paralegal	Paralegal	3,630	4,339	1.8%	1.8%	71	65	136
Safety Training	Industrial Health and Safety Engineers	260	305	1.6%	2.2%	4	6	10
	Occupational Health and Safety Specialists	610	715	1.6%	2.8%	10	17	28

Source: FBEI

f = forecast

Supply gaps are indicated for all eight of the professions although in varying degrees. In terms of absolute numbers, information technology will drive the gap in the supply of workers, with an average of 141 people per year (1,410 individuals over the decade) in short supply. Engineers will also be at a significant premium, with an average supply gap estimated to amount to about 110 individuals per year. Education will rank third with about 91 more people demanded than readily available over the next ten years. (See Exhibit 7.)

Adjusting for the size of the occupation, the picture of supply gaps appears significantly different. Although engineering also appears as a major supply problem, with the supply gap equal to 10% of current employment, accounting, and clinical research and trials also are expected to show shortfalls of about 10% of employment. (See Exhibit 8.)

Exhibit 7

IT and Engineering Lead Expected Supply Gaps in Numbers
Average number, 2013-2022f

f = forecast
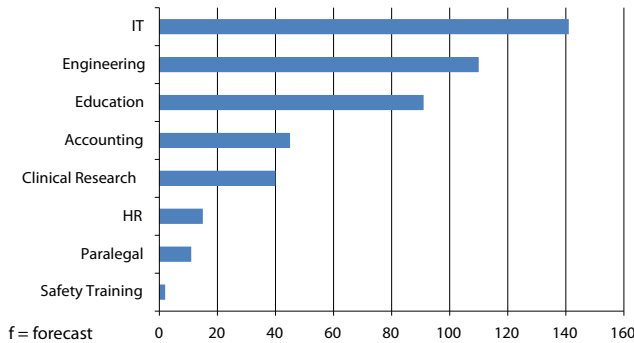
Exhibit 8

Engineering, Accounting, and Clinical Research to Drive Supply Gaps by Percent
Percent of annual job openings, 2013-2022f

f = forecast
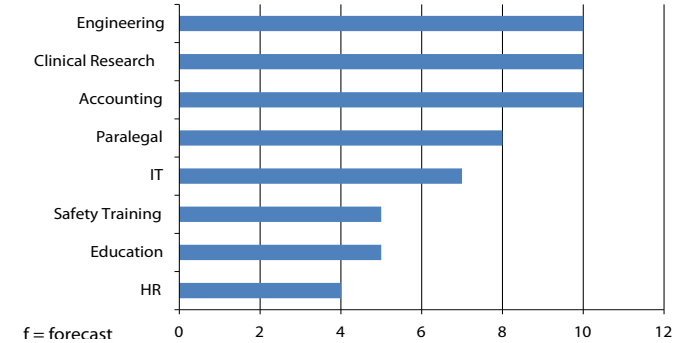
The supply gaps will not be distributed evenly over the next decade. In fact, slack demand and high unemployment may generally persist for the next two to three years. However, even now many employers are reporting shortages of various skill sets, including those of accountants, engineers, teachers, and information technology workers. (See Exhibit 9.) Employers report additional expected shortages going forward across all eight occupations. (See Exhibit 10.)

These potential supply gaps will be closed by a number of factors, including rising wages, possible lost industry expansion to other areas, or the importing of required skills from outside the region. The most constructive solution would be to meet expected occupational demands through an expansion of the facilities and programs required in San Diego.

Exhibit 9

Employers Report Current Shortages
Percent of respondents
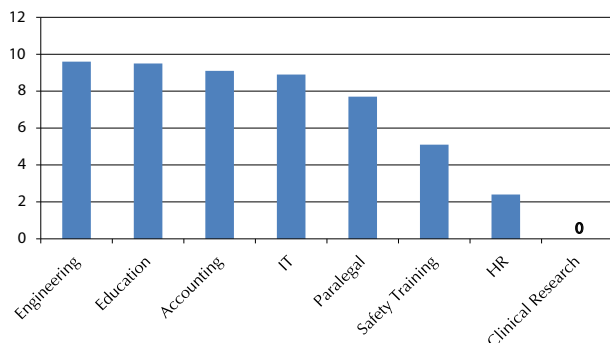
Exhibit 10

Employers Report Expected 10-Year Shortages
Percent of respondents
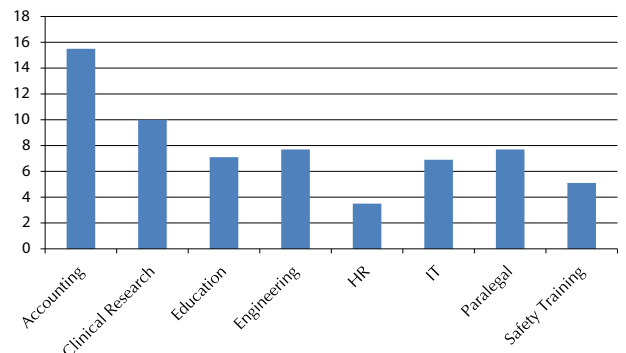
III. OCCUPATION ANALYSIS

This section describes in depth the average wages that can be expected, minimum education requirements, specific credentials that may be required, and industries that employ the different occupations. The analysis is conducted on a sub-occupation basis since most of the eight occupational groups have specific subcategories with significant differences. Exhibits showing numbers of workers, wages, and minimum educational requirements are included in this section. Exhibits indicating the details of required certificates or specialized training and employing industries are included in the Appendix.

ACCOUNTING

Nearly 10,500 individuals work as professional accountants in San Diego. They earn an annual wage averaging about $75,000 a year, which is considerably more than the $51,000 average wage earned by all San Diego employees.

A bachelor's degree is typically required as the minimum level of formal education, including a significant number of specific accounting classes. Most significantly, accounting professionals are required to pass the uniform Certified Public Accountant (CPA) exam. Successful completion of an ethics course and at least one year of experience under the guidance of a licensed CPA are also generally necessary.

Accountants work in a vast number of companies and industries. More than a quarter of them work for accounting and bookkeeping firms that serve a number of firms who do not employ their own full-time accountants but outsource this activity instead. Many accounting professionals also are self employed.

(See Exhibit 11 and Appendix 1a and 1b.)

Exhibit 11

Accountants

Occupation	Number of People*	Mean Annual Wage**	Minimum Requirements:
Accountant	10,450	$75,213	Bachelor's Degree

*May 2012   **1st Quarter 2012

CLINICAL RESEARCH AND TRIALS

A total of 7,800 individuals work as clinical and trial professionals, with the occupation comprising scientists, technologists, and laboratory technicians.

Annual average wages across these subgroups range from $41,000 to $84,000.

Medical scientists in this field typically require a Ph.D., while a bachelor's degree is needed for a technologist. An associate (two-year) degree is generally the level of formal education requested for clinical technicians.

Professionals working in the clinical research and trials field are required to be licensed by the State of California and to have extensive training specialized in the discipline.

The largest number of medical scientists in this field work for scientific research and development firms, followed by hospitals and universities or colleges. Clinical technologists and technicians frequently work for either hospitals or laboratories.

(See Exhibit 12 and Appendix 2a and 2b.)

Exhibit 12

Clinical Researchers

Occupation	Number of People*	Mean Annual Wage**	Minimum Requirements
Medical Scientists, Except Epidemiologists	5,310	$83,953	Ph.D.
Medical and Clinical Lab Technologists	1,060	$69,953	Bachelor's degree
Medical and Clinical Lab Technicians	1,430	$40,631	Associate degree

*May 2012 **1st Quarter 2012

EDUCATION

Approximately 49,500 professionals work in the field of education. They span the gamut from preschool teachers to professors at colleges and universities. Average annual wages range widely from a low of about $28,000 to a high of $82,000.

Although some teaching jobs may require only a high school diploma or experience, many stipulate a bachelor's degree. Positions in higher education require at least a master's diploma. Some teaching positions, such as in self-enrichment courses, require no credential. However, all K-12 public schools necessitate a California teaching credential. For postsecondary education, no credential is required. However, community colleges generally require a master's degree, while universities ask for a Ph.D.

The largest numbers of teachers (about 13,000 each) work in either higher education or in preschools and elementary schools. In postsecondary schools, the largest specific fields of specialization are law, chemistry, and history.

(See Exhibit 13 and Appendix 3a and 3b.)

Exhibit 13

Educators

Occupation	Number of People*	Mean Annual Wage**	Minimum Requirements
Postsecondary Teachers	13,000	$81,533	Master's Degree
Preschool Teachers and Elementary School Teachers, Except Special Ed	13,140	$53,683	Post Secondary Vocational Training
Middle School Teachers, Except Special and Career/Technical Education	3,420	$66,092	Bachelor's Degree
Secondary School Teachers, Except Special and Career/Technical Education	7,420	$68,074	Bachelor's Degree
Special Education Teachers	1,490	$69,622	Bachelor's Degree
Adult Basic and Secondary Education and Literacy Teachers and Instructors	480	$60,214	Bachelor's Degree
Self-Enrichment Education Teachers	2,100	$44,748	Work Experience
Teachers and Instructors, All Other	5,370	$51,800	Bachelor's Degree
Education, Training, and Library Workers, All Other	3,070	$28,300	Bachelor's Degree

*May 2012 **1st Quarter 2012

ENGINEERING

A total of nearly 20,000 individuals in San Diego work in some aspect of engineering. The profession encompasses ten primary subcategories, including aerospace engineers, civil engineers, electrical engineers, mechanical engineers, and environmental engineers. Wages range from an average of about $79,000 for marine engineers to $112,000 for nuclear engineers.

All specialized fields of engineering specify a bachelor's degree as the minimum level of required formal education. Requirements for specific licenses vary significantly across the various sub-professions and among particular firms. For example, many employers may not require a Professional Engineer (PE) certificate, but it may be desired. A PE certificate may also be stipulated for certain types of work, such as that involving the approval of documents or the supervision of other engineers. Some employers may also prefer specific licenses in civil, chemical, geotechnical, mechanical, or nuclear engineering.

Industries employing engineers span a wide array of firms. These include research and development companies, manufacturers of medical equipment and pharmaceuticals, architecture and engineering service consultants, and manufacturers of various types of electronics products.

(See Exhibit 14 and Appendix 4a and 4b.)

Exhibit 14

Engineers

Occupation	Number of People*	Mean Annual Wage**	Minimum Requirements
Aerospace Engineers	1,270	$96,225	Bachelor's Degree
Biomedical Engineers	440	$97,396	Bachelor's Degree
Chemical Engineers	240	$87,617	Bachelor's Degree
Civil Engineers	3700	$87,397	Bachelor's Degree
Electrical and Electronics Engineers	5,810	$102,044	Bachelor's Degree
Environmental Engineers	840	$80,634	Bachelor's Degree
Marine Engineers and Naval Architects	30	$79,152	Bachelor's Degree
Materials Engineers	200	$97,054	Bachelor's Degree
Mechanical Engineers	3,480	$89,941	Bachelor's Degree
Nuclear Engineers	450	$111,781	Bachelor's Degree
Engineers, All Other	3,150	$100,596	Bachelor's Degree

*May 2012   **1st Quarter 2012

HUMAN RESOURCES

About 8,400 professionals work in human resources. These individuals work as either managers or specialists in the areas of compensation, benefits, training and development, as well as the general area of human resources. Average annual salaries range from $63,000 for specialists or analysts to $106,000 for top managers.

Human resource professionals generally are required to have at least a bachelor's degree. In addition, managerial positions demand work experience in the field. While no certificates are generally required for either specialists or managers, some form of human resources certification is typically preferred. The Human Resources Certification Institute (HRCI) awards a number of different types of certificates.

Human resource professionals are scattered across a broad range of San Diego employers. These include companies involved in computer design and equipment, health care, engineering, pharmaceuticals, motion picture or video production, and insurance. The largest numbers of managers or specialists work for management companies or consultants, where their services may be outsourced to other firms.

(See Exhibit 15 and Appendix 5a and 5b.)

Exhibit 15

Human Resource Professionals

Occupation	Number of People*	Mean Annual Wage**	Minimum Requirements
Compensation and Benefits Managers	210	$105,757	Work Experience + Bachelor's Degree
Human Resources Managers	970	$118,850	Work Experience + Bachelor's Degree
Human Resources Specialists	4,220	$65,666	Bachelor's Degree
Compensation, Benefits, and Job Analysis Specialists	960	$63,214	Bachelor's Degree
Training and Development Specialists	2,010	$64,385	Bachelor's Degree

*May 2012   **1st Quarter 2012

INFORMATION TECHNOLOGY

A total of 43,000 people work as Information Technology (IT) professionals in San Diego County. The largest number (about 14,500) work in software development for either applications or computer systems. Other IT professionals work as computer system analysts, programmers, network administrators, network support personnel, and computer hardware engineers. Average annual wages range from about $51,000 to $136,000.

Almost all of the subgroups of IT require a bachelor's degree as a minimum in terms of formal education. An exception may be made for individuals involved in computer user support where only vocational school plus experience are required. Individuals employed as scientists for computer and information research typically need to have a Ph.D. Managers for computer and information systems generally need to have work experience in addition to the four-year college degree.

While certificates are often not required by various firms employing IT professionals, they are becoming increasingly common. Hundreds of different types of certification programs are available. Many product vendors or software companies offer training and certificates and may require that employees working with their products be certified. A number of computer hardware engineers hold a Professional Engineer (PE) license. Many entry level candidates and those aspiring for advancement in computer user or network support may benefit from computer information science certificate programs offered by many community colleges, private schools, and software and hardware vendors.

IT specialists are in high demand across all major industry groups in San Diego. Large numbers of the profession work for firms dedicated to computer systems design and software publishing. Manufacturers of computer equipment, electronics instruments, semiconductors, and various other types of peripheral equipment or components also hire large numbers of IT engineers and professionals. The diversity of employers of IT personnel is demonstrated by employers that include banks, insurance companies, hospitals, accounting firms, colleges and universities, personnel agencies, and utilities.

(See Exhibit 16 and Appendix 6a and 6b.)

Exhibit 16

Information Technology Professionals

Occupation	Number of People*	Mean Annual Wage**	Minimum Requirements
Computer and Information Systems Managers	3,790	$135,936	Work Experience + Bachelor's Degree
Computer and Information Research Scientists	930	$94,097	Ph.D.
Computer Systems Analysts	4,450	$87,923	Bachelor's Degree
Computer Programmers	4,190	$77,180	Bachelor's Degree
Software Developers, Applications	7,410	$100,833	Bachelor's Degree
Software Developers, Systems Software	7,150	$104,629	Bachelor's Degree
Database Administrators	930	$79,860	Bachelor's Degree
Network and Computer Systems Administrators	4,030	$78,121	Bachelor's Degree
Computer User Support	5,370	$51,030	Work Experience + Vocational School
Computer Network Support	1,320	$51,030	Bachelor's Degree
Computer Hardware Engineers	3,640	$103,543	Bachelor's Degree

*May 2012   **1st Quarter 2012

PARALEGAL

Approximately 3,600 individuals work as paralegals in the San Diego region. They earn about $56,000 per year and are generally required to hold only an associate degree from a two-year college or a certificate.

Two different national associations offer certification for paralegals, which are valid for five years and renewable: NALA and NALS. NALA offers the Certified Legal Assistant/ Certified Paralegal (CP/CLA) credential, which also requires 50 hours of continuing legal education credits. NALS offers the Professional Paralegal certification, which stipulates that 75 hours of continuing education credits be earned.

The preponderance, or about 70%, of paralegals work for dedicated law firms. Some may work for management companies, personnel agencies, or insurance carriers as well as a variety of other companies.

(See Exhibit 17 and Appendix 7a and 7b.)

Exhibit 17

Paralegals

Occupation	Number of People*	Mean Annual Wage**	Minimum Requirements
Paralegal	3,630	$55,586	Associate Degree

*May 2012   **1st Quarter 2012

SAFETY TRAINING

Fewer than 900 individuals in San Diego County work in safety training, although many employers are viewing the role as increasingly important. Two primary subcategories characterize the profession: industrial health and safety engineers and occupational and health and safety specialists.

About 250 individuals in San Diego work in the first group as safety engineers. They are typically charged with developing procedures and designing systems to prevent employee illness or injury from chemicals, machinery, or other elements in the workplace. They earn an average annual salary of about $89,000.

Approximately 600 professionals are employed in the second group as safety specialists. These individuals frequently focus on insuring that the employer is adhering to national and state regulations governing safety, health, and the environment. Rules from the Occupational Safety and Health Administration (OSHA) and the California Division of Occupational Safety and Health (Cal/OSHA) are the primary focus. These professional earn salaries averaging approximately $80,000 per year.

Both groups of safety training professionals typically require at least a bachelor's degree in terms of formal academic education. In addition, they each require that individuals hold the Professional Certificate in Occupational Safety and Training. This certificate can be acquired from OSHA training centers, such as that located at UC San Diego Extension.

The largest number of industrial health and safety engineers (about 15%) work for firms involved in construction for utilities or other types of nonresidential building. Engineering firms or technical consulting organizations also hire sizable numbers of these professionals.

Hospitals are the largest employers of occupational health and safety specialists, accounting for about 13% of them. Colleges and universities also employ sizable numbers of these specialists. As for most professions, a large number of other types of organizations may also hire people in this field.

(See Exhibit 18 and Appendix 8a and 8b.)

Exhibit 18

Safety Professionals

Occupation	Number of People*	Mean Annual Wage**	Minimum Requirements
Industrial Health and Safety Engineers	260	$89,003	Bachelor's Degree
Occupational Health and Safety Specialists	610	$80,344	Bachelor's Degree

*May 2012   **1st Quarter 2012

IV. EDUCATIONAL AND TRAINING RESOURCES IN SAN DIEGO

Nearly 30 educational or training institutes offer programs supporting a variety of the eight professions covered in this study in San Diego County. These encompass community colleges, public universities, private universities, online providers, University Extension programs, and specialty programs. (See Exhibit 19.)

Exhibit 19*

Education & Training Providers in San Diego County								
Provider Name	Accounting	Clinical Research	Education	Engineering	HR	IT	Paralegal	Safety Training
Art Institute of California - San Diego						X		
Ashford University	X		X		X	X		
Azusa Pacific University			X					
Brandman University	X		X					
California State University, San Marcos	X	X	X	X	X	X		
Coleman University						X		
Cuyamaca College	X		X	X		X	X	
Grossmont College	X		X	X				
ITT Technical Institute - San Diego						X		
Keller Graduate School of Management	X					X		
Mira Costa College	X		X	X		X		
National University	X	X	X	X	X	X		
Palomar College	X		X	X		X		X
Point Loma Nazarene University	X	X	X	X	X	X		
San Diego Christian College			X					
San Diego City College	X		X			X		
San Diego Mesa College	X		X	X		X		
San Diego Miramar College	X		X	X		X	X	
San Diego State University	X	X	X	X	X	X		
San Diego State University Continuing Ed	X	X	X	X	X	X		X
San Diego Univ. for Integrative Studies	X					X		
Southwestern College	X		X	X		X		X
The Accounting Academy	X							
UCSD			X	X				
UCSD Extension	X	X	X	X	X	X	X	X
University of Phoenix	X		X			X		
University of San Diego	X		X					
University of San Diego Continuing Ed			X				X	
TOTALS	21	6	22	14	7	20	4	4

* Graduation requirements, degree or program descriptions, and course titles or descriptions may vary across institutions.

The education, accounting, and information technology (IT) professions have access to the largest numbers of providers, with 20 institutions serving each professional field. Engineering coursework and training is offered by fourteen San Diego facilities. The smallest numbers of skill providers are for paralegals and safety training facilities (four each). (See Exhibit 20.)

Exhibit 20

Educational Institutes Serve All Disciplines
Number, 2012
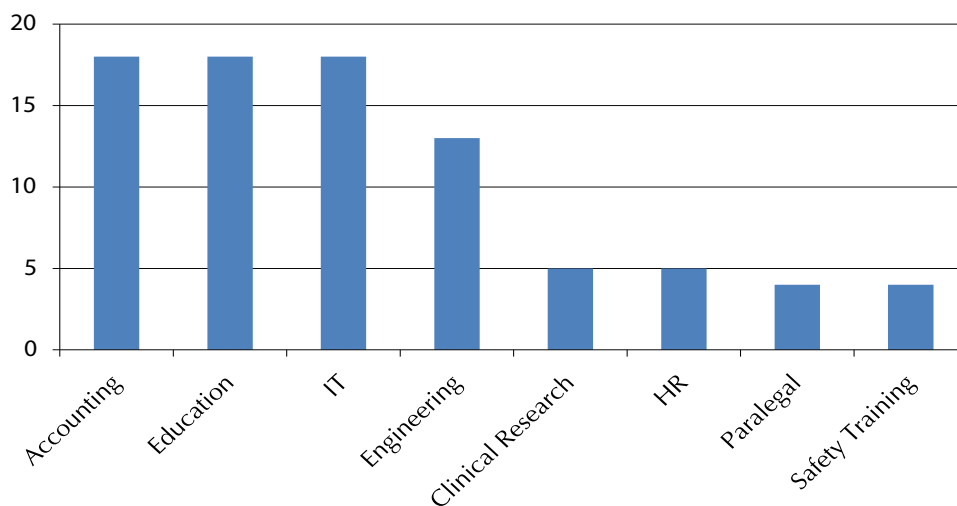
Community Colleges

Eight community colleges are spread throughout San Diego County. Listed south to north, these are: (1) Southwestern College, (2) San Diego City College, (3) Cuyamaca College, (4) San Diego Mesa College, (5) Grossmont College, (6) San Diego Miramar College, (7) Palomar College, and (8) Mira Costa College. Two of the community colleges (Cuyamaca and Miramar) have paralegal certificate or associates degree programs and three of the community colleges (Cuyamaca, Palomar, and Southwestern) offer courses and certificates in safety training. In terms of the other six occupation groups, the community colleges primarily provide general education courses for transfer to four-year colleges and universities.

Public Universities

Three public universities are located in San Diego County. Listed south to north, these are: (1) San Diego State University (SDSU), (2) University of California at San Diego (UCSD), and (3) California State University San Marcos. The public universities provide undergraduate and graduate degrees in accounting, clinical research and trials, education, engineering, human resources, and IT. The public universities also offer teaching credential programs for students choosing to teach in the California public K-12 system.

Private Colleges and Universities

Two major private religious universities are based in San Diego County: Point Loma Nazarene University and University of San Diego (USD). These private religious universities provide undergraduate and graduate degrees in accounting, clinical research and trials, education, engineering, human resources, and IT. These two universities also offer teaching credential programs for students choosing to teach in the California public K-12 system. San Diego Christian College and Azusa Pacific University, private religious institutions as well, have smaller education and teaching credential programs.

Brandman University, part of the Chapman University System, offers programs in both accounting and education.

Primarily online educational providers include National University, Ashford University, and the University of Phoenix. These universities offer programs in accounting, education, human resources, IT, and a number of other fields.

University Extension

Three of the major universities in San Diego County offer programs related to the eight occupation groups through their continuing education/extension centers. UCSD Extension offers certificates and courses in all eight of the occupation groups. SDSU Continuing Education has programs in all areas, except for paralegals. USD Continuing Education offers certificates and courses in the fields of education and paralegal.

Specialty Schools

Three private institutions of higher learning in San Diego County offer certificates and degrees specifically geared toward IT: (1) Art Institute of California, (2) Coleman University, and (3) ITT Technical Institute. As its name suggests, The Accounting Academy focuses exclusively on accounting. This school offers a training program with course emphasis on small business accounting. Keller Graduate School of Management and San Diego University for Integrative Studies offer certificates and degrees in accounting and IT.

V. THE EMPLOYEE PERSPECTIVE

A view of the current status of individuals employed in the eight different occupations in San Diego provides important insights as to the background, career paths, and resources for various professionals in the region.

Degrees and Experience

The survey of employers of the eight occupations shows that most employees have a bachelor's degree or more even if it is not an absolute requirement for employment where they work. Close to 90% of human resource professions and accountants have at least a four-year degree. Sixty percent or more of all of the other professions also have a bachelor's or higher degree. The lowest incidence of higher education is in individuals employed in supporting clinical research and trials, where a third of the professionals have a bachelor's degree. (See Exhibit 21.)

The survey of employees working in the various eight different occupations indicates a significant amount of continuity. More than half of them indicate that they have held the same position for more than a decade. This kind of consistency may be necessary to gain the experience required for advancement. It also suggests that many of these individuals find their employment challenging and rewarding, although the recent recession has reduced the incentive of employees to leave their current positions for work elsewhere. (See Exhibit 22.)

Exhibit 21

Most Employees Have at Least a Bachelor's Degree
Percent of respondents
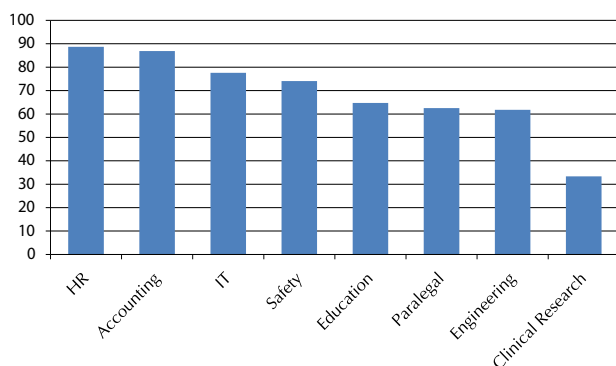
Exhibit 22

Most Employees Have Held the Same Position for Over a Decade
Percent of respondents
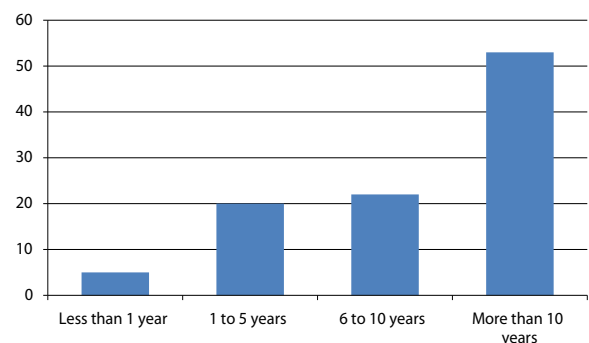
Academic Career Paths

Individuals in the various professions have generally, but not always, followed academic paths with specific fields of study that appear closely related to their current work. 90% of the bachelor's degrees earned by accountants, for example, were in business, while the other 10% were in computer sciences. All of the master's degrees received by accountants were in business. (See Exhibits 23a-d.)

For clinical researchers, half of the bachelor's degrees were in mathematics, but the other half were in social sciences. Master's degrees were often in other areas, such as biomechanics.

Educators typically earned their undergraduate degrees in humanities, social sciences, or education. Higher degrees have tended to be more concentrated specifically in education. Engineers have generally been linear in their pursuit of the field, with a preponderance of

bachelor's, master's, and higher degrees focused on the engineering discipline. Human resource professionals frequently have followed a business course of study as undergraduates and graduates, although social sciences have often been common. Education has also been important for those pursuing degrees beyond the master's.

Individuals working in information technology show a dispersion of disciplines in their bachelor's degrees, encompassing engineering, business, computer sciences, and humanities. Master's degrees have been more concentrated in either computer sciences or engineering.

All of the paralegals surveyed indicated that their undergraduate degrees were in social sciences. Undergraduate degrees for safety professionals have ranged from computer sciences to physical education.

Exhibit 23a

Associate's Degree Fields of Study
Percent of Respondents

	Accountant	Safety Professional	Paralegal	IT	HR	Engineer	Educator	Clinical Researcher
Humanities	NA	0%	0%	NA	NA	0%	29%	NA
Social Sciences	NA	0%	0%	NA	NA	33%	29%	NA
Business	NA	0%	0%	NA	NA	33%	14%	NA
Mathematics	NA	0%	0%	NA	NA	33%	14%	NA
Education	NA	0%	0%	NA	NA	0%	14%	NA
Other:	NA	100%	100%	NA	NA	0%	0%	NA
Grand Total	**NA**	**100%**	**100%**	**NA**	**NA**	**100%**	**100%**	**NA**

NA = not applicable

Exhibit 23b

Bachelor's Degree Fields of Study
Percent of respondents

	Accountant	Safety Professional	Paralegal	IT	HR	Engineer	Educator	Clinical Researcher
Humanities	0%	0%	0%	17%	6%	0%	24%	0%
Social Sciences	0%	0%	100%	0%	24%	2%	26%	50%
Computer Sciences	10%	50%	0%	17%	0%	4%	1%	0%
Engineering	0%	0%	0%	33%	0%	81%	1%	0%
Business	90%	0%	0%	33%	53%	0%	6%	0%
Natural Sciences	0%	0%	0%	0%	6%	8%	9%	0%
Mathematics	0%	0%	0%	0%	0%	0%	6%	50%
Education	0%	0%	0%	0%	0%	0%	19%	0%
Other:	0%	50%	0%	0%	12%	4%	9%	0%
Grand Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Exhibit 23c

Master's Degree Fields of Study
Percent of respondents

	Accountant	Safety Professional	Paralegal	IT	HR	Engineer	Educator	Clinical Researcher
Humanities	0%	NA	NA	0%	0%	0%	5%	0%
Social Sciences	0%	NA	NA	0%	17%	0%	8%	0%
Computer Sciences	0%	NA	NA	50%	0%	0%	1%	0%
Engineering	0%	NA	NA	50%	0%	90%	0%	0%
Business	100%	NA	NA	0%	83%	7%	4%	0%
Natural Sciences	0%	NA	NA	0%	0%	0%	4%	0%
Education	0%	NA	NA	0%	0%	0%	71%	0%
Other:	0%	NA	NA	0%	0%	3%	7%	100%
Grand Total	**100%**	**NA**	**NA**	**100%**	**100%**	**100%**	**100%**	**100%**

NA=not applicable

Exhibit 23d

Doctoral Degree Fields of Study
Percent of respondents

	Accountant	Safety Professional	Paralegal	IT	HR	Engineer	Educator	Clinical Researcher
Humanities	NA	NA	NA	NA	0%	0%	8%	NA
Social Sciences	NA	NA	NA	NA	50%	0%	17%	NA
Computer Sciences	NA	NA	NA	NA	0%	0%	8%	NA
Engineering	NA	NA	NA	NA	0%	100%	0%	NA
Natural Sciences	NA	NA	NA	NA	0%	0%	17%	NA
Education	NA	NA	NA	NA	50%	0%	50%	NA
Grand Total	**NA**	**NA**	**NA**	**NA**	**100%**	**100%**	**100%**	**NA**

NA = not applicable

Individuals employed in various aspects of engineering are generally, but not universally, licensed. About two-thirds of the engineers surveyed indicate that they hold a license, while the remaining third say that they do not hold one. Of course, some of these differences reflect different requirements among some of the various classes or specific types of engineers. (See Exhibit 24.)

Exhibit 24

Most Engineers Are Licensed
Percent of respondents

No
35%

Yes
65%
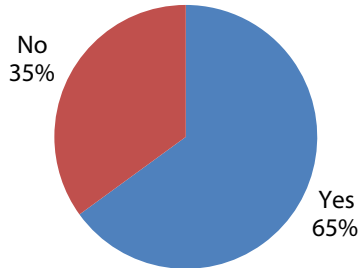
Exhibit 25

Highest Level of Education Mainly Attained in San Diego
Percent of respondents

No
36%

Yes
64%
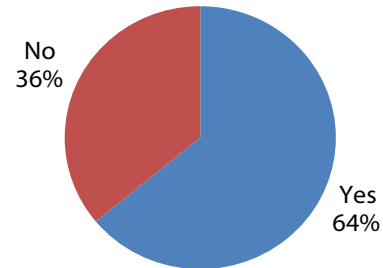
Where have the individuals working in the various eight occupations received their highest levels of education or most advanced degrees? **The survey suggests that although the majority of the degrees (over 60%) have been earned in San Diego, a sizable number (over 35%) have been granted from institutions outside the region.** This finding indicates that a significant amount of the professional training or education required for the eight occupations is being provided by non-San Diego facilities or providers. (See Exhibit 25.)

Ongoing Education and Training

Employees see education and training as important and strategic investments in their professional progress. On a scale of 1 to 5, with 1 indicating "no use" and 5 signaling "very useful", scores for education and training beyond an associate's degree average between about 4.1 and 4.5. Their employers also assign high ratings to education and training beyond a degree from a junior college. (See Exhibit 26 and Exhibit 27.) An associate's degree is typically viewed as primarily useful for paralegals and safety engineers.

Exhibit 26

Employees and Employers Value Education and Training
Average ranking on 1-5 scale

Category	Employee	Employer
Conferences and workshops	4.53	4.15
Graduate degree	4.40	3.84
In-house training	4.17	4.25
Continuing education	4.11	3.89
Bachelor's degree	4.10	4.23
Associate's degree	3.33	3.26
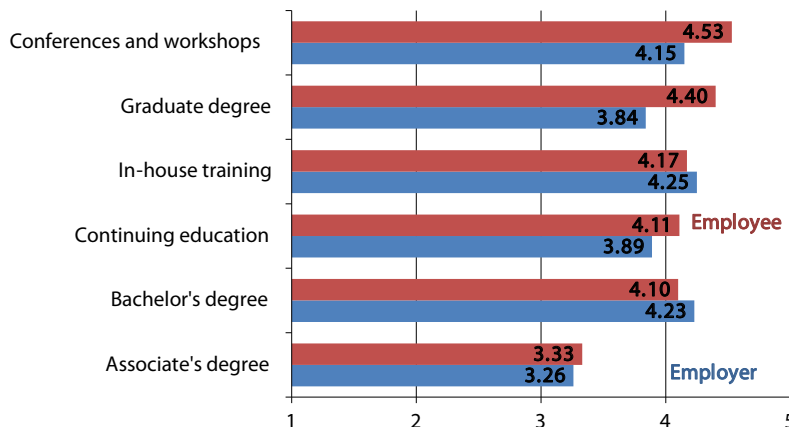
Exhibit 27

Employees' Ranking of Education and Training Opportunities
Scale 1-5*

	Associate's	Bachelor's	Graduate	In-house	Continuing Ed	Conferences
Accountant	NA	4.44	3.67	4.33	NA	4.50
Safety Professional	4.00	4.00	NA	5.00	NA	5.00
Paralegal	4.00	4.33	NA	3.33	5.00	5.00
IT	NA	3.40	4.50	4.50	5.00	4.50
HR	NA	4.24	4.57	4.33	4.55	4.75
Engineer	2.33	4.10	4.50	4.29	3.88	4.35
Educator	3.57	4.06	4.36	4.02	4.00	4.55
Clinical Researcher	NA	4.50	5.00	5.00	4.67	5.00
Average Score	3.33	4.10	4.40	4.17	4.11	4.53

*1=no use, 2=limited use, 3= neutral, 4=useful, 5=very useful, NA =not applicable

The importance of education and training acquired after the formal academic degree or degrees are granted is particularly striking. Employees give their top rating (about 4.5) to conferences and workshops, which also receives a relatively high rating (4.2) from their employers. Both employees and their employers also give one of their top three ratings (4.2 for each) to in-house training.

Accountants place the greatest value on bachelor's degrees or industry conferences and workshops. In-house training is also deemed as important. Clinical researchers all give 5.0 ratings to graduate degrees, in-house training, and industry conferences.

Educators place the highest value on conferences specific to their fields, followed by graduate degrees. Engineers agree that these two areas—graduate degrees and conferences—have been the most useful, although the formal degree has been the more important of the two from their perspective. For engineers, in-house training ranks a close third in its perceived value.

Industry conferences, graduate degrees, and continuing education rank highly in terms of their relevance for human resources professionals. IT professions give continuing education a perfect 5.0 score in their assessment, as rating that is shared by paralegals. Paralegals also ascribe a 5.0 rating to conferences and workshops

Safety professionals give their 5.0 ratings to both in-house training and industry conferences.

As indicated above, employees place considerable value on continuing education. About seven out of every ten of the employees surveyed indicate that such training or education has been highly relevant or specific to their current job or position. Only about three of ten report that this additional study has not been tightly linked to the field where they

Exhibit 28

Most Employees Receive Job-Specific Continuing Education
Percent of respondents

No
29%

Yes
71%
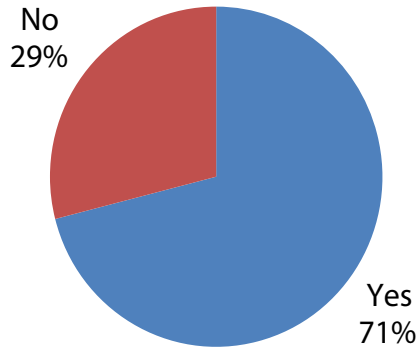
currently work. (See Exhibit 28.)

Employees report wide discrepancies in terms of the financial support for ongoing education. While slightly more than half of the employers pay the full or partial cost of continuing education, forty percent provide no support. These results indicate a substantial disparity in the options available to professionals. The survey results do indicate that employers place a sizable value on ongoing education, but many may believe that such training may benefit the employee more than the firm and are therefore unwilling to make the required investment. (See Exhibit 29.)

Exhibit 29

Funding for Continuing Education Varies
Percent of respondents
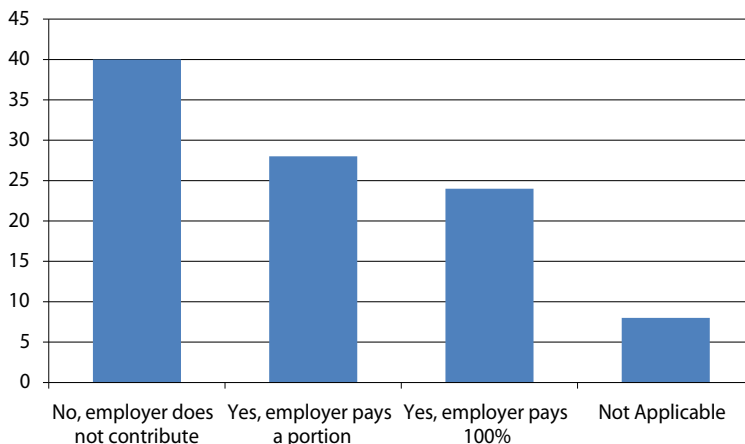
VI. UNIVERSAL SKILL GAPS

In addition to the possible shortages of the particular skills, education, or training required for various specific occupations, San Diego also faces a continued deficiency in terms of some of the more general qualifications or aptitudes that companies need across a broad array of industries. These include both "hard" skills, such as quantitative and technological capabilities, as well as "soft" skills, such as creative thinking and speaking abilities.

Data compiled from surveys of both personnel agencies and companies in the San Diego region reveal significant deficiencies in a number of these areas. Two-thirds of personnel agencies report that candidates often lack the technological skills necessary to compete in today's marketplace. One-half of these agencies also cite poor writing skills as a major deficiency among job seekers or candidates. A third of the agencies indicate sizable gaps both in speaking abilities and quantitative capabilities. (See Exhibit 30.)

Among employers, writing skills are identified as the primary deficiency among workers, with more than half of the survey firms indicating it as a problem. Shortfalls in terms of critical thinking are the second most common complaint among employers, with 45% of them identifying it as a shortfall. A third of the firms point to both creative thinking and technology skills as not being up to par. Speaking skills are also pointed to as a significant shortcoming.

The gaps in terms of so many of these hard and soft skills indicate a major problem in San Diego's current and future workforce, which could curb the region's productivity, competitive advantage, and ability to grow.

Exhibit 30

Basic Skills Are Deficient
Percent of survey respondents
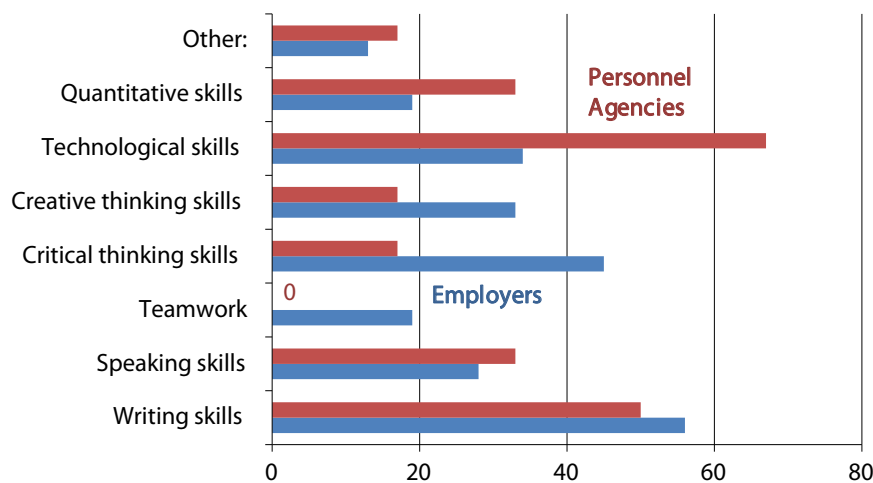
Proficiency in an additional language will likely enhance the universal skills of an employee. However, the specifics of that skills enhancement were beyond the scope of this study and will likely need additional research.

VII. METHODOLOGY

The primary source of data and information for this study were surveys distributed to four unique groups of the occupational spectrum: (1) employees, (2) employers, (3) personnel agencies, and (4) colleges and universities that provide training for the eight occupation groups included in this study

Survey Process

The FBEI of PLNU created the survey questions that were tailored to each of the specific professions. UCSD Extension and the San Diego Workforce Partnership (SDWP) each provided feedback. UCSD Extension helped to distribute the survey to the contact lists that were compiled for each of the four different constituent groups. The occupation groups that were covered by the surveys were: (1) accountants, (2) clinical researchers, (3) educators, (4) engineers, (5) human resource professionals, (6) IT professionals, (7) paralegals, and (8) safety training professionals. The survey questions distributed to each of the four groups focused solely upon these eight occupations.

The employer survey was primarily targeted toward San Diego County companies that have 25 employees or more, as companies of this size are more likely to have at least one full-time employee working in one of the occupation groups being studied. However, some smaller firms that specialize in one of the eight occupation groups were also part of the sample. The survey was distributed to members of contact lists of the FBEI, the San Diego Regional Chamber of Commerce, and the San Diego Economic Development Corporation (EDC). Employers were asked to identify the size of their organization and which industry group they principally represent. They were then asked to identify which of the eight occupation groups they employ in San Diego County, the number of relevant employees, and what they expect growth to be in each occupation group over the next 10 years. Employers were asked to specify their preferred degree/training for each relevant occupation they employ.

The employers were also asked to rank sources of training for their employees in terms of importance. These sources included degree coursework, in-house training, continuing education, and conferences/workshops hosted by a third party. Employers were then asked to identify the subcategories they employ (occupations) and to indicate any shortages they were currently experiencing or expect to see in the future. The employer respondents were then asked to note any general skills (including: writing, speaking, quantitative, etc.) that they feel are lacking in current employees within these occupations. Responses from employers totaled 178.

The employee survey was distributed to people who currently hold positions in San Diego County in the eight occupation groups. Potential survey respondents were compiled by accessing the alumni networks of major universities and colleges throughout the county, by contacting professional associations in these occupations, and by asking employers responding to the employer survey to forward the employee survey to their workers.

The surveys directed respondents into subcategories of the eight occupation groups. Questions to the employee respondents included how long they had been working in the particular profession and the type of firm (public, private) in which they are employed. Questions regarding employee education included what type and level of college degree(s) they have earned and whether or not their highest degree was completed in San Diego

County. Survey respondents were asked if (and where) they had obtained any continuing education (non-degree) specific to their job. Survey respondents were asked to rank the importance of their degrees/training with regard to their ability to perform in their current occupation. Employees were asked if they receive any funding assistance from their employer for continuing education, training certificates, or additional degrees. Responses from employees totaled 326.

The survey that was distributed to personnel agencies was similar to the employer survey. The agencies were asked to identify the specific type of placement they specialize in (executive search firm, temp agency, etc.) As in the employer survey, the personnel agencies were requested to highlight the general skills they find to be lacking in individuals seeking employment in the given occupations (writing, speaking, quantitative, etc.). Agencies were also asked to identify whether or not they had placed workers in the eight occupation groups, how many workers had been placed in each group, and whether or not these were mostly full-time positions. The agencies were asked if there was a current or expected shortage for people with the skill set for these occupation groups. Six San Diego personnel agencies responded to the survey (a response rate of nearly 38%).

The university and college survey asked respondents to identify their specific type of institution (community college, professional school, technical school, four-year university with graduate programs, etc.). The survey asked which programs the institution offered related to the eight occupation groups, the number of students who graduated in 2012 with a degree in each of those occupation groups, and the expected average number of graduates per year over the next ten years. Occupations were then identified from the programs that were offered, and the institution indicated whether or not those specific occupations were in high demand. Institutions were then asked what type of funding assistance students of the eight occupation groups typically receive. There were 10 educational institutions that responded to the survey (a response rate of nearly 42%).

The surveys varied widely in responses. The results of the employer survey are most indicative of the demand side of employment in San Diego County, while the employee and educational institution surveys indicate more of the supply side of the employment market. The personnel agency survey gives a unique perspective of both the demand and the supply side of the job market, but only for those seeking assistance in finding a job or filling a position. The results of the surveys collectively represent a valuable perspective on the job market for the eight professions in San Diego County. (See Appendices 9-12 for surveys.)

Other Data

Each of the eight professions was divided into specific subcategories. For example, the engineering occupation has eleven subgroups, including aerospace engineers, civil engineers, environmental engineers, materials engineers, mechanical engineers, and nuclear engineers. For the overall study, a total of 43 specific occupations were analyzed.

Key data on current employment, average wages, industry employers, minimum educational requirements, and required credentials was obtained from the California Employment Development Department (EDD), Labor Market Information Division. The Standard Occupational System (SOC) developed by the U.S. Bureau of Labor Statistics (BLS) was used to classify the various occupations. Much of the data provided by California's EDD is developed in coordination with the national BLS.

Demand and Supply Projections

The number of workers expected to be demanded by San Diego employers over the next ten years through 2022 was developed for each of the eight professional groups and all of the sub-occupations. First, an average 10-year demand growth rate for each group was developed based on occupational projections by the EDD, information from surveys of employers, and forecasts made by the FBEI. These projections reflect views on the overall economy, industry specific demands, technological factors, and other drivers. The resulting forecasts produced an average net job growth over the next decade, expected job levels for each of the next ten years, and an average net new demand number for each sub-profession over the coming decade.

Attrition or separation rates were also estimated for all of the various sub-professions based on estimates made by the EDD and FBEI. The total average number of individuals demanded for all 43 sub-professions was then calculated as the sum of net job additions plus replacement demands.

Information on the expected supply and the relation of those supplies relative to expected demand for the different occupations was based on survey information collected from schools, employers, and personnel agencies. Because information on the potential supply of the different occupations was less granular than on the demand side, forecasts were made for each of the overall eight professional groups.

This forecast process developed the projections on the average number of individuals that will be in demand for the eight professions, the expected supplies, and the supply gaps that are identified and discussed in Section II of the report.

VIII. CONCLUSIONS AND RECOMMENDATIONS

This study indicates that the San Diego region faces potential supply gaps over the coming decade in all eight of the primary occupations under review: accounting, clinical research and trials, education, engineering, human resources, informational technology (IT), paralegal, and safety training. Such gaps will not be spread evenly over the next ten years as high unemployment and a general slack in the labor market are likely to persist over the next two to three years. Later in the decade, companies could face greater difficulties in finding qualified workers for key positions.

In absolute numbers, information technology will lead the gap in the supply of workers, followed by engineers and education. In percentage terms or adjusting for different occupation sizes, engineering, accounting, and clinical research and trials are expected to show the greatest shortfalls.

Forces will come into play to close these gaps if preventative actions are not taken. Wages could rise appreciably, companies could target their expansion plans outside of the region, or key personnel could be recruited from outside San Diego. However, the adoption of policies and steps to allow San Diego to meet any shortfalls of necessary talents and capabilities would clearly be of the greatest benefit to the region.

This study also found deficiencies in several critical basic aptitudes or skills affecting most or all of the occupational groups. These include capabilities or competence in technology, writing, speaking, quantitative tools, critical reasoning, creative thinking, and speaking. These general hard and soft skills need to also be addressed.

Several recommendations or policy actions could help alleviate some of the region's labor market gaps over the next decade.

> **More educational institutions in the San Diego region need to offer programs** in some of the occupations that now have only limited resources for education and training. These include clinical research, human resources, paralegal preparation, and safety training.

> Although a sizable number of academic and training facilities have programs in accounting, education, engineering, and information technology, **these programs may need further expansion** to meet the growing demand for these critical workers.

> **Academic institutions need to place a greater emphasis on incorporating basic skills**, such as quantitative techniques, writing, speaking, critical thinking, and creativity, into their core curricula for all specific programs.

> **The San Diego Workforce Partnership (SDWP) might consider sponsoring programs to help develop these universal hard and soft skills**. Professional organizations for the various occupational groups should also consider hosting or sponsoring seminars featuring these various basic skills.

> **High school counselors and teachers should be encouraged to alert students to the opportunities in the job market that will be in high demand during the next decade**, such as engineering, IT, accounting, and education. This could help shape young people's aspirations and plans for higher education.

> **High school programs also need to do a better job in developing the various basic skill sets**, including quantitative techniques, writing, speaking, critical thinking, and creativity.

> **College general, career, and job counselors should emphasize the major areas for job demands to freshmen and other students in their early years of higher education**. While a broad based fundamental education can be invaluable, specific capabilities that can be harnessed for opportunities in the job market will be important.

> **Returning veterans should be directed to consider the eight occupations** addressed in this study and made aware of the requirements and resources available to enter and advance in those fields.

> **The autistic population offers a promising source of workers for software programming**, testing, and other IT work. SAP and Auticon in Europe are already tapping into this talent pool of individuals because of their intelligence and powers of observation and concentration.

> More **employers should consider helping their employees with funding for ongoing education**. A company's employees generally represent its most important asset and investment in them will yield valuable returns.

> Elementary, middle, and high schools need to not only continue to place a **greater emphasis on science, technology, engineering, and mathematics (STEM) education, but greater efforts need to be made to remove some of the stigma** frequently surrounding students who focus on those programs. A cultural divide is apparent in many schools, where students who concentrate on these fields are considered as "nerds", causing others to eschew those fields to be more socially acceptable. This is an issue that parents need to become vitally involved with to reverse.

> A much **tighter linkage needs to be forged between employers and educational facilities** to ensure that the courses, curricula, and training they are providing match the specific occupational skills and more general capabilities that are needed in the workplace. The San Diego Regional Chamber of Commerce and or the Economic Development Corporation might conduct surveys every two years to assess the expected demands for various occupations and to report on various shortages. The SDWP could play a pivotal role facilitating or funding these updates and also in setting up clearer channels of communications between employers and the various providers of educational resources in the region.

San Diego is known for its emphasis on collaboration. **The cooperation and communication among companies, personnel agencies, academic institutions, and policy leaders can address the potential shortcomings in the job market that might otherwise constrain growth in the period ahead. Proactive steps can help the San Diego region remain on the leading edge in various economic sectors and to realize its full growth potential.**

APPENDIX

Accounting Industry
Percent employed in San Diego

Employer Type	% of Occupation
Accounting and Bookkeeping Services	26.0%
Management of Companies and Enterprises	4.7%
Computer Systems Design and Rel Services	2.6%
Management & Technical Consulting Services	2.6%
Office Administrative Services	1.7%
Architectural and Engineering Services	1.5%
Employment Services	1.4%
Activities Related to Real Estate	1.4%
Electronic Markets and Agents/Brokers	1.1%
General Medical and Surgical Hospitals	1.1%
Scientific Research and Development Services	1.0%
Other Financial Investment Activities	1.0%

> *Most common industries represented, percentages may not add to 100%*

Accounting Certifications

Occupation	Certification
Accountant	**CPA requirements (2014 and beyond):** A bachelor's degree with 150 semester units (or 225 quarter units) 24 semester units in accounting-related subjects 24 semester units in business-related or further accounting classes Passing the Uniform CPA Exam Passing an ethics course One year of general accounting experience supervised by a licensed CP

Medical and Clinical Lab Technicians
Percent employed in San Diego

Employer Type	% of Occupation
General Medical and Surgical Hospitals	48.4%
Medical and Diagnostic Laboratories	20.7%
Offices of Physicians	10.0%
Colleges and Universities	8.9%
Outpatient Care Centers	2.6%
Other Ambulatory Health Care Services	2.3%
Scientific Research and Development Svc	2.0%

Medical and Clinical Lab Technologists
Percent employed in San Diego

Employer Type	% of Occupation
General Medical and Surgical Hospitals	57.4%
Medical and Diagnostic Laboratories	24.3%
Offices of Physicians	6.4%
Scientific Research and Development Svc	2.8%
Other Ambulatory Health Care Services	1.9%
Colleges and Universities	1.3%

Medical Scientists
Percent employed in San Diego

Employer Type	% of Occupation
Scientific Research and Development Svc	38.7%
General Medical and Surgical Hospitals	18.7%
Colleges and Universities	16.4%
Pharmaceutical & Medicine Manufacturing	11.2%
Offices of Physicians	2.1%
Management & Technical Consulting Svc	2.1%
Medical and Diagnostic Laboratories	1.8%

> *Most common industries represented, percentages may not add to 100%*

Clinical Research Certifications

Occupation	Certifications
Medical Scientists, Except Epidemiologists	In California, Medical Scientists are required to have a state license. In addition, documentation from a professional certification agency is necessary before a license is issued. California does not recognize any other State licenses. Certification can be obtained through the following agencies: the American Society for Clinical Pathology (ASCP) Board of Certification (BOC), offering certification for medical laboratory professionals; the American Board of Medical Genetics, offering certification in clinical biochemical genetics clinical cytogenics, and clinical molecular genetics; and the American Board of Clinical Chemistry, offering certification in clinical chemistry and toxicological chemistry and molecular diagnostics.
Medical and Clinical Lab Technologists	Completion of a bachelor's degree is followed by a 12-month CDPH approved CLS training program or a 12 -month National Accrediting Agency for Clinical Laboratory Sciences (NAACLS) training program in a clinical laboratory approved by the CDPH. All candidates accepted into a clinical training program must first obtain a trainee license from the CDPH. A renewable training license will be issued once a bachelor's degree is obtained and final transcripts have been confirmed. Most programs will interview and accept students before they have received their trainee license as long as they will have their license prior to actually starting training programs. Upon successful completion of the 12-month CLS training program, participants are awarded the Clinical Laboratory Science/Medical Technology Certificate. Certified candidates then take the California CLS licensing exam and one of the certification exams offered by the American Society of Clinical Pathology. After a trainee has passed the required examinations, they may apply for California licensure through CDPH.
Medical and Clinical Lab Technicians	Medical Laboratory Technicians must be licensed to work in the State of California. To obtain licensure, applicants must submit an MLT license application and pay the appropriate fees as well as pass the Medical Laboratory Technician Certifying Organization examination administered by the American Association of Bioanalysts (AAB) or the American Society of Clinical Pathologists (ASCP). The licensing process generally takes 150 days once the completed MLT license application and official documents, such as college transcripts or documentation of MLT training or experience, is received. In addition, candidates must renew their licenses every two years. Certification may be a prerequisite for jobs and is often is necessary for career advancement. Medical Laboratory Technicians may hold one or several certificates such as Medical Laboratory Technician, Phlebotomy Technician, Pathologist Assistant, Patient Care Technician, and Registered Vascular Technologist. Some employers require MLTs to be certified in cardiopulmonary resuscitation (CPR).

Postsecondary Teachers
Percent employed in San Diego

Employer Type	% of Occupation
Postsecondary Teachers, All Other	19.3%
Health Specialties Teachers, Postsecondary	10.5%
Vocational Education Teachers, Postsecondary	10.0%
English Language and Literature Teachers, Postsecondary	7.6%
Art, Drama, and Music Teachers, Postsecondary	5.9%
Biological Science Teachers, Postsecondary	5.3%
Mathematical Science Teachers, Postsecondary	5.2%
Psychology Teachers, Postsecondary	4.7%
Business Teachers, Postsecondary	4.5%
Computer Science Teachers, Postsecondary	3.5%
Nursing Instructors and Teachers, Postsecondary	2.8%
Education Teachers, Postsecondary	2.8%
Engineering Teachers, Postsecondary	2.7%
Communications Teachers, Postsecondary	2.4%
Law Teachers, Postsecondary	1.9%
Chemistry Teachers, Postsecondary	1.6%
History Teachers, Postsecondary	1.5%
Social Sciences Teachers, Postsecondary, All Other	1.2%
Philosophy and Religion Teachers, Postsecondary	1.2%
Physics Teachers, Postsecondary	1.1%
Political Science Teachers, Postsecondary	1.0%
Area, Ethnic, and Cultural Studies Teachers, Postsecondary	0.9%
Economics Teachers, Postsecondary	0.9%
Sociology Teachers, Postsecondary	0.8%
Anthropology and Archeology Teachers, Postsecondary	0.6%

Pre-school and Elementary Teachers
Percent employed in San Diego

Employer Type	% of Occupation
Elementary School Teachers, Except Special Education	54.4%
Preschool Teachers, Except Special Education	33.4%
Kindergarten Teachers, Except Special Education	12.1%

Middle School Teachers
Percent employed in San Diego

Employer Type	% of Occupation
Elementary and Secondary Schools	98.4

Secondary School Teachers
Percent employed in San Diego

Employer Type	% of Occupation
Elementary and Secondary Schools	99.4

Special Education Teachers
Percent employed in San Diego

Employer Type	% of Occupation
Special Education Teachers, Preschool, Kindergarten, and Elementary School	54.3%
Special Education Teachers, Secondary School	30.2%
Special Education Teachers, Middle School	15.4%

> Most common industries represented, percentages may not add to 100%

Educator Certifications

Occupation	Certifications
Postsecondary Teachers	No certificates generally required. Minimum qualification for community college teachers is generally a master's degree. Full-time employment at a university generally requires a PhD.
Preschool Teachers and Elementary School Teachers, Except Special Ed	**All public school teachers in the K-12 system must possess a CA teaching credential:** The Preliminary Credential is valid for five years. Applicants must: Complete a bachelor's degree or higher from an accredited college or university. Pass the California Basic Educational Skills Test (CBEST). Verify subject matter competence by taking and passing the California Subject Examinations for Teachers (CSET). Pass the Reading Instruction Competence Assessment (RICA). Complete a multiple subject teacher preparation program, including successful student teaching, and be recommended for the credential. The Professional Clear Credential is renewable on-line after five years. Applicants must complete one of the following: A Commission-approved Professional Teacher Induction Program, A National Board Certification after their California Preliminary Multiple Subject Teaching Credential was issued.
Middle School Teachers, Except Special and Career/Technical Education	
Secondary School Teachers, Except Special and Career/Technical Education	
Special Education Teachers	
Adult Basic and Secondary Education and Literacy Teachers and Instructors	
Self-Enrichment Education Teachers	No certificates generally required.
Teachers and Instructors, All Other	No certificates generally required.
Education, Training, and Library Workers, All Other	No certificates generally required.

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Adult Basic and Secondary Education and Literacy Teachers and Instructors

Percent employed in San Diego

Employer Type	% of Occupation
Elementary and Secondary Schools	59.6%
Junior Colleges	9.9%
Other Schools and Instruction	5.0%
Vocational Rehabilitation Services	1.6%

Self Enrichment Education Teachers

Percent employed in San Diego

Employer Type	% of Occupation
Other Schools and Instruction	20.5%
Religious Organizations	17.6%
Individual and Family Services	10.3%
Elementary and Secondary Schools	8.4%
Civic and Social Organizations	4.7%
Vocational Rehabilitation Services	2.7%
Emergency and Other Relief Services	1.9%

Teachers and Instructors, All Other

Percent employed in San Diego

Employer Type	% of Occupation
Elementary and Secondary Schools	28.7%
Other Schools and Instruction	16.2%
Individual and Family Services	1.0%

Education, Training, and Library Workers, All Other

Percent employed in San Diego

Employer Type	% of Occupation
Elementary and Secondary Schools	58.40%
Junior Colleges	10.10%
Colleges and Universities	7.70%
Other Schools and Instruction	1.00%

> *Most common industries represented, percentages may not add to 100%*

Aerospace Engineering
Percent employed in San Diego

Employer Type	% of Occupation
Scientific Research and Development Services	37.3%
Aerospace Product & Parts Manufacturing	22.0%
Electronic Instrument Manufacturing	12.0%
Communications Equipment Manufacturing	7.1%
Architectural and Engineering Services	6.4%
Employment Services	1.5%

Biomedical Engineering
Percent employed in San Diego

Employer Type	% of Occupation
Medical Equipment and Supplies Manufacturing	32.9%
Pharmaceutical & Medicine Manufacturing	25.6%
Scientific Research and Development Services	22.4%
Colleges and Universities	7.4%
Electronic Instrument Manufacturing	2.0%
General Medical and Surgical Hospitals	1.7%

Chemical Engineering
Percent employed in San Diego

Employer Type	% of Occupation
Scientific Research and Development Services	31.5%
Architectural and Engineering Services	8.9%
Electronic Instrument Manufacturing	5.4%
Petroleum & Coal Products Manufacturing	3.9%
Management & Technical Consulting Services	2.3%

Civil Engineering
Percent employed in San Diego

Employer Type	% of Occupation
Architectural and Engineering Services	41.5%
Nonresidential Building Construction	5.6%
Management & Technical Consulting Svc	3.0%
Residential Building Construction	1.1%
Highway, Street, and Bridge Construction	1.1%

Environmental Engineering
Percent Employed in San Diego

Employer Type	% of Occupation
Architectural and Engineering Services	32.6%
Management & Technical Consulting Services	21.5%
Scientific Research and Development Services	3.0%
Employment Services	1.9%
Natural Gas Distribution	1.1%

> *Most common industries represented, percentages may not add to 100%*

Engineering Certifications

Occupation	Certifications
	Professional Engineer (PE) licensing requirements in California: To become licensed, engineers must first pass the Engineer-in-Training or Fundamentals of Engineering examination which requires at least three years of coursework from a college or university offering an engineering program accredited by the Accreditation Board for Engineering and Technology (ABET), or three years of engineering-related experience. The next step in the process is to pass the professional examination which requires a bachelor's degree in engineering from an ABET-accredited institution, along with two years of eligible engineering experience. Engineers without a bachelor's degree in engineering must possess six years of eligible experience. PE licenses are issued in the areas of: Agricultural, Chemical, Control Systems, Electrical, Fire Protection, Industrial, Mechanical, Metallurgical, Nuclear, and Petroleum Engineering.
Aerospace Engineers	A PE license is not required for aerospace engineers, but some employers prefer a PE license in electrical or mechanical engineering. Some certifications may be required for Aerospace Engineers, such as Project Management Professional, Quality Engineer, and Reliability Engineer Certifications. These certifications are offered by various professional organizations. PE license is not required for aerospace engineers, but some employers prefer a PE license in electrical or mechanical engineering.
Biomedical Engineers	No certification generally required.
Chemical Engineers	No certification generally required.
Civil Engineers	Civil Engineers who approve engineering documents, whose work may affect the public welfare, or oversee less experienced engineers, must obtain a professional engineering (PE) license. The license must be renewed every two years. There are a variety of certificates available for Civil Engineers, such as Certified Measurement and Verification Professional, Certified Stormwater Manager, and Project Management. These certifications are offered by various professional organizations. Certification can demonstrate to an employer skills and knowledge beyond that needed for licensure in California.
Electrical and Electronics Engineers	Electrical Engineers who approve engineering documents or oversee less experienced engineers must obtain a professional engineering (PE) license. The license must be renewed every two years. Some certifications or credentials may be required for Electrical Engineers, such as Energy Manager, Lighting Efficiency Professional, Green Building Engineer, LEED, and Sustainable Development Professional. These credentials are offered by various professional organizations. A Professional Engineer's (PE) license is not required for Electronics Engineers. However, a number of Engineers may possess a PE license in control systems or electrical engineering, which some employers recommend. The license must be renewed every two years. Certification is not a requirement to be employed as an Electronics Engineer. However, there are numerous certifications that are available, such as Reliability Engineer and Project Management. These certifications are offered by various professional organizations.
Environmental Engineers	While a PE license is not required for Environmental Engineers, some Engineers may possess a license in civil, chemical, geotechnical, or mechanical engineering. Those Engineers who approve engineering documents, or provide professional oversight to less experienced engineers, must obtain a PE license. The PE license generally requires a degree from a college or university offering an engineering program accredited by the Accreditation Board for Engineering and Technology (ABET), four years of relevant work experience under the oversight of a licensed Engineer, and completion of an examination. The license must be renewed every two years. Engineering specialty certification is voluntary for some Environmental Engineer positions; however there are many specialty certifications, such as Energy Manager, Green Building Engineer, and Hazardous Materials Manager. These certifications are offered by various professional organizations.
Marine Engineers and Naval Architects	No known certification required.
Materials Engineers	Certification is generally not required for materials engineers, but those employed in the area of metallurgical engineering can earn the Metallurgical Engineer License. Examination Requirements: National Council of Examiners for Engineers and Surveyors (NCEES) Metallurgical 8 hour examination and Take-Home California State Laws and Board Rules exam. Renewal is required every two years.
Mechanical Engineers	The professional engineering (PE) license is generally not required in mechanical engineering fields, but possession of the license may enhance one's chances of employment or promotion. However, Mechanical Engineers who approve engineering documents or whose work may affect the public are required to obtain a PE license, which must be renewed every two years. Several professional associations offer certificates related to mechanical engineering, such as the Geometric Dimensioning and Tolerancing Professional Certification. Certification can help demonstrate a level of competence that may enhance job prospects.
Nuclear Engineers	Employers prefer that employees hold a Nuclear Engineer License. Nuclear Engineer License Examination Requirements: National Council of Examiners for Engineers and Surveyors (NCEES) Nuclear 8 hour examination and Take-Home California State Laws and Board Rules exam. Renewal is required every two years.
Engineers, All Other	General engineering contractors must hold a valid license issued by the Contractors State License Board in order to perform work in California. The title "Consulting Engineer" is restricted and may only be used by individuals licensed by the Board in any engineering discipline. It is not issued as a separate license.

Electrical Engineering
Percent employed in San Diego

Employer Type	% of Occupation
Architectural and Engineering Services	21.3%
Semiconductor and Electronic Components	19.0%
Electronic Instrument Manufacturing	15.1%
Scientific Research and Development Svc	7.3%
Communications Equipment Manufacturing	2.7%
Electrical Equipment and Appliances	2.7%
Employment Services	2.2%
Industrial Machinery Manufacturing	2.0%
Natural Gas Distribution	1.9%
Aerospace Product & Parts Manufacturing	1.8%
Computers and Peripheral Equipment	1.8%
Computer Systems Design and Rel Services	1.3%
Building Equipment Contractors	1.3%
Electric Goods Merchant Wholesalers	1.1%
Management of Companies and Enterprises	1.0%
Management & Technical Consulting Svc	1.0%

Mechanical Engineering
Percent Employed in San Diego

Employer Type	% of Occupation
Architectural and Engineering Services	19.2%
Electronic Instrument Manufacturing	10.8%
Aerospace Product & Parts Manufacturing	10.0%
Scientific Research and Development Svc	4.8%
Semiconductor and Electronic Components	4.7%
Industrial Machinery Manufacturing	3.3%
Medical Equipment and Supplies Mfg	2.8%
Other Fabricated Metal Product Mfg	2.7%
Employment Services	2.6%
Communications Equipment Manufacturing	2.5%
Other General Purpose Machinery Mfg	2.3%
Electrical Equipment and Appliances	1.9%
Management of Companies and Enterprises	1.9%
Commercial & Service Industry Machinery	1.8%
Computers and Peripheral Equipment	1.6%
Management & Technical Consulting Svc	1.2%
Machine Shops and Threaded Products	1.0%

Electronics Engineering
Percent employed in San Diego

Employer Type	% of Occupation
Semiconductor and Electronic Components	15.8%
Electronic Instrument Manufacturing	11.6%
Other Telecommunications	6.3%
Scientific Research and Development Svc	6.2%
Architectural and Engineering Services	6.0%
Electric Goods Merchant Wholesalers	4.2%
Wired Telecommunications Carriers	3.9%
Communications Equipment Manufacturing	3.4%
Commercial Goods Merchant Wholesalers	3.4%
Computers and Peripheral Equipment	2.8%
Computer Systems Design and Rel Services	2.4%
Management & Technical Consulting Svc	2.4%
Electrical Equipment and Appliances	1.6%
Electronic Markets and Agents/Brokers	1.0%

Nuclear Engineering
Percent Employed in San Diego

Employer Type	% of Occupation
Architectural and Engineering Services	75.1%

All other Engineering
Percent employed in San Diego

Employer Type	% of Occupation
Electronic Instrument Manufacturing	17.0%
Aerospace Product & Parts Manufacturing	15.8%
Architectural and Engineering Services	10.1%
Employment Services	3.8%
Semiconductor and Electronic Components	3.5%
Scientific Research and Development Svc	3.1%
Computers and Peripheral Equipment	2.6%
Colleges and Universities	2.5%
Natural Gas Distribution	2.4%
Management & Technical Consulting Svc	2.4%
Computer Systems Design and Rel Services	1.8%
Medical Equipment and Supplies Mfg	1.8%
Management of Companies and Enterprises	1.3%
Petroleum & Coal Products Manufacturing	1.1%
Commercial Goods Merchant Wholesalers	1.0%
Communications Equipment Manufacturing	1.0%

> Industry data for Marine Engineers and Naval Architects not available.

> Most common industries represented, percentages may not add to 100%

Materials Engineering
Percent Employed in San Diego

Employer Type	% of Occupation
Electronic Instrument Manufacturing	21.8%
Semiconductor and Electronic Components	20.9%
Aerospace Product & Parts Manufacturing	17.9%
Communications Equipment Manufacturing	4.7%
Architectural and Engineering Services	4.4%

Compensation and Benefits Managers
Percent employed in San Diego

Employer Type	% of Occupation
Management of Companies and Enterprises	15.4%
Computer Systems Design and Related Services	5.0%
Management & Technical Consulting Services	3.5%
Scientific Research and Development Services	2.9%
Insurance Agencies, Brokerages & Support	2.7%
General Medical and Surgical Hospitals	2.3%
Architectural and Engineering Services	2.1%
Insurance Carriers	2.0%
Pharmaceutical & Medicine Manufacturing	1.8%
Software Publishers	1.7%
Electronic Instrument Manufacturing	1.6%
Individual and Family Services	1.4%
Automobile Dealers	1.3%
Legal Services	1.3%
Religious Organizations	1.3%
Accounting and Bookkeeping Services	1.2%

Human Resource Certifications

Occupations	Certifications
	The Human Resources Certification Institute (HRCI) awards the following professional credentials: Professional in Human Resources (PHR®) Senior Professional in Human Resources (SPHR®) Global Professional in Human Resources (GPHR®) California Certifications (PHR-CA®) and (SPHR-CA®) Human Resource Management Professional (HRMP) Human Resource Business
Compensation and Benefits Managers	No certificates generally required, but HR certification is preferred.
Human Resources Managers	No certificates generally required, but HR certification is preferred.
Human Resources Specialists	No certificates generally required, but HR certification is preferred.
Compensation, Benefits, and Job Analysis Specialists	No certificates generally required, but HR certification is preferred.
Training and Development Specialists	No certificates generally required, but HR certification is preferred.

Human Resource Managers
Percent employed in San Diego

Employer Type	% of Occupation
Management of Companies and Enterprises	12.8%
Computer Systems Design and Rel Services	4.2%
Computers and Peripheral Equipment	3.8%
Elementary and Secondary Schools	3.5%
Colleges and Universities	3.3%
Employment Services	3.1%
Scientific Research and Development Svc	2.9%
General Medical and Surgical Hospitals	2.8%
Office Administrative Services	2.6%
Depository Credit Intermediation	2.4%
Electronic Instrument Manufacturing	2.4%
Architectural and Engineering Services	2.4%
Accommodation	2.0%
Management & Technical Consulting Svc	1.7%
Semiconductor and Electronic Components	1.7%
Motion Picture and Video Industries	1.6%
Insurance Carriers	1.5%
Software Publishers	1.3%
Pharmaceutical & Medicine Manufacturing	1.1%
Other Information Services	1.1%
Industrial Machinery Manufacturing	1.0%

> *Most common industries represented, percentages may not add to 100%*

Human Resources Specialists
Percent employed in San Diego

Employer Type	% of Occupation
Professional and Similar Organizations	18.9%
Management of Companies and Enterprises	6.3%
Motion Picture and Video Industries	3.4%
Management & Technical Consulting Svc	3.2%
Elementary and Secondary Schools	2.5%
General Medical and Surgical Hospitals	2.3%
Architectural and Engineering Services	2.1%
Computer Systems Design and Rel Services	2.1%
Department Stores	1.8%
Depository Credit Intermediation	1.7%
Employment Services	1.5%
Scientific Research and Development Svc	1.4%
Electronic Instrument Manufacturing	1.3%
Insurance Carriers	1.1%
Office Administrative Services	1.1%
Aerospace Product & Parts Manufacturing	1.1%
Building Material and Supplies Dealers	1.1%
Colleges and Universities	1.0%
Semiconductor and Electronic Components	1.0%

Training and Development Specialists
Percent employed in San Diego

Employer Type	% of Occupation
Management & Technical Consulting Services	7.6%
Management of Companies and Enterprises	6.6%
Insurance Carriers	5.8%
General Medical and Surgical Hospitals	3.4%
Computer Systems Design and Related Services	3.1%
Depository Credit Intermediation	2.7%
Employment Services	2.6%
Nursing Care Facilities	2.5%
Accounting and Bookkeeping Services	1.9%
Office Administrative Services	1.5%
Power Generation and Supply	1.4%
Scientific Research and Development Services	1.4%
Security & Commodity Investment Activity	1.4%
Offices of Physicians	1.3%
Offices of Real Estate Agents & Brokers	1.3%
Natural Gas Distribution	1.3%
Individual and Family Services	1.3%
Insurance Agencies, Brokerages & Support	1.1%

> *Most common industries represented, percentages may not add to 100%*

Compensation, Benefits, and Job Analysis Specialists
Percent employed in San Diego

Employer Type	% of Occupation
Management of Companies and Enterprises	11.1%
Management & Technical Consulting Svc	4.9%
Insurance Agencies, Brokerages & Support	4.3%
Elementary and Secondary Schools	4.2%
Colleges and Universities	3.4%
General Medical and Surgical Hospitals	3.4%
Computer Systems Design and Rel Services	3.3%
Scientific Research and Development Svc	2.7%
Insurance Carriers	2.0%
Offices of Physicians	1.7%
Employment Services	1.6%
Junior Colleges	1.5%
Office Administrative Services	1.4%
Accounting and Bookkeeping Services	1.2%
Architectural and Engineering Services	1.2%
Semiconductor and Electronic Components	1.2%
Accommodation	1.1%
Depository Credit Intermediation	1.0%

Computer and Information Systems Managers
Percent employed in San Diego

Employer Type	% of Occupation
Computer Systems Design and Rel Services	18.1%
Management of Companies and Enterprises	6.5%
Motion Picture and Video Industries	6.1%
Computers and Peripheral Equipment	4.1%
Software Publishers	3.7%
Scientific Research and Development Svc	3.6%
Other Information Services	3.1%
Commercial Goods Merchant Wholesalers	2.9%
Management & Technical Consulting Svc	2.7%
Insurance Carriers	2.2%
Depository Credit Intermediation	2.0%
Architectural and Engineering Services	1.9%
Electronic Instrument Manufacturing	1.8%
Nondepository Credit Intermediation	1.8%
ISPs, Search Portals, & Data Processing	1.7%
General Medical and Surgical Hospitals	1.4%
Office Administrative Services	1.3%
Semiconductor and Electronic Components	1.2%
Insurance Agencies, Brokerages & Support	1.2%
Accounting and Bookkeeping Services	1.1%
Colleges and Universities	1.1%
Wired Telecommunications Carriers	1.1%
Employment Services	1.1%
Electronic Markets and Agents/Brokers	1.1%

Computer and Information Research Scientists
Percent employed in San Diego

Employer Type	% of Occupation
Software Publishers	19.4%
Computer Systems Design and Rel Services	17.0%
Other Information Services	9.3%
Scientific Research and Development Services	8.0%
Colleges and Universities	4.2%
Software Publishers	19.4%
Computer Systems Design and Rel Services	17.0%
Other Information Services	9.3%
Scientific Research and Development Services	8.0%
Colleges and Universities	4.2%
Software Publishers	19.4%

> Most common industries represented, percentages may not add to 100%

Information Technology Certifications

Occupation	Certifications
Computer and Information Systems Managers	No certification generally required.
Computer and Information Research Scientists	Certification is not required. The Institute of Electrical and Electronics Engineers offers the following certifications: Certified Biometrics Professional and Certified Software Development Professional.
Computer Systems Analysts	Certification is not required to work as a Computer Systems Analyst; however, voluntary certification may demonstrate a level of competence in a particular field. Some vendors may offer certification and require professionals who work with their products to be certified.
Computer Programmers	Professional certification is becoming more common in this occupation. Candidates can demonstrate programming knowledge by becoming certified in a programming language such as C++ or Java. Product vendors or software firms also offer certification and may require those who work with their products to be certified.
Software Developers, Applications	Certification is generally not required to work as an Applications Software Developer; however, some product vendors or software firms require Software Developers who work with their products to be certified. In addition, voluntary certification can be obtained through professional computing associations and is a good way to demonstrate competence and gain a competitive edge.
Software Developers, Systems Software	Certification is generally not required to work as a Systems Software Developer; however, some product vendors or software firms require Software Developers who work with their products to be certified. In addition, voluntary certification can be obtained through professional computing associations and is a good way to demonstrate competence and gain a competitive edge.
Database Administrators	Professional certification is becoming the industry standard and can demonstrate competence in a particular field. There are hundreds of different certification programs available. Many are offered by product vendors or software firms. Product vendors may require Database Administrators to be certified in the products they use.
Network and Computer Systems Administrators	Professional certification is becoming the industry standard and can demonstrate competence in a particular field. There are hundreds of different certification programs available. Many are offered by product vendors or software firms. Product vendors may require Systems Administrators to be certified in the products that they use.
Computer User Support	Although certification is optional, it can enhance career development and advancement. Computer information science certificate programs offered by many community colleges, private schools, and software and hardware product vendors will help applicants qualify for entry level positions.
Computer Network Support	Although certification is optional, it can enhance career development and advancement. Computer information science certificate programs offered by many community colleges, private schools, and software and hardware product vendors will help applicants qualify for entry level positions.
Computer Hardware Engineers	Licensing is not required for Computer Hardware Engineers. However, a number of Engineers may possess a Professional Engineer (PE) license in electrical engineering, which some employers may recommend. The license must be renewed every two years. To become licensed, Engineers must first pass the Engineer-in-Training or Fundamentals of Engineering examination, which requires at least three years of coursework from a college or university offering an engineering program accredited by the Accreditation Board for Engineering and Technology (ABET), or three years of engineering-related experience. The next step in the process is to pass the professional examination which requires a bachelor's degree in engineering from an ABET-accredited institution, along with two years of eligible engineering experience. Engineers without a bachelor's degree in engineering must possess six years of eligible experience. Several professional certifications for Computer Hardware Engineers exist, such as Quality Engineer and Reliability Engineer Certifications. These may be beneficial for advancement to senior technical or managerial positions. Many certification programs are offered by professional organizations.

Computer Systems Analysts
Percent employed in San Diego

Employer Type	% of Occupation
Computer Systems Design and Rel Services	20.5%
Management of Companies and Enterprises	4.8%
Commercial Goods Merchant Wholesalers	4.7%
Management & Technical Consulting Svc	4.0%
Insurance Carriers	3.5%
Colleges and Universities	2.5%
Architectural and Engineering Services	2.4%
Computers and Peripheral Equipment	2.4%
Scientific Research and Development Svc	2.1%
Software Publishers	2.0%
Electronics and Appliance Stores	2.0%
Nondepository Credit Intermediation	1.8%
General Medical and Surgical Hospitals	1.6%
Depository Credit Intermediation	1.6%
Employment Services	1.4%
Natural Gas Distribution	1.2%
Insurance Agencies, Brokerages & Support	1.2%
Office Administrative Services	1.2%
ISPs, Search Portals, & Data Processing	1.1%

Computer Programmers
Percent employed in San Diego

Employer Type	% of Occupation
Computer Systems Design and Rel Services	26.1%
Software Publishers	6.3%
Employment Services	5.8%
Commercial Goods Merchant Wholesalers	5.0%
Colleges and Universities	2.8%
Management & Technical Consulting Services	2.7%
Management of Companies and Enterprises	2.6%
Other Information Services	2.5%
Scientific Research and Development Services	2.4%
Insurance Carriers	1.7%
Office Administrative Services	1.5%

Software Developers Applications
Percent employed in San Diego

Employer Type	% of Occupation
Computer Systems Design and Related Services	36.7%
Computers and Peripheral Equipment	7.9%
Software Publishers	6.5%
Other Information Services	5.6%
Management & Technical Consulting Services	3.0%
Management of Companies and Enterprises	2.9%
Architectural and Engineering Services	2.8%
Scientific Research and Development Services	2.5%
Electronic Instrument Manufacturing	2.4%
Aerospace Product & Parts Manufacturing	2.2%
Colleges and Universities	1.8%

Software Developers, Systems Software
Percent employed in San Diego

Employer Type	% of Occupation
Computer Systems Design and Rel Services	24.3%
Computers and Peripheral Equipment	12.3%
Electronic Instrument Manufacturing	8.4%
Scientific Research and Development Services	7.5%
Management & Technical Consulting Services	4.9%
Software Publishers	3.8%
Other Information Services	3.8%
Commercial Goods Merchant Wholesalers	3.3%
Semiconductor and Electronic Components	3.3%
Architectural and Engineering Services	2.4%
Employment Services	1.6%
Motion Picture and Video Industries	1.4%
Wired Telecommunications Carriers	1.3%
ISPs, Search Portals, & Data Processing	1.3%
Other Telecommunications	1.2%
Management of Companies and Enterprises	1.1%
Colleges and Universities	1.0%

Database Administrators
Percent employed in San Diego

Employer Type	% of Occupation
Computer Systems Design and Related Services	23.1%
Management & Technical Consulting Services	4.7%
Commercial Goods Merchant Wholesalers	4.1%
Employment Services	3.3%
Architectural and Engineering Services	3.1%
Other Information Services	2.9%
Insurance Carriers	2.8%
Elementary and Secondary Schools	2.7%
Software Publishers	2.3%
Scientific Research and Development Services	2.1%
General Medical and Surgical Hospitals	1.9%
Electronic Instrument Manufacturing	1.8%
Depository Credit Intermediation	1.6%
Colleges and Universities	1.5%
Other Financial Investment Activities	1.3%
Accounting and Bookkeeping Services	1.2%
Insurance Agencies, Brokerages & Support	1.2%
Aerospace Product & Parts Manufacturing	1.0%
Professional and Similar Organizations	1.0%

> *Most common industries represented, percentages may not add to 100%*

Network and Computer Systems Administrators
Percent employed in San Diego

Employer Type	% of Occupation
Computer Systems Design and Rel Services	14.3%
Management of Companies and Enterprises	6.3%
Management & Technical Consulting Services	3.7%
Electronics and Appliance Stores	3.3%
General Medical and Surgical Hospitals	2.9%
Elementary and Secondary Schools	2.7%
Architectural and Engineering Services	2.4%
Scientific Research and Development Services	2.2%
Insurance Carriers	2.0%
Employment Services	2.0%
Other Telecommunications	1.9%
Software Publishers	1.9%
Colleges and Universities	1.9%
Other Information Services	1.8%
Depository Credit Intermediation	1.8%
Legal Services	1.5%
Semiconductor and Electronic Components	1.4%
Accounting and Bookkeeping Services	1.4%
Wired Telecommunications Carriers	1.4%
Commercial Goods Merchant Wholesalers	1.3%
Insurance Agencies, Brokerages & Support	1.2%
Electronic Markets and Agents/Brokers	1.1%
Electronic Instrument Manufacturing	1.1%
ISPs, Search Portals, & Data Processing	1.0%
Office Administrative Services	1.0%

Computer Hardware Engineers
Percent employed in San Diego

Employer Type	% of Occupation
Computer Systems Design and Rel Services	29.7%
Computers and Peripheral Equipment	27.8%
Semiconductor and Electronic Components	11.1%
Scientific Research and Development Services	8.3%
Communications Equipment Manufacturing	2.6%
Electronic Instrument Manufacturing	2.1%
Electric Goods Merchant Wholesalers	1.8%
Commercial Goods Merchant Wholesalers	1.2%

> Industry data on Computer User Support and Computer Network Support is not available.

> Most common industries represented, percentages may not add to 100%

Paralegals and Legal Assistants
Percent employed in San Diego

Employer Type	% of Occupation
Legal Services	69.8%
Management of Companies and Enterprises	1.9%
Employment Services	1.3%
Insurance Carriers	1.1%

> Most common industries represented,
> percentages may not add to 100%

Paralegal Certifications

Occupation	Certifications
Paralegal	**NALA:** Certified Legal Assistant/Certified Paralegal (CP/CLA) credential, a five-year renewable certification requiring 50 hours of approved continuing legal education credits. **NALS:** Professional Paralegal certification, a five-year renewable certification. To qualify for recertification, applicants much receive 75 hours of continuing legal education credits.

Industrial Health and Safety Engineers
Percent employed in San Diego

Employer Type	% of Occupation
Utility System Construction	9.7%
Nonresidential Building Construction	5.4%
Architectural and Engineering Services	5.3%
Management & Technical Consulting Services	4.7%
Scientific Research and Development Services	4.3%
Management of Companies and Enterprises	3.8%
Computer Systems Design and Rel Services	2.8%
Waste Management and Remediation Service	2.7%
Electronic Instrument Manufacturing	2.0%

Occupational Health and Safety Specialists
Percent employed in San Diego

Employer Type	% of Occupation
General Medical and Surgical Hospitals	12.6%
Colleges and Universities	7.6%
Management of Companies and Enterprises	5.2%
Scientific Research and Development Svc	3.0%
Architectural and Engineering Services	2.3%
Pharmaceutical & Medicine Manufacturing	1.3%

> Most common industries represented,
> percentages may not add to 100%

Safety Training Certifications

Occupation	Certifications
	Professional Certificate in Occupational Health and Safety: 24 units total required for Construction or General Industry, 4 elective units for Construction or 3 units for General Industry. 35 units total required for a dual certificate in both Construction and General Industry. Only 1 of the 2 trainer courses is required, the OSHA 500 or 501. If students choose not to take the other trainer course, they must instead take 3 other units as electives to reach the required 35 units in the dual certificate.
Industrial Health and Safety Engineers	Professional Certificate in Occupational Health and Safety.
Occupational Health and Safety Specialists	Professional Certificate in Occupational Health and Safety.

Schools Survey

Q1 Which of the following best describes your institution?
Two-year college (1)
Four-year college or university (2)
College or university with graduate programs (3)
Professional school (4)
Technical school (5)

Q2 What funding assistance do students attending your institution typically find?
No support (1)
Employer partial support (but less than 100%) (2)
Employer 100% support (3)

Q3 For which of the following eight occupation groups do you provide education or training , how many people graduated with a degree or certificate in that occupation group in 2012, and how many people do you expect on average to graduate with a degree in that occupation group over the next ten years? (Mark all that apply)

	Program Offered (1)	# Graduated in 2012 (1)	Avg. Expected per Year (1)
Accounting (1)			
Clinical Research & Trials (2)			
Education (3)			
Engineering (4)			
Human Resources (5)			
IT (6)			
Paralegal (7)			
Safety Training (OSHA, etc) (8)			

Answer If Accounting Is Selected

Q4 Is Accounting training or education in high demand at your institution?

	High Demand (1)
Accountants and Auditors (1)	

Answer If Clinical Research & Trials Is Selected

Q5 What specific Clinical Research and Trials occupations are experiencing the greatest demand for training or education at your institution? (Mark all that apply.)

	High Demand (1)
Clinical Research Coordinators (1)	
Biostatisticians (2)	
Clinical Data Managers (3)	
Medical Scientists (except Epidemiologists) (4)	
Medical and Clinical Lab Technologists (5)	
Medical and Clinical Lab Technicians (6)	
Bioinformatics Technicians (7)	

Answer If Education Is Selected

Q6 What specific Education occupations are experiencing the greatest demand for training or education at your institution? (Mark all that apply.)

	High Demand (1)
Postsecondary Teachers (1)	
Secondary School Teachers (except Special Ed) (2)	
Middle School Teachers (except Special Ed) (3)	
Preschool and Elementary School Teachers (except Special Ed) (4)	
Special Education Teachers (5)	
Adult Education Teachers (6)	
Self-Enrichment Teachers (7)	

Answer If Engineering Is Selected

Q7 What specific Engineer occupations are experiencing the greatest demand for training or education at your institution? (Mark all that apply.)

	High Demand (1)
Aerospace Engineers (1)	
Biomedical Engineers (2)	
Chemical Engineers (3)	
Civil Engineers (4)	
Electrical and Electronics Engineers (5)	
Environmental Engineers (6)	
Marine Engineers and Naval Architects (7)	
Materials Engineers (8)	
Mechanical Engineers (9)	
Nuclear Engineers (10)	

Answer If Human Resources Is Selected

Q8 What specific Human Resource occupations are experiencing the greatest demand for training or education at your institution? (Mark all that apply.)

	High Demand (1)
Compensation and Benefits Managers (1)	
Human Resources Managers (2)	
Human Resources Specialists (3)	
Compensation, Benefits, and Job Analysis Specialists (4)	
Training and Development Specialists (5)	

Answer If IT Is Selected

Q9 What specific IT occupations are experiencing the greatest demand for training or education at your institution? (Mark all that apply.)

	High Demand (1)
Computer and Information Systems Managers (1)	
Computer and Information Research Scientists (2)	
Computer Systems and Information Security Analysts (3)	
Computer Programmers (4)	
Software Developers (5)	
Database Administrators (6)	
Network and Computer Systems Administrators (7)	
Computer Support Specialist (8)	
Computer Hardware Engineers (9)	

Answer If Paralegal Is Selected

Q10 Is Paralegal training or education in high demand at your institution?

	High Demand (1)
Paralegals and Legal Assistants (1)	

Answer If Safety Training (OSHA, etc) Is Selected

Q11 What specific Safety Training occupations are experiencing the greatest demand for training or education at your institution? (Mark all that apply.)

	High Demand (1)
Industrial Health and Safety Engineers (1)	
Occupational Health and Safety Specialists (2)	

Q12 Would you be willing for the Fermanian Business & Economic Institute to conduct a follow up interview to gain further insights about your schools education and training services?

Yes (1)
No (2)

Employees Survey

Q1 Of the job concentrations listed below, which best describes your occupation?
    Accounting Professional (1)
    Safety Training Professional (2)
    Paralegal (3)
    IT Professional (4)
    Human Resource Professional (5)
    Engineer (6)
    Educator (7)
    Clinical Research and Trials Professional (8)
    None of the above (9)
        If None of the above Is Selected, Then Skip To End of Survey

Q2 Which of the following best describes your occupation?
    Public Accountant (1)
    Corporate Accountant (2)
    Accounting Administrator (3)
    Auditor (4)
    Other: (5) _____

Q3 Which of the following best describes your occupation?
    Industrial Health and Safety Engineer (1)
    Occupational Health and Safety Specialist (2)
    Other: (3) _____

Q4 Which of the following best describes your occupation?
    Paralegal (1)
    Legal Assistant (2)
    Other: (3) _____

Q5 Which of the following best describes your occupation?
    Computer and Information Systems Manager (1)
    Computer and Information Research Scientist (2)
    Computer Systems and Information Security Analyst (3)
    Computer Programmer (4)
    Software Developer (5)
    Database Administrator (6)
    Network and Computer Systems Administrator (7)
    Computer Support Specialist (8)
    Computer Hardware Engineer (9)
    Other: (10) _____

Q6 Which of the following best describes your occupation?
    Compensation and Benefits Manager (1)
    Human Resources Manager (2)
    Human Resources Specialist (3)
    Compensation, Benefits, and Job Analysis Specialist (4)
    Training and Development Specialist (5)
    Compensation and Benefits Manager (6)
    Other: (7) _____

Q7 Which of the following best describes your occupation?
    Aerospace Engineer (1)
    Biomedical Engineer (2)
    Chemical Engineer (3)
    Civil Engineer (4)
    Electrical or Electronics Engineer (5)
    Environmental Engineer (6)
    Marine Engineer (7)
    Materials Engineer (8)
    Mechanical Engineer (9)
    Nuclear Engineer (10)
    Other: (11) _____

Q8 Which of the following best describes your occupation?
    Postsecondary Teacher (1)
    Secondary School Teacher (except Special Ed) (2)
    Middle School Teacher (except Special Ed) (3)
    Preschool or Elementary School Teacher (except Special Ed) (4)
    Special Education Teacher (5)
    Adult Education Teacher (6)
    Self-Enrichment Teacher (7)
    Other: (8) _____

Q9 Which of the following best describes your occupation?
    Clinical Research Coordinator (1)
    Biostatistician (2)
    Clinical Data Manager (3)
    Medical Scientist (4)
    Medical and Clinical Lab Technologist (5)
    Medical and Clinical Lab Technician (6)
    Bioinformatics Technician (7)
    Other: (8) _____

Answer If Accounting Professional Is Selected. What job concentration best describes your occupation?

Q10 Are you a certified public accountant?
    Yes (1)
    No (2)

Answer If Engineer Is Selected. What job concentration best describes your occupation?

Q11 Are you a licensed engineer (PE)?
    Yes (1)
    No (2)

Q12 How many years have you been employed in this occupation?
    Less than 1 year (1)
    1 to 5 years (2)
    6 to 10 years (3)
    More than 10 years (4)

Q13 Which of the following categories best describes your current employment status?
    Employee in a private company (1)
    Employee in a public firm (2)
    Employee in a government or government agency (3)
    Self-employed (4)

Q14 Which of the following degrees have you been awarded? (check all that apply)
    Associate's degree (1)
    Bachelor's degree (2)
    Master's degree (3)
    Doctoral or professional degree (4)
    Some college/ No degree (5)

Q15 What area of study was your Associate's degree?
    Humanities (Literature, Performing Arts, Fine Arts, Modern Languages, Philosophy, or Religion) (1)
    Social Sciences (Anthropology, Economics, History, Political Science, Psychology, Sociology, Area Studies) (2)
    Computer Sciences (3)
    Engineering (4)
    Business (Accounting, Business, Finance, Marketing, Real Estate) (5)
    Natural Sciences (6)
    Mathematics (7)
    Education (8)
    Other: (9) _____

Q16 What area of study was your Bachelor's degree?
    Humanities (Literature, Performing Arts, Fine Arts, Modern Languages, Philosophy, or Religion) (1)
    Social Sciences (Anthropology, Economics, History, Political Science, Psychology, Sociology, Area Studies) (2)
    Computer Sciences (3)
    Engineering (4)
    Business (Accounting, Business, Finance, Marketing, Real Estate) (5)
    Natural Sciences (6)
    Mathematics (7)
    Education (8)
    Other: (9) _____

Q17 What area of study was your Master's degree?
    Humanities (Literature, Performing Arts, Fine Arts, Modern Languages, Philosophy, or Religion) (1)
    Social Sciences (Anthropology, Economics, History, Political Science, Psychology, Sociology, Area Studies) (2)
    Computer Sciences (3)
    Engineering (4)
    Business (Accounting, Business, Finance, Marketing, Real Estate) (5)
    Natural Sciences (6)
    Mathematics (7)
    Education (8)
    Other: (9) _____

Q18 What area of study was your Doctoral or professional degree?
    Humanities (Literature, Performing Arts, Fine Arts, Modern Languages, Philosophy, or Religion) (1)
    Social Sciences (Anthropology, Economics, History, Political Science, Psychology, Sociology, Area Studies) (2)
    Computer Sciences (3)
    Engineering (4)
    Business (Accounting, Business, Finance, Marketing, Real Estate) (5)
    Natural Sciences (6)
    Mathematics (7)
    Education (8)
    Other: (9) _____

Q19 Was your highest level of education completed within San Diego County?
    Yes (1)
    No (2)

Q20 Have you obtained continuing education (i.e. non-degree) specific to your job?
    Yes (1)
    No (2)

Q21 Where have you participated in continuing education?
  College or university (1)
  Professional association (2)
  In-house training courses (employer provided) (3)

Q22 What continuing education college or university resources have you utilized? (check all that apply)
  UC San Diego (1)
  San Diego State University (2)
  University of San Diego (3)
  Point Loma Nazarene University (4)
  National University (5)
  Community College (6)
  CSU San Marcos (7)
  Other: (8) _____

Q23 Please rank the following sources of training/education in terms of importance to your ability to perform your current occupation:

	No Use (1)	Limited Use (2)	Neutral (3)	Useful (4)	Very Useful (5)
If awarded, how useful has this degree been? Associate's degree coursework (1)					
If awarded, how useful has this degree been? Bachelor's degree coursework (2)					
If awarded, how useful has this degree been? Graduate degree (Master's Ph.D. etc.) coursework (3)					
If awarded, how useful has this degree been? In-house training courses (employer provided) (4)					
If awarded, how useful has this degree been? Continuing education provided by college or university (5)					
If awarded, how useful has this degree been? Conferences and workshops provided by professional organization (6)					

Q24 Does your employer help fund your continuing education, training certificates, or additional training needs?
  No, employer does not contribute (1)
  Yes, employer pays a portion (but not 100%) (2)
  Yes, employer pays 100% (3)
  Not Applicable (occupation does not require additional training or education) (4)

Q25 Would you be willing for the Fermanian Business & Economic Institute to conduct a follow up interview to gain further insights about your career pathway and training?
  Yes (1)
  No (2)

Employers Survey

Q1 How many employees do you have in San Diego County?
    1-25 (1)
    26-50 (2)
    51-100 (3)
    101-250 (4)
    251-500 (5)
    Over 500 (6)

Q2 Which of the following four industry groups best describes your business?
    Agriculture, Forestry, Fishery, Hunting; Mining; Construction; Manufacturing (1)
    Transportation, Utilities, Information, Communications (2)
    Finance, Insurance, Real Estate (3)
    Trade; Retail trade; Professional, Scientific, Technical services; Health Care Services; Administrative, Support, Waste Management & Remediation Services; Art, Entertainment, Recreation; Accommodations & Food Service; Other services (4)

Q3 What are the primary areas in which you perceive a lack of skills in individuals employed by your company? (Mark all that apply)
    Writing skills (1)
    Speaking skills (2)
    Teamwork (3)
    Critical thinking skills (4)
    Creative thinking skills (5)
    Technological skills (6)
    Quantitative skills (7)
    Other: (8) _____

Q4 Which of the following eight occupation groups does your business employ? (Mark all that apply)
    Accounting (1)
    Clinical Research & Trials (2)
    Education (3)
    Engineering (4)
    Human Resources (5)
    IT (6)
    Paralegal (7)
    Safety Training (OSHA, etc) (8)

Q5 How many people in each occupation group does your company employ in San Diego County? What is the preferred education/training for employees in this occupation group? And what is the average annual growth rate in the number of employees in this occupation group that you expect over the next ten years? (Mark all that apply)

	# Employed In San Diego	Preferred Degree				
	(1)	Associate's Degree (1)	Bachelor's Degree (2)	Master's Degree (3)	Doctoral or professional degree (MD, JD, PhD, etc.) (4)	Technical training and/or certificate (5)
Accounting (1)						
Clinical Research & Trials (2)						
Education (3)						
Engineering (4)						
Human Resources (5)						
IT (6)						
Paralegal (7)						
Safety Training (OSHA, etc) (8)						

	% Expected Growth						
	Less than zero (1)	0.0% to 1.0% (2)	1.1% to 2.0% (3)	2.1% to 2.9% (4)	3.0% to 3.9% (5)	4.1% to 5.0% (6)	More than 5% (7)
Accounting (1)							
Clinical Research & Trials (2)							
Education (3)							
Engineering (4)							
Human Resources (5)							
IT (6)							
Paralegal (7)							
Safety Training (OSHA, etc) (8)							

Q6 Rank the following sources of training/education in terms of importance to your employees' ability to perform their jobs in this occupation group?

	No Use (1)	Limited Use (2)	Neutral (3)	Useful (4)	Very Useful (5)
Associate's degree coursework (1)					
Bachelor's degree coursework (2)					
Graduate degree coursework (3)					
In-house training courses (employer provided) (4)					
Continuing education provided by college or university (5)					
Conferences and workshops provided by professional organization (6)					

Q7 Are you currently experiencing difficulty in recruiting Accounting workers (current shortage), and where do you expect shortfalls during the next ten years? (Mark all that apply.)

	Current Shortage (1)	Expected Shortfall (1)
Accountants and Auditors (1)		

Q8 Which specific Clinical Research and Trials occupations do you employ, where are you currently experiencing difficulty in recruiting workers (current shortage), and where do you expect shortfalls during the next ten years? (Mark all that apply.)

	Occupation Employed (1)	Current Shortage (1)	Expected Shortfall (1)
Clinical Research Coordinators (1)			
Biostatisticians (2)			
Clinical Data Managers (3)			
Medical Scientists (except Epidemiologists) (4)			
Medical and Clinical Lab Technologists (5)			
Medical and Clinical Lab Technicians (6)			
Bioinformatics Technicians (7)			

Q9 Which specific Education occupations do you employ, where are you currently experiencing difficulty in recruiting workers (current shortage), and where do you expect shortfalls during the next ten years? (Mark all that apply.)

	Occupation Employed (1)	Current Shortage (1)	Expected Shortfall (1)
Postsecondary Teachers (1)			
Secondary School Teachers (except Special Ed) (2)			
Middle School Teachers (except Special Ed) (3)			
Preschool and Elementary School Teachers (except Special Ed) (4)			
Special Education Teachers (5)			
Adult Education Teachers (6)			
Self-Enrichment Teachers (7)			

Q10 Which specific Engineer occupations do you employ, where are you currently experiencing difficulty in recruiting workers (current shortage), and where do you expect shortfalls during the next ten years? (Mark all that apply.)

	Occupation Employed (1)	Current Shortage (1)	Expected Shortfall (1)
Aerospace Engineers (1)			
Biomedical Engineers (2)			
Chemical Engineers (3)			
Civil Engineers (4)			
Electrical and Electronics Engineers (5)			
Environmental Engineers (6)			
Marine Engineers and Naval Architects (7)			
Materials Engineers (8)			
Mechanical Engineers (9)			
Nuclear Engineers (10)			

Q11 Which specific Human Resource occupations do you employ, where are you currently experiencing difficulty in recruiting workers (current shortage), and where do you expect shortfalls during the next ten years? (Mark all that apply.)

	Occupation Employed (1)	Current Shortage (1)	Expected Shortage (1)
Compensation and Benefits Managers (1)			
Human Resources Managers (2)			
Human Resources Specialists (3)			
Compensation, Benefits, and Job Analysis Specialists (4)			
Training and Development Specialists (5)			

Q12 Which specific IT occupations do you employ, where are you currently experiencing difficulty in recruiting workers (current shortage), and where do you expect shortfalls during the next ten years? (Mark all that apply.)

	Occupation Employed (1)	Current Shortage (1)	Expected Shortage (1)
Computer and Information Systems Managers (1)			
Computer and Information Research Scientists (2)			
Computer Systems and Information Security Analysts (3)			
Computer Programmers (4)			
Software Developers (5)			
Database Administrators (6)			
Network and Computer Systems Administrators (7)			
Computer Support Specialist (8)			
Computer Hardware Engineers (9)			

Q13 Where are you currently experiencing difficulty in recruiting Paralegal workers (current shortage), and where do you expect shortfalls during the next ten years? (Mark all that apply.)

	Current Shortage (1)	Expected Shortage (1)
Paralegals and Legal Assistants (1)		

Q14 Where are you currently experiencing difficulty in recruiting Safety Training Professionals (current shortage), and where do you expect shortfalls during the next ten years? (Mark all that apply.)

	Occupation Employed (1)	Current Shortage (1)	Expected Shortage (1)
Industrial Health and Safety Engineers (1)			
Occupational Health and Safety Specialists (2)			

Q15 Would you be willing for the Fermanian Business & Economic Institute to conduct a follow up interview to gain further insights about your company?
    Yes (1)
    No (2)

Personnel Agencies Survey

Q1 Which of the following best describes your institution?
    Personnel agency (all skill levels) (1)
    Executive search firm (2)
    Temporary help agency (3)
    Job placement center (4)
    Other (5) _____

Q2 What are the primary areas in which you perceive a lack of skills in individuals applying for a job? (Mark all that apply)
    Writing skills (1)
    Speaking skills (2)
    Teamwork (3)
    Critical thinking skills (4)
    Creative thinking skills (5)
    Technological skills (6)
    Quantitative skills (7)
    Other: (8) _____

Q3 For which of the following eight occupation groups do you provide services, how many individuals did you find jobs for in these occupation groups in 2012, and are most jobs in these occupation groups full-time? (Mark all that apply)

	Services Provided (1)	Individuals Placed in 2012 (specify number) (1)	Mostly Full-time? (1)
Accounting (1)			
Clinical Research & Trials (2)			
Education (3)			
Engineering (4)			
Human Resources (5)			
IT (6)			
Paralegal (7)			
Safety Training (OSHA, etc) (8)			

Answer If Accounting Is Selected

Q4 Are you having difficulty filling Accounting positions with qualified workers (current shortage) and do you expect shortfalls during the next ten years? (Mark all that apply.)

	Current Shortage (1)	Expected Shortfall (1)
Accountants and Auditors (1)		

Answer If Clinical Research & Trials Is Selected

Q5 Which specific Clinical Research and Trials occupations are you having difficulty filling with qualified workers (current shortage) and which do you expect shortfalls during the next ten years? (Mark all that apply.)

	Current Shortage (1)	Expected Shortfall (1)
Clinical Research Coordinators (1)		
Biostatisticians (2)		
Clinical Data Managers (3)		
Medical Scientists (except Epidemiologists) (4)		
Medical and Clinical Lab Technologists (5)		
Medical and Clinical Lab Technicians (6)		
Bioinformatics Technicians (7)		

Answer If Education Is Selected

Q6 Which specific Education occupations are you having difficulty filling with qualified workers (current shortage) and which do you expect shortfalls during the next ten years? (Mark all that apply.)

	Current Shortage (1)	Expected Shortfall (1)
Postsecondary Teachers (1)		
Secondary School Teachers (except Special Ed) (2)		
Middle School Teachers (except Special Ed) (3)		
Preschool and Elementary School Teachers (except Special Ed) (4)		
Special Education Teachers (5)		
Adult Education Teachers (6)		
Self-Enrichment Teachers (7)		

Answer If Engineering Is Selected

Q7 Which specific Engineering occupations are you having difficulty filling with qualified workers (current shortage) and which do you expect shortfalls during the next ten years? (Mark all that apply.)

	Current Shortage (1)	Expected Shortfall (1)
Aerospace Engineers (1)		
Biomedical Engineers (2)		
Chemical Engineers (3)		
Civil Engineers (4)		
Electrical and Electronics Engineers (5)		
Environmental Engineers (6)		
Marine Engineers and Naval Architects (7)		
Materials Engineers (8)		
Mechanical Engineers (9)		
Nuclear Engineers (10)		

Answer If Human Resources Is Selected

Q8 Which specific Human Resource occupations are you having difficulty filling with qualified workers (current shortage) and which do you expect shortfalls during the next ten years? (Mark all that apply.)

	Current Shortage (1)	Expected Shortfall (1)
Compensation and Benefits Managers (1)		
Human Resources Managers (2)		
Human Resources Specialists (3)		
Compensation, Benefits, and Job Analysis Specialists (4)		
Training and Development Specialists (5)		

Answer If IT Is Selected

Q9 Which specific IT occupations are you having difficulty filling with qualified workers (current shortage) and which do you expect shortfalls during the next ten years? (Mark all that apply.)

	Current Shortage (1)	Expected Shortfall (1)
Computer and Information Systems Managers (1)		
Computer and Information Research Scientists (2)		
Computer Systems and Information Security Analysts (3)		
Computer Programmers (4)		
Software Developers (5)		
Database Administrators (6)		
Network and Computer Systems Administrators (7)		
Computer Support Specialist (8)		
Computer Hardware Engineers (9)		

Answer If Paralegal Is Selected

Q10 Are you having difficulty filling Paralegal positions with qualified workers (current shortage) and do you expect shortfalls during the next ten years? (Mark all that apply.)

	Current Shortage (1)	Expected Shortfall (1)
Paralegals and Legal Assistants (1)		

Answer If Safety Training (OSHA, etc) Is Selected

Q11 Which specific Safety Training occupations are you having difficulty filling with qualified workers (current shortage) and which do you expect shortfalls during the next ten years? (Mark all that apply.)

	Current Shortage (1)	Expected Shortfalls (1)
Industrial Health and Safety Engineers (1)		
Occupational Health and Safety Specialists (2)		

Q12 Would you be willing for the Fermanian Business & Economic Institute to conduct a follow up interview to gain further insights about your company?
    Yes (1)
    No (2)